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SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIAʻĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA

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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF: OCCL: KS COR: OA 25-174

To: Mary Alice Evans, Acting Director
Office of Planning and Sustainable Development
Environmental Review Program

From: Dawn N.S. Chang, Chairperson
Board of Land and Natural Resources

SUBJECT: Draft Environmental Assessment (DEA) for the Humuhumu Services, LLC and Starfish Infrastructure, Inc. Oahu Subsea Cable Telecommunications project
Located at Barbers Point Beach Park, Honouliuli, Ewa, Oahu
Tax Map Key (TMK): (1) 9-1-026:027 (seaward)

The Department of Land and Natural Resources has reviewed the subject Draft EA and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the June 23, 2025, issue of The Environmental Notice.

If you have any questions, please contact Kariann Stark of our Office of Conservation and Coastal Lands staff at (808) 587-0380 or kariann.stark@hawaii.gov.

From: dbedt.opsd.erp@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Monday, June 16, 2025 12:25:24 PM

Action Name

Oahu Subsea Cable Telecommunications Project

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds
- (2) Propose any use within any land classified as a conservation district
- (3) Propose any use within a shoreline area

Judicial district

ʻEwa, Oʻahu

Tax Map Key(s) (TMK(s))

(1) 9-1-026:027 (seaward)

Action type

Applicant

Other required permits and approvals

U.S. Army Corps of Engineers Nationwide Permit 57, Conservation District Use Permit, Submerged Land Easement Shoreline Certification, Hawaiʻi Department of Transportation Use and Occupancy Agreements, Special Management Area Major Permit, Shoreline Setback Variance, Utility Easements with City and County of Honolulu, Building, Right-of-Entry, and Construction Permits

Discretionary consent required

Conservation District Use Permit from DLNR

Agency jurisdiction

State of Hawaiʻi

Approving agency

DLNR Office of Conservation and Coastal Lands

Agency contact name

Kariann Stark

Agency contact email (for info about the action)

kariann.stark@hawaii.gov

Email address for receiving comments

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Agency contact phone

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1151 Punchbowl St., Room 131,
honolulu, HI 96813
United States
Map It

Applicant

Humuhumu Services, LLC and Starfish Infrastructure, Inc.

Applicant contact name

Lauren Minford

Applicant contact email

lminford@subcom.com

Applicant contact phone

(804) 887-0193

Applicant address

1001 E. McComas Street
Baltimore, Maryland 21230
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Map It

Is there a consultant for this action?

Yes

Consultant

ICF

Consultant contact name

Tanya Copeland

Consultant contact email

tanya.copeland@icf.com

Consultant contact phone

(970) 691-4724

Consultant address

980 9th Street
Suite 1200
Sacramento, California 95814
United States
Map It

Action summary

Humuhumu Services, LLC and Starfish Infrastructure, Inc. propose to construct the Oʻahu Subsea Cable Telecommunications Project (Project). The onshore portion of the Project includes a cable landing site at Barbers Point Beach Park (Tax Map Key [1] 9-1-026:027) and installation of an underground conduit system in public road rights-of-way to a new telecommunication facility that would be located at University of Hawaiʻi – West Oʻahu. The offshore portion of the Project includes six landing pipes that would be installed with directional drilling and three subsea fiber optic cables that would be surface laid in State of Hawaiʻi marine waters. The overall purpose of the project is to provide affordable, reliable, and diverse internet connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan.

Reasons supporting determination

The Anticipated Finding of No Significant Impact is based on the analysis of significance criteria provided in Chapter 6 of the DEA/AFONSI.

Attached documents (signed agency letter & EA/EIS)

- DEA-Transmittal-Ltr-to-ERP_COR-OA-25-174-Oahu-Subsea-Cable-Telecommunications-Project-part-1-signed-UNLOCKED-ADA.pdf
- OA_DEA_Oahu-Subsea-Cable-Telecom-Project_2025_0428_5081.pdf

ADA Compliance certification (HRS §368-1.5):

The authorized individual listed below acknowledges that they retain the responsibility for ADA compliance and are knowingly submitting documents that are unlocked, searchable, and may not be in an ADA compliant format for publication. The project files will be published without further ADA compliance changes from ERP, with the following statement included below the project summary in The Environmental Notice: "If you are experiencing any ADA compliance issues with the above project, please contact (authorized individual submitting the project at phone and/or email)."

Action location map

- 20250422_Oahu_SubseaCable_TelecommunicationsProject-11.zip

Authorized individual

Kariann Stark

Authorized individual email

kariann.stark@hawaii.gov

Authorized individual phone

(808) 587-0380

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

O'AHU SUBSEA CABLE TELECOMMUNICATIONS PROJECT
DRAFT ENVIRONMENTAL ASSESSMENT

PREPARED FOR:

Humuhumu Services, LLC and Starfish Infrastructure, Inc.

PREPARED BY:

ICF
980 9th Street, Suite 1200
Sacramento, CA 95814
Contact: Tanya Copeland
tanya.copeland@icf.com

April 2025

ICF. 2025. *Oʻahu Subsea Cable Telecommunications Project – Draft Environmental Assessment*. April. Sacramento, CA. Prepared for Humuhumu Services, LLC and Starfish Infrastructure, Inc.

Contents

Tables

Figures

Acronyms and Abbreviations

Acronym	Definition
AADT	annual average daily traffic
ADA	Americans with Disabilities Act
Applicants	Humuhumu Services, LLC and Starfish Infrastructure, Inc.
BA	Biological Assessment
BMH	beach manhole
BMP	best management practices
BWS	Honolulu Board of Water Supply
CAA	Clean Air Act
CCD	Census County Division
CCH	City and County of Honolulu
CDUP	Conservation District Use Permit
CEDS	Comprehensive Economic Development Strategy
CIA	cultural impact assessment
cm	centimeters
CO	carbon monoxide
CWA	Clean Water Act
CWB	Clean Water Branch
CWRM	State Commission on Water Resource Management
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DBEDT	Department of Business, Economic Development & Tourism
DLNR	Hawaiʻi Department of Land and Natural Resources
DOFAW	Hawaiʻi Division of Forestry and Wildlife
DPP	CCH Department of Planning and Permitting
DPR	CCH Department of Parks and Recreation
DPS	Distinct Population Segment
DTS	CCH Department of Transportation Services
EA	environmental assessment
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESCP	erosion and sediment control plan
F/O	fiber optic
FIRM	Flood Insurance Rate Maps
FR	Federal Register
General Plan	Oʻahu General Plan
GHG	greenhouse gases
HAAQS	Hawaiʻi ambient air quality standards
HAPC	habitat areas of particular concern
HAR	Hawaiʻi Administrative Rules
HBI	Hawaiʻi Broadband Initiative
HCCMAC	Hawaiʻi Climate Change Mitigation and Adaptation Commission

Acronym	Definition
HDD	horizontal directional drilling
HDOH	Hawaiʻi Department of Health
HDOT	Hawaiʻi Department of Transportation
HECO	Hawaiian Electric Company
HIFL	Hawaiian Islands Fiber Link
HRS	Hawaiʻi Revised Statutes
IBC	International Building Code
IDFR	inadvertent drilling fluid release
IPaC	Information for Planning and Consultation
IR	Integrated Report
km	kilometers
LUO	Land Use Ordinance
kph	kilometer per hour
LCAs	Land Commission Awards
LRFI	literature review and field inspection
LSB	University of Hawaiʻi Land Study Bureau
LUC	State Land Use Commission
m	meters
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation Management Act
MBTA	Migratory Bird Treaty Act
MRCI	Marine Research Consultants, Inc.
MUS	management unit species
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
nm	nautical miles
NMFS	National Marine Fisheries Service
NO2	nitrogen dioxide
NPDES	National Pollution Discharge Elimination System
NRC	noise reduction coefficient
NRCS	U.S. Natural Resources Conservation Service
OCCL	Office of Conservation and Coastal Lands
OGB	ocean ground beds
OHWM	ordinary high-water mark
OR&L	Oʻahu Railway & Land Company
Project	Oʻahu Subsea Cable Telecommunications Project
ROH	Revised Ordinances of Honolulu
ROW	rights-of-way
SHPD	State Historic Preservation Division
SIHP	State Inventory of Historic Places
SLR-XA	sea level rise exposure area
SMA	Special Management Area
SO2	sulfur dioxide
SSURGO	Soil Survey Geographic Database
STC	sound transmission class
SWPPP	stormwater pollution prevention plan

Acronym	Definition
TMK	Tax Map Key
UHWO	University of Hawaiʻi – West Oʻahu
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WPRFMC	Western Pacific Regional Fishery Management Council
WQC	Water Quality Certification

Applicant Publication Form

Project Name:	Oʻahu Subsea Cable Telecommunications Project
Document Type/ Determination	Draft EA and Anticipated Finding of No Significant Impact
HRS §343-5(a) Triggers	(1) Proposes the use of state and county lands (2) Proposes use within land classified as a conservation district (3) Proposes use within the shoreline area
Judicial District	ʻEwa District
Tax Map Key (TMK)	TMKs (1) 9-1-016:179 (por.); (1) 9-1-016:222 (por.); (1) 9-1-026:027 (por.); ʻŌlaʻi St rights-of-way; Kalaeloa Blvd rights-of-way; Kamōkila Blvd rights-of-way; Farrington Hwy rights-of-way; and submerged lands seaward of TMK (1) 9-1-026:027
Permit(s)/ Approvals(s)	U.S. Army Corps of Engineers Nationwide Permit 57 Conservation District Use Permit Submerged Land Easement Shoreline Certification Hawaiʻi Department of Transportation Use and Occupancy Agreements Special Management Area Major Permit Shoreline Setback Variance Utility Easements with City and County of Honolulu Building, Right-of-Entry, and Construction Permits
Approving Agency:	Department of Land and Natural Resources, Office of Conservation and Coastal Lands
Contact Name, Email, Telephone, Address	Michael Cain, Administrator Email: michael.cain@hawaii.gov Phone: 808.587.0377 Office of Conservation and Coastal Lands Kalanimoku Building 1151 Punchbowl Street, Room 131 Honolulu, HI 96813
Applicants:	Humuhumu Services, LLC and Starfish Infrastructure, Inc.
Contact Name, Email, Telephone, Address	Lauren Minford, Senior Permitting Manager Email: lminford@subcom.com Phone: 804.887.0193 1001 E. McComas Street Baltimore, MD 21230
Consultant:	ICF
Contact Name, Email, Telephone, Address	Tanya Copeland, Principal Email: tanya.copeland@icf.com Phone: 970.691.4724 980 9th Street, Suite 1200 Sacramento, CA 95814
Action Summary	Humuhumu Services, LLC and Starfish Infrastructure, Inc. propose to construct the Oʻahu Subsea Cable Telecommunications Project (Project). The onshore portion of the Project includes a cable landing site at Barbers Point Beach Park (Tax Map Key [1] 9-1-026:027) and installation of an underground conduit system in public road rights-of-way to a new telecommunication facility that would be located at University of Hawaiʻi – West Oʻahu. The offshore portion of the Project includes six landing pipes that would be installed with directional drilling and three subsea fiber optic cables that would be surface laid in State of Hawaiʻi marine waters. The overall purpose of the project is to provide affordable, reliable, and diverse internet connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan.

Executive Summary

Project Name: O‘ahu Subsea Cable Telecommunications Project

Tax Map Key (TMK): TMKs (1) 9-1-016:179 (por.); (1) 9-1-016:222 (por.); (1) 9-1-026:027 (por.); ‘Ōla‘i St rights-of-way; Kalaeloa Blvd rights-of-way; Kamōkila Blvd rights-of-way; Farrington Hwy rights-of-way; and submerged lands seaward of TMK (1) 9-1-026:027

Applicants: Humuhumu Services, LLC and Starfish Infrastructure, Inc.

Approving Agency: Department of Land and Natural Resources, Office of Conservation and Coastal Lands

Landowner:

University of Hawai‘i: (1) 9-1-016:179; (1) 9-1-016:222

Public road rights-of-way: City and County of Honolulu and Hawai‘i Department of Transportation

Department of Parks and Recreation of the City and County of Honolulu: (1) 9-1-026:027

Existing Uses: Public beach park; public road rights-of-way; undeveloped/agriculture

Current Land Use Designations:

<u>State Land Use</u>

Conservation: submerged lands seaward of TMK (1) 9-1-026:027

Urban: TMKs (1) 9-1-026:027, (1) 9-1-016:179, and (1) 9-1-016:222

Agriculture: portions of public road rights-of-way along fronthaul system

<u>County Zoning</u>

P-2 – General Preservation District: TMK (1) 9-1-026:027

A-2 – Medium-Density Apartment District: (1) 9-1-016:179 (por.)

BMX-3 – Community Business Mixed Use District: (1) 9-1-016:222 (por.)

R-5 – Residential District: (1) 9-1-016:179 (por.)

<u>Special Management Area</u>

Within Special Management Area: TMK (1) 9-1-026:027

Proposed Action: Humuhumu Services, LLC and Starfish Infrastructure, Inc. (Applicants), propose to construct the O‘ahu Subsea Cable Telecommunications Project (Project). The Proposed Action includes installation of six subterranean landing pipes between the shoreline, and exit points on submerged lands using a construction method known as horizontal directional drilling (HDD), and the installation of three subsea fiber optic cables from the limit of the State of Hawai‘i marine waters to a proposed cable landing site at Barbers Point Beach Park (TMK [1] 9-1-026:027), ‘Ewa District, Island of O‘ahu, Hawai‘i. The Project subsea cables would be laid on the seafloor along a predetermined route between the limit of the State of Hawai‘i marine waters (out to 3 nautical miles) and the proposed cable landing site at Barbers Point Beach Park. The six landing pipes would be installed via HDD and extend from beach manholes on land to subsea exit points 4,400 to 5,100 feet (1,341 to 1,555 meters) seaward from the shoreline. An underground conduit system, known as a *fronthaul* system, would be constructed within public road rights-of-way between the cable landing site at Barbers Point Beach Park and the proposed telecommunication facility on land owned by University of Hawai‘i at TMKs (1) 9-1-016:179 and (1) 9-1-016:222. Once constructed, the telecommunication facility is expected to occupy an approximately 4-acre area, in addition to access roads and utility routes.

Alternatives Considered:	No Action Alternative: The Project would not be constructed and potential impacts associated with the Project would be avoided. However, under the No Action Alternative, the overall purpose of the Project to provide affordable, reliable, and diverse internet connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan would not occur.
Potential Impacts of the Proposed Action:	Construction of the Proposed Action would result in the potential for temporary and localized impacts on air quality, geology and soils, marine and nearshore biological resources, noise, recreational resources, roadways and transportation, terrestrial biological resources, and water quality. As discussed in Chapter 2, *Affected Environment and Environmental Impacts*, avoidance and minimization measures would be implemented to reduce impacts and all temporary and minor impacts during construction would be less than significant. Most Project infrastructure would be installed below ground level and would not be noticeable or have long-term effects during operations. The telecommunication facility would be constructed in accordance with current building code requirements and has been sited adjacent to Farrington Highway at a location that is consistent with long-term development plans for the University of Hawaiʻi – West Oʻahu. The Proposed Action would have beneficial effects on the economic and social welfare of the community and state due to the improved telecommunication infrastructure that the Proposed Action would provide. The provision of critical broadband infrastructure for the State of Hawaiʻi would have multiple benefits for innovation, economic development, healthcare, education, public safety, research, public services, and entertainment and would increase broadband capacity to support forecast population growth.
Anticipated Determination:	Finding of No Significant Impact

Chapter 1
Project Description and Alternatives

Humuhumu Services, LLC and Starfish Infrastructure, Inc. (Applicants), propose to construct the Oʻahu Subsea Cable Telecommunications Project (Project). The marine portion of the Project includes installation of six landing pipes between the shoreline, and exit points on submerged lands using a construction method known as horizontal directional drilling (HDD), and the installation of three subsea fiber optic (F/O) cables from the limit of the State of Hawaiʻi marine waters to a proposed cable landing site at Barbers Point Beach Park (Tax Map Key [TMK] [1] 9-1-026:027), ʻEwa District, Island of Oʻahu, Hawaiʻi (Figure 1-1). The onshore portion of the Project includes installation of underground infrastructure at the cable landing site and installation of an underground conduit system to a telecommunication facility to be located at property owned by the University of Hawaiʻi – West Oʻahu (UHWO) pending due diligence completion and finalization of the lease agreement (Figure 1-1).

The Project will require a Conservation District Use Permit from the Hawaiʻi Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL), and a Special Management Area (SMA) Permit from the Honolulu City Council. The Project will also require the use of state lands and is, therefore, subject to review under Hawaiʻi Revised Statutes (HRS) Chapter 343. OCCL is the approving agency for this environmental assessment (EA). This Draft EA has been prepared pursuant to HRS Chapter 343 and Hawaiʻi Administrative Rules (HAR) Section 11-200.1, *Environmental Impact Statement Rules*. Refer to Section 4.2.1, *Environmental Impact Statement Law, Chapter 343 Hawaiʻi Revised Statutes*, for additional detail regarding the need for HRS Chapter 343 environmental review.

1.1 Project Description

1.1.1 Project Location and Land Ownership

The Project subsea cables would be laid on the seafloor along a predetermined route between the limit of the State of Hawaiʻi marine waters (out to 3 nautical miles [nm]) and the proposed cable landing site at Barbers Point Beach Park (TMK [1] 9-1-026:027) (Figure 1-1 and Figure 1-2). The cables would be landed via construction of subterranean conduits, known as landing pipes, installed utilizing HDD methods and extending from a beach manhole (BMH) on land to a subsea exit point on the seafloor 4,400 to 5,100 feet (1,341 to 1,555 m) seaward from the shoreline. An underground conduit system, known as a *fronthaul* system, would be constructed within public road rights-of-way (ROW) between the cable landing site at Barbers Point Beach Park and the proposed telecommunication facility at UHWO (TMKs [1] 9-1-016:179 and [1] 9-1-016:222) (Figure 1-1 and Figure 1-3). Table 1-1 lists the components of the Project, TMKs of the parcels involved, and their ownership. Additional details for each Project component are provided in Section 1.3.1, *Proposed Action*.

Table 1-1. Project Components, Tax Map Keys, and Land Ownership

Onshore Components	Subcomponents	Tax Map Key(s)	Land Ownership
Cable Landing Site	6 HDD landing pipes 4 beach manholes 3 fronthaul vaults 4 ocean ground beds Existing access road	(1) 9-1-026:027	Department of Parks and Recreation of the City and County of Honolulu [a]
Fronthaul	Underground conduit system	N/A for public road ROW	Public ROW (City and County of Honolulu [a] and Hawaiʻi Department of Transportation)
Telecommunication Facility	Warehouse; office building; parking lot; mechanical yard; perimeter fencing; utility and access roads	(1) 9-1-016:179 and (1) 9-1-016:222 [a]	University of Hawaiʻi [b]
Marine Components	Subcomponents	Tax Map Key(s)	Land Ownership
Landing Pipe	6 HDD landing pipes	N/A	State submerged lands [c]
Subsea Cable	3 subsea cables installed within State marine waters (3 nm [5.55 km])	N/A	State submerged lands [c]

Source: CCH 2025; State of Hawaiʻi 2025.

HDD = horizontal directionally drilled; km = kilometers; N/A = not applicable; nm = nautical miles; rights-of-way = ROW

[a] Pending acquisition of easements from City and County of Honolulu Department of Parks and Recreation.

[b] Pending negotiation of a lease agreement with University of Hawaiʻi.

[c] Pending acquisition of a submerged land easement from the State of Hawaiʻi.

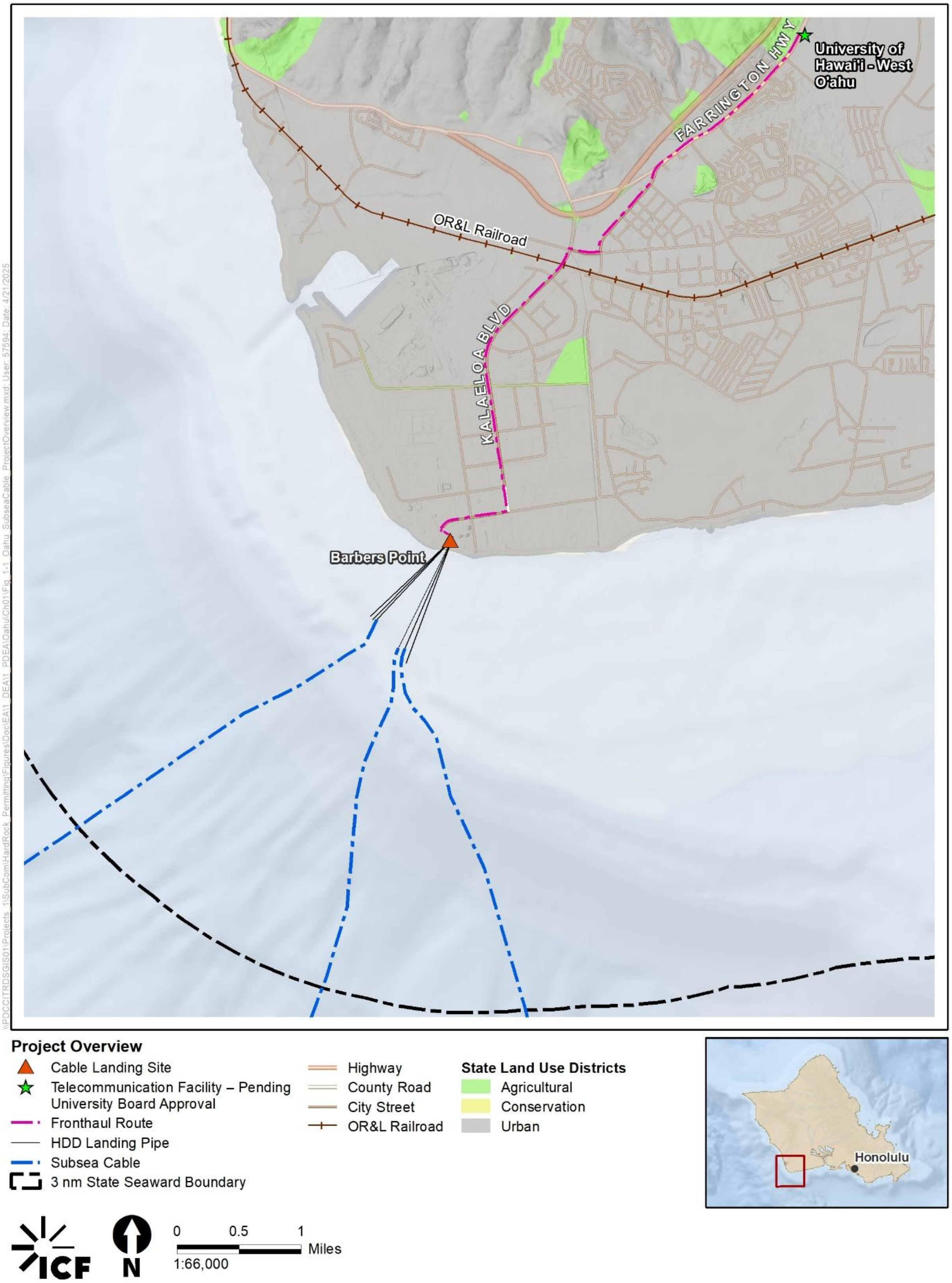

Figure 1-1. Project Overview

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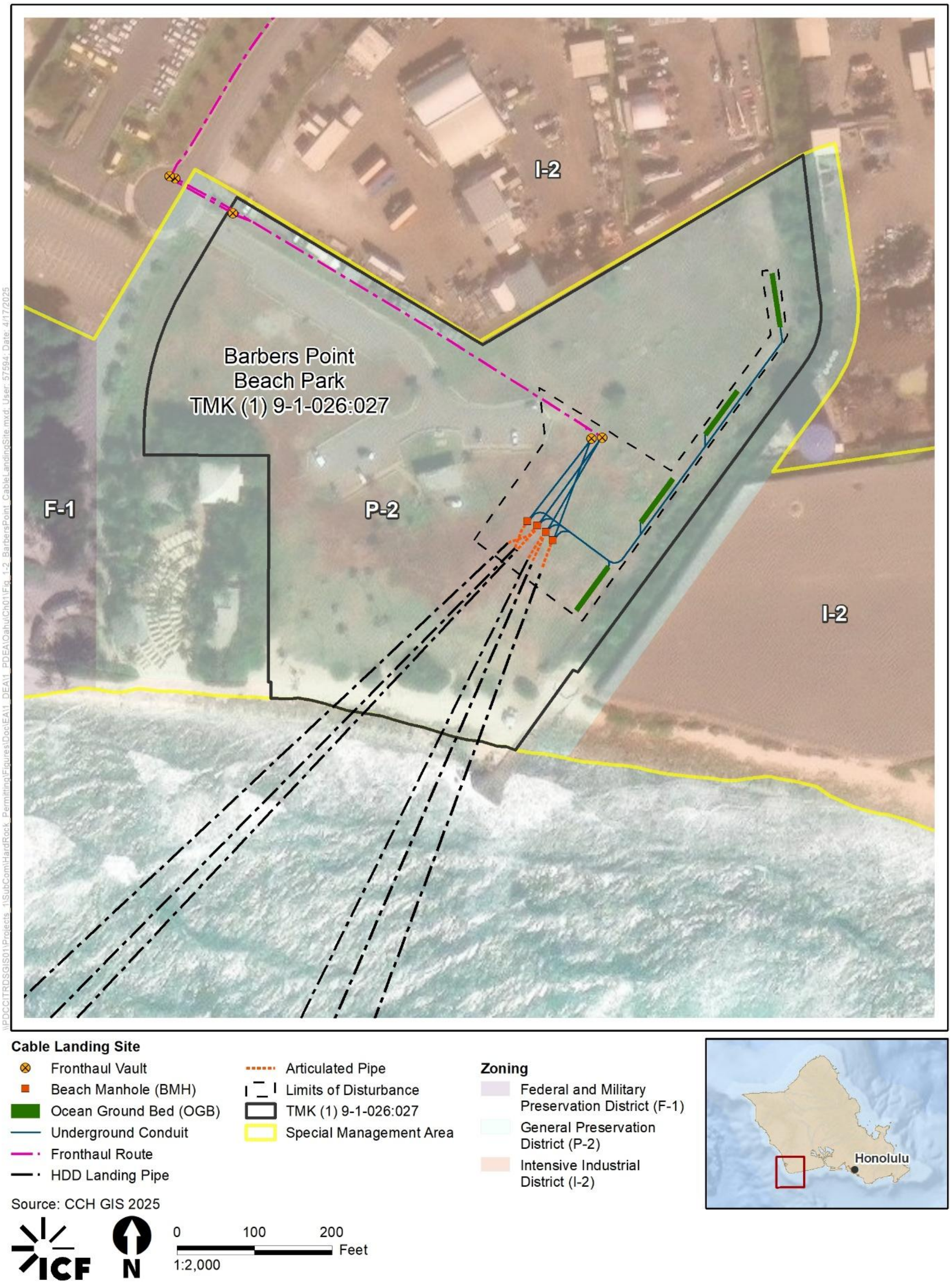

Figure 1-2. Cable Landing Site

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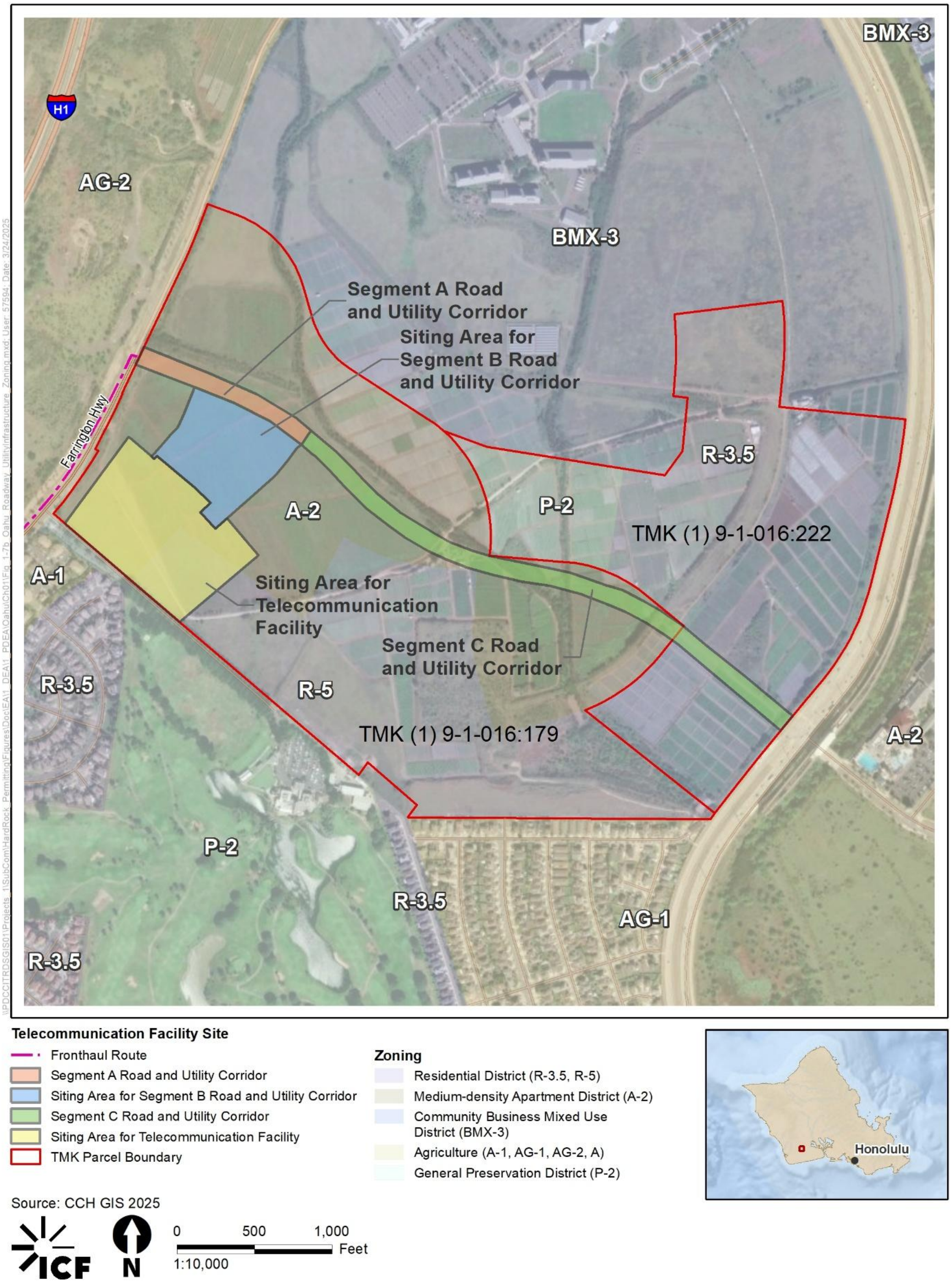

Figure 1-3. Telecommunication Facility Site

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1.1.2 Project Area Land Use and Surrounding Land Uses

The proposed cable landing site, including temporary parking and equipment and material staging locations, would be located entirely in the State Land Use Urban District (Table 1-1 and Figure 1-1). The telecommunication facility and the majority of the fronthaul system would also be located within the Urban District; however, some parcels along the proposed fronthaul route are currently mapped in the Agricultural District. Parcels zoned Agricultural are entirely within either public roadway ROW (i.e., portions of Farrington Highway) or the Oʻahu Railway & Land Company (OR&L) ROW. Submerged lands extending seaward from the cable landing site are in the State Conservation District, Resource Subzone, which extends to the limits of the State of Hawaiʻi marine waters (3 nm [5.5 kilometers (km)]from shore). The entirety of the Barbers Point Beach Park Parcel (TMK [1] 9-1-026:027) and a small portion of the adjacent ʻŌlaʻi Street ROW are located within the SMA. Therefore, the cable landing site and approximately 50 feet (15.2 meters [m]) of the fronthaul system along ʻŌlaʻi Street would be located within the SMA boundary.

The City and County of Honolulu (CCH) Land Use Ordinance (LUO) zoning for the cable landing site parcel is General Preservation (Table 1-2 and Figure 1-2). The fronthaul system would intersect several CCH LUO zoning districts and would be installed entirely underground and within public road ROW. The parcels for the telecommunication facility are zoned Apartment Medium-Density, Business Mixed Use Community, and Residential (Table 1-2).

Table 1-2. Current Land Use Designations for the Project Area

Category	Submerged Lands	Cable Landing Site (1) 9-1-026;027	Fronthaul System	Telecommunication Facility (1) 9-1-016:179 (1) 9-1-016:222
State Land Use	Conservation	Urban	Urban; Agricultural	Urban
CCH LUO (Zoning)	N/A	General Preservation (P-2)	General Preservation (P-2); Intensive Industrial (I-2); General Agricultural (A-2); Agricultural Restricted (A-1); Business Mixed Use Community (BMX-3); Apartment, Medium Density (A-2)	Apartment Medium-Density (A-2); Business Mixed Use Community (BMX-3); Residential District (R-5)
SMA	N/A	Within SMA	Portions of the fronthaul within TMK (1) 9-1-026:027 and extending west to ʻŌlaʻi Street are within the SMA	N/A

Source: CCH 2025; State of Hawaiʻi 2025.

CCH LUO = City and County of Honolulu Land Use Ordinance; N/A = not applicable; SMA = Special Management Area; TMK = Tax Map Key.

The cable landing site is bordered on the west by privately owned commercial land (Germaine's Lūʻau), and to the north and east by privately owned industrial land. In the vicinity of the cable landing site are industrial use areas and recreational areas (Barbers Point Lighthouse and Kalaeloa

Beach Park). Access to the cable landing site for both construction and operation of the Project would be from ʻŌlaʻi Street. The fronthaul system would be installed along public road ROW and pass under Farrington Highway and the OR&L ROW. The parcels for the telecommunication facility are bordered by agricultural and UHWO-related uses to the northeast; other land uses in the vicinity include residences and the Kapolei Golf Club.

1.2 Purpose and Need for the Proposed Action

Broadband has been recognized as critical infrastructure for the State of Hawaiʻi by providing the foundation for innovation, economic development, healthcare, education, public safety, research, public services and entertainment (Department of Business, Economic Development & Tourism [DBEDT] 2020). The Hawaiʻi Broadband Initiative was launched in 2011 with the goal of ubiquitous gigabit (one gigabit per second) connectivity throughout Hawaiʻi by 2018, and the ultimate purpose of ensuring that all citizens of Hawaiʻi have access to high-speed broadband at affordable prices. The State Broadband Strategic Plan was developed to provide information and a framework for the creation of policies and programs to address the challenges faced in meeting both state and national broadband goals. The updated plan describes transpacific connectivity as the state's broadband "lifeline," which is achieved primarily through the use of submarine F/O cable to the mainland United States and Asia (Department of Business, Economic Development & Tourism 2020).

There are currently seven transpacific F/O cable systems that provide broadband connections between Hawaiʻi and the U.S. mainland, Asia, and the South Pacific (Submarine Networks 2024). Two of these cable systems have been installed recently and have added important broadband capacity to Hawaiʻi: the SEA-US system in 2017 and the Hawaiki system in 2018. However, the Office of the Lieutenant Governor indicates that the state's internet connectivity is reliant on three main undersea cables, and two of the cables are nearing the end of their operational life (Office of the Lieutenant Governor 2024). The combination of increased costs coupled with the expected exponential growth of demand for broadband capacity by both consumers and businesses necessitates upgrades to the state's broadband infrastructure (Department of Business, Economic Development & Tourism 2020). Additionally, vulnerability to disruptions in service due to the lack of redundancy remains a major obstacle facing submarine cable systems. Concerns regarding the adequacy of bandwidth available for out-of-state connectivity led the Broadband Task Force to recommend the state take steps to encourage new fiber system landings in Hawaiʻi.

The overall purpose of the Project is to enhance telecommunication connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan. As designed, the Project would respond to the needs identified under the Hawaiʻi Broadband Initiative by contributing to the development of the state's broadband infrastructure and for at least the next 25 years through increased telecommunications speed and reliability.

The Project would improve reliability, reduce latency, add redundancy, and help ensure the state has continued connectivity and enhanced bandwidth to and from Japan while also connecting Hawaiʻi with the continental United States, other Pacific Islands, and Australia. Overall, the Project would improve internet connections in the South Pacific and help protect the islands from internet disruptions by bringing much needed telecommunications competition and resilience to the region. Due to its remote location and small market, there is limited competition among broadband service providers and transpacific cable operators that provide connectivity to points outside of Hawaiʻi (Hawaiʻi Department of Commerce and Consumer Affairs 2012). This presents few options for

Hawaiʻi consumers and reduces cost competitiveness. Additionally, with advances in F/O technology enabling longer fiber spans, several cables already directly connect the U.S. mainland to Asia or the South Pacific and bypass Hawaiʻi, further reducing cost competitiveness amongst the existing transpacific cable systems serving Hawaiʻi. The Project would bring multiple additional cables to Hawaiʻi, increasing capacity (supply), thereby putting downward pressure on pricing. The proposed cables and selected cable landing location are separate from existing infrastructure, thereby increasing reliability of communications and resiliency of communication networks to and around the region.

1.3 Proposed Action and Alternatives

The alternatives evaluated in this section consist of the Proposed Action and the No Action Alternative. Additional alternatives that were considered but not carried forward for further evaluation are discussed in Section 1.3.3, *Alternatives Considered but Eliminated from Detailed Study*.

1.3.1 Proposed Action

The Proposed Action includes the installation, operation, and maintenance of the Project, which includes subsea cable installation and the following components: a cable landing site, fronthaul system, and telecommunication facility.

Project components installed for the cable landing site beneath Barbers Point Beach Park (TMK [1] 9-1-026:027), owned by the City and County of Honolulu, include the following.

- Four underground vaults (BMHs) would provide access to underground conduits for cable pulling and splicing. Two of the BMHs would measure approximately 6.5-feet-wide (1.9 m) by 10-feet-long (3.0 m); the other two BMHs would measure approximately 3-feet-wide (0.9 m) by 5-feet wide (1.5 m). Three additional vaults (fronthaul vaults), measuring approximately 3-feet-wide (0.9 m) by 5-feet-long (1.5 m), would be installed at the cable landing site to connect the F/O to the fronthaul system. All BMHs and vaults would be approximately 6 feet (1.8 m) deep.
- Four underground earth grounding beds (ocean ground beds [OGB]), each consisting of four to six earth anodes. Each OGB would be approximately 66 feet (20.1 m) long and 2 feet (0.60 m) wide, into which the anodes would be installed vertically and horizontally by a mechanical drilling process.
- Six subterranean steel conduits, known as landing pipes, into which the individual F/O cables would be installed. The landing pipes would measure approximately 7 inches (17.8 centimeters [cm]) (outside diameter) and would be installed using HDD methods beginning on land and exiting on the seafloor approximately 4,400 to 5,100 feet (1,341 m to 1,555 m) from the shoreline. Water depths for the subsea HDD exit points would range from approximately 49 feet (15 m) to 71 feet (22 m). Construction would take place in an approximate 150-foot by 150-foot (45.7 m by 45.7 m) work area which, when combined with the areas needed for the OGBs and fronthaul connection vault, would temporarily affect approximately 0.96 acre on the Barbers Point Beach Park property.

Project components extending inshore from the cable landing site include the following.

- Six underground polyvinyl chloride conduits measuring 4 inches (10.26 cm) in diameter and buried at a minimum 48 inches (121.9 cm) deep, likely installed by HDD.

- Fronthaul system approximately 5.3 miles (8.5 km) in length and constructed within public road ROW between the cable landing site at Barbers Point Beach Park and the telecommunication facility at UHWO. The conduit system would utilize ʻŌlaʻi Street, Kalaeloa Boulevard, Kapolei Boulevard, Kamōkila Boulevard, and Farrington Highway. The underground conduit system would contain the cables necessary to operate the submarine F/O cable system, including F/O, ground cables, and power cables. Construction would be completed in a temporary working corridor with a maximum width of 20 feet (6.1 m). Over the proposed 5.3-mile (8.5 km) route, the temporary working corridor would occupy up to 15.2 acres; however, there would be only approximately 0.24 acre of temporary surface disturbance within the working corridor to install the fronthaul system. Once construction is complete, and all areas have been restored, the final area affected would consist of a 2-foot-wide (0.6 m) underground easement corridor with only the in-ground vaults being visible.
- Telecommunication facility parcels owned by the University of Hawaiʻi (TMKs [1] 9-1-016:179 and [1] 9-1-016:222) at the corner of Farrington Highway and Kapolei Golf Course Road. The proposed telecommunication facility would consist of a parking lot, warehouse, office building, small mechanical yard, and perimeter fencing, all of which will be designed and constructed in accordance with state and county building codes and design standards, and UHWO-approved site plans.

Project components extending seaward from the cable landing site include the following.

- Three submarine F/O cables, installed by a cable-laying ship, on the surface of the seabed that follow a surveyed and engineered route in the Pacific Ocean extending from the landing pipe exit point to the limit of the State of Hawaiʻi marine waters (out to 3 nm [5.65 km]) would include approximately 4.6 to 5.0 nm (8.5 km to 9.3 km) of cable length, depending on the subsea cable. This length of cable would provide a sufficient amount of cable to accommodate topographic variations along the determined F/O route. From the 3 nm (5.6 km) state marine waters limit, the F/O cables would extend another 112.6 to 133.6 nm (208.5 to 247.4 km), where they would connect with the cable trunk routes at a Branching Unit on the seafloor. An easement corridor on submerged lands for subsea cable installation, operation, and maintenance would be requested from DLNR for each subsea cable.

Surface disturbance for the onshore Project components is summarized in Table 1-3. Additional detail for the onshore Project components is provided in the following sections.

Table 1-3. Surface Disturbance Estimates by Onshore Project Component

Project Component	Surface Disturbance (acres)
Cable Landing Site	0.96
Fronthaul System	0.24
Telecommunication Facility	4.30
Access and Utility Connections – Segment A	2.50
Access and Utility Connections – Segment B	1.10
Access and Utility Connections – Segment C	6.20
Total	**15.30**

1.1.1.1 Shore End Site Work, Nearshore Landing, and Telecommunication Facility

Cable Landing Site Preparation

The cable landing site is proposed to be at Barbers Point Beach Park, which is under the jurisdiction of CCH. The Applicants will obtain an easement from CCH for use of the site. Site preparation would begin by cordoning off the HDD work site and securing it from public access. Any access improvements, such as temporary gravel vehicle roadways, would be installed, and then equipment and materials would be moved onto the site. Equipment would include a large bore (HDD) machine, control shack/office, excavator, dump truck, crane, forklift, mud mixer-separator, tool trailer, generators, pumps, and supplies. Following completion of construction, the site would be restored to pre-project contours and condition.

Horizontal Directional Drilling and Cable Landing

The landing pipes would be installed by HDD, which would allow the landing pipes to be installed beginning at a point on land and bored beneath the beach and surf zones, exiting at a point in the ocean without any disturbance along the way (Figure 1-3). The HDDs would be guided by a drill head fitted with a steering tool, using magnetometers and inertial devices to track the direction of advance (horizontally and vertically) and the absolute location. The tracking system would be implemented continuously to verify the drill position and path. A component of the tracking system is a wire loop that is placed on the ground in the cable landing site. The wire loop is energized for a fraction of a second after each 30-foot joint of pipe is installed. The loop allows the drill operator to triangulate the exact location of the drill head. Two types of drill heads could be used, depending on geologic conditions.

- **Spud Jet.** Spud jets force the drilling fluid through the jet bit to erode the earth material and create the bore hole into which the conduit is inserted. This type of drill head is used in soft soils such as sands, silts, and clays, the expected composition of material to be encountered during landing pipe installation.
- **In-Hole Mud Motor.** An in-hole mud motor would use drilling fluids to rotate a drill head though hard rock such as limestone, sandstone, and granite; this type of head would be used if such conditions were encountered.

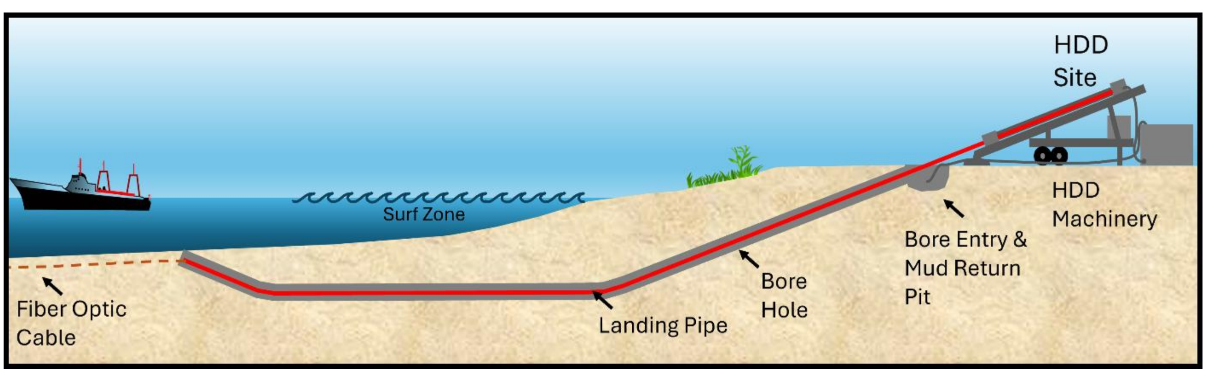

Figure 1-4. Typical HDD Profile

The HDDs would be advanced in 30-foot sections through the bore hole as it is created. Surveys would be conducted in 15-foot and 30-foot increments (using 30-foot joint sections) to verify the drill position and path. The HDD machine would occupy the bore entry site, drilling steel casing into the ground at an angle of approximately 12 degrees. Once the HDD reaches the desired depth, the direction would level out as the drilling continues to push the landing pipe horizontally through the ground. When the landing pipe reaches the appropriate distance offshore, the drill head would be guided to the ocean bottom at approximately a water depth of approximately 49 feet (15 m) to 71 feet (22 m). This operation would be repeated for each of the landing pipes.

After the bore hole is completed, the bore assembly, consisting of the drill bit and electronics, would be removed either by divers or the bore pipe would be withdrawn back to the bore site to remove the assembly before reinstalling the landing pipe into the completed borehole. The end of the bore pipe would be fitted with a one-way check valve to prohibit intrusion of debris into the pipe. The seaward end of the pipe would be left at a depth of approximately 3.2 feet (1 m) below the ocean floor. The pipe would then be ready for cable installation.

Horizontal Directional Drilling Fluid

HDD drilling fluid (a non-toxic, inert material, typically a solution of bentonite clay and water) would be circulated into the bore hole to prevent it from caving in; the fluid would coat the wall of the bore hole to minimize fluid losses to permeable rock and soil types. Drilling fluid also serves as a lubricant for the drill head and carries the cuttings (pieces of drilled rock, sand, and other materials) back to the entry pit, where the cuttings are removed so the drilling fluid can be recirculated into the bore hole. Drilling fluid would be used for drilling all conduit, except for the final approximately 30 feet of the bore hole offshore. The drilling fluid would be changed to water (instead of the drilling fluid) at the end of the bore hole installing the landing pipes; this would minimize the release of drilling fluid into the ocean floor when the drill bit exits offshore. Spent drilling fluid (except for that lost to the surrounding subsurface material) and cuttings would be pumped back to the landing site where it would be run through the mixer separator. The separated drilling mud would be reused in the bore process, and the cuttings would be removed and disposed of at a permitted landfill.

Given the variety of geologic conditions that may be encountered, it is possible that some of the drilling fluid would be absorbed into fractures in the surrounding subsurface material. For cases in which the fracture is lateral and subterranean, lost fluid would not rise to the surface. In other cases, drilling fluid may reach the surface (e.g., if the fracture comes close enough to the surface that the pressure causes release of drilling fluid above the ocean bottom).

The potential for substantial releases of drilling fluid into the environment would be minimized through several measures, including implementation of an Inadvertent Drilling Fluid Release Contingency Plan (Appendix A). Prior to drilling, the geologic characteristics of the substrate would be evaluated to determine the most appropriate route for the landing pipe installation. During drilling, the potential for losing drilling fluid to the substrate would be assessed by monitoring the volume of the drilling fluid that is returning to the bore entry point and monitoring for changes in the drilling fluid’s pressure. If a loss of fluid volume or pressure is detected, drilling may be stopped or slowed to allow close observation for a surface release in the ocean. If a release is discovered above the ordinary high-water mark (OHWM) it would be contained with sandbags and collected for reuse or disposal.

Drilling mud used in HDD methodologies is usually made from bentonite clay and water and is not toxic or hazardous. For inadvertent releases below the OHWM, it would be impractical to contain and collect releases because of the wave energy in the surf zone. The wave energy in the surf zone would quickly dissipate the drilling fluid. If releases are detected in the water, measures would be implemented to minimize and control the release. If a release into the water column is discovered, the drilling would stop to allow any plume to dissipate before continuing until cloudy water was again observed. This process would continue until the bore worked its way past the release point.

Construction of the Beach Manhole

To support the landing pipes and cables, BMHs measuring approximately 8 feet (2.4 m) wide by 12 feet (3.7 m) long by 9 feet (2.7 m) deep, must be installed at the landing site. The BMHs would each take 2 days to install by excavating with a backhoe or excavator, placing the vault in the excavation, and then backfilling around the vault. Operators then would compact the material using a hand-operated vibratory compactor. Although excess material is not expected, any material that is not replaced on site would be hauled to a local landfill site. The BMHs would house the splice connecting the submarine cable to the terrestrial cables.

Ocean Ground Bed Installation

Prior to the cable landing, OGBs would be installed. An OGB is a collection of electrodes buried below ground level that provides the return path for the electrical circuit that powers the repeaters (amplifiers) in the submarine cable system. Installing OGBs would involve the installation of three to six anodes between 7 feet (2.1 m) and 11.5 feet (3.5 m) below ground level near the BMH, located within the cable landing site property. Figure 1-4 depicts a typical vertical installation of anodes within an OGB. Horizontal installation of anodes within the OGB is also under consideration. An OGB requires at least 32 feet (9.8 m) of separation from buried objects and utilities. The anodes would be spaced at a distance of at least 8 feet (2.4 m) within the OGB.

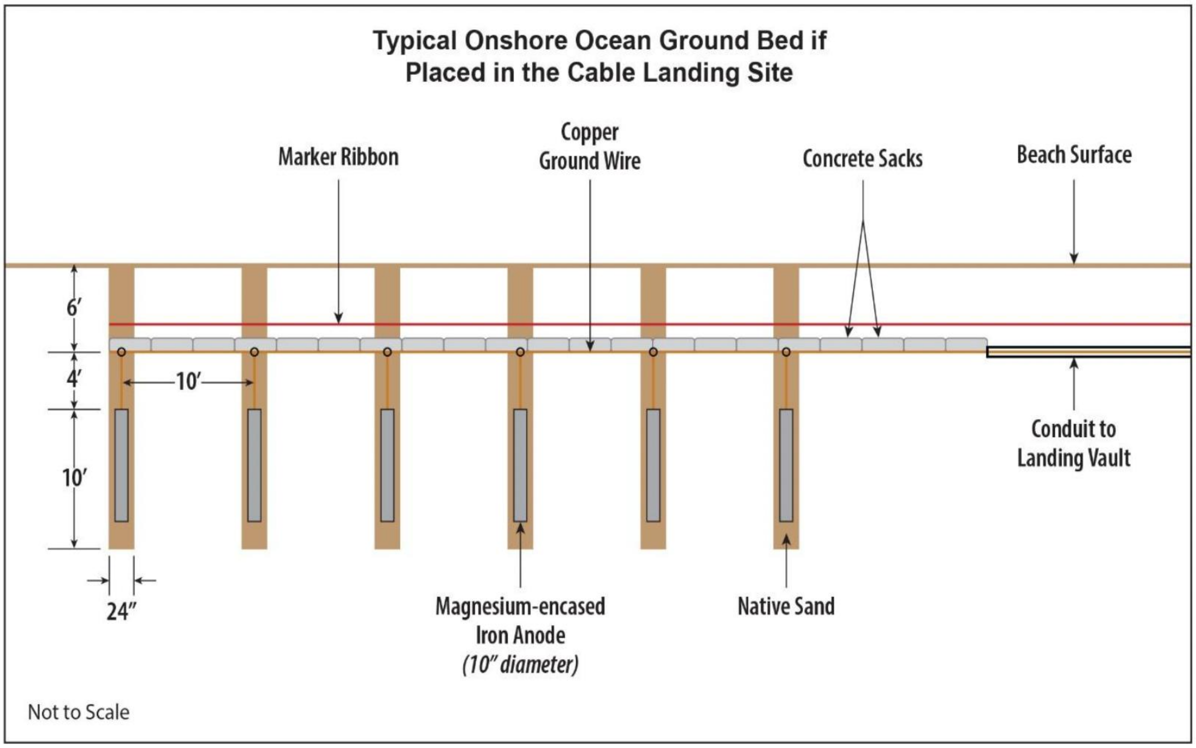

Figure 1-5. Typical Ocean Ground Bed

Underground Conduit System

An underground conduit system (fronthaul system) would connect the BMHs with the telecommunication facility (Figure 1-1). The alignment of the 5.3-mile-long (8.5 km) fronthaul system would utilize public road ROW and would consist of six 4-inch (10.2-cm) diameter conduits installed to a minimum depth of 5 feet (1.5 m). The conduits would house the following cable types for each submarine cable system.

- F/O cable—the F/O cable transmits telecommunications data.
- Power cable—the insulated copper power cable transmits power from the cable landing site to the marine cable.
- Ground cable—the insulated copper ground cable is part of the electrical equipment ground system and connects the cable landing station to the OGB at the cable landing site.

The fronthaul system would be primarily installed using directional boring. However, depending on site-specific conditions, it is expected that some limited areas of trenching would be needed. To facilitate access to the conduits, precast concrete manholes would be placed at intervals of approximately 800 feet (243.8 m) along the route. Typically, the manholes would be approximately 4 feet (1.2 m) wide by 6 feet (1.8 m) long and 6 feet (1.8 m) deep, with a cast-iron manhole cover 36 inches (91.4 cm) in diameter at grade level (i.e., flush with the ground). All manhole covers would be marked with appropriate identification and would be secured (i.e., locked and bolted).

Telecommunication Facility

A telecommunication facility would be constructed within a 46-acre area of land owned by University of Hawaiʻi on TMKs (1) 9-1-016:179 and (1) 9-1-016:222 (Figure 1-3). Once constructed, the facility is expected to occupy an approximately 4-acre area, in addition to access roads and utility routes. The telecommunication facility would act as a vital link to the proposed cable system and include the infrastructure needed to house the F/O cable system components and on-site staff. Infrastructure associated with the telecommunication facility would consist of a warehouse building (inclusive of adjoined condenser units, lighting, windows/doors, electrical connections, ventilation, bollards, disconnect meter, and underground pipe trenching), an external mechanical yard (inclusive of six generators, a storage tank, three air cooled chillers, two light fixtures, concrete sidewalks, screening wall, and underground pipe trenching), and a roadway adjacent to the facility infrastructure. All infrastructure would be designed and constructed in accordance with UHWO-approved site plans. The total maximum permanent footprint for building components is assumed to be 1.25 acres. The preliminary site layout evaluated in this EA represents current design and is consistent with other technical studies completed to date; however, both the layout and location of the telecommunication facility may change as the design progresses.

The warehouse building would be located in the northwest portion of the approximately 46-acre site, constructed on a concrete slab. The building is anticipated to be metal (colored off-white to be consistent with current UHWO buildings) and may include various internal offices, a kitchen area, restrooms, storage areas, pump room, electrical gear, and security. External aboveground components may include attached condenser units, lighting, windows/doors, electrical connections, ventilation, bollards, and a disconnect meter. The warehouse building (including external components as applicable) is projected to be approximately 264 feet (80.5 m) long, 131 feet (39.9 m) wide, and 33 feet (10.1 m) tall.

The external mechanical yard would be adjacent to the warehouse building, spanning approximately 100 feet (30.5 m) by 129 feet (39.3 m). All infrastructure within the mechanical yard, except the two light fixtures and storage tank, would be concealed by the surrounding metal, hurricane louver screening wall, which would be approximately 20 feet (6.1 m) tall. The light fixtures and storage tank are estimated to be 30 and 27 feet (9.1 m and 8.2 m) tall, respectively.

The telecommunication facility would likely be accessed from the north, off of Farrington Highway, via an existing gravel road; however, finalized site access and exit locations have not yet been determined. The location of the permanent, new access road for operations is being finalized through discussions with the University of Hawaiʻi. The roadway within the site would be located adjacent to telecommunication facility infrastructure and parking would be included onsite as part of the 1.25-acre developed area for the telecommunication facility.

Construction of the telecommunication facility is estimated to take about 9 months. Construction is estimated to begin in the second quarter of 2026 and end in the second quarter of 2027. An average of 26 workers would be present on site at one time during construction. An average of 10 deliveries and 36 vehicle trips are anticipated per day during construction. Construction would occur during typical working hours (i.e., 7 a.m. to 5 p.m.).

Minimal on-site maintenance would be required over the life of the telecommunication facility. Generator testing would occur monthly during daytime hours. A maximum of three operations workers would be present on site at one time and would rotate shifts to ensure operation of the facility 24 hours per day, 7 days per week. An average of three deliveries and two vehicle trips are anticipated per day during operations.

1.1.1.2 Submarine Cable Laying and Installation

The marine segments of the Project cable system would be installed using a special purpose cable laying vessel, such as the SubCom Reliance Class cable ship or equivalent. These cable ships are approximately 492 feet (150.0 m) in length and would operate at speeds of 1 to 5 knots (1.9 to 9.3 km/h) throughout the majority of cable installation activities in open ocean waters, but speeds vary depending on weather, seabed, and location. Marine operations are typically a 24 hour per day operation.

The submarine portion of the F/O cable would be laid on the seabed; no trenching or burying would be required. Cable laying activities consider the seabed profile, cable type, and benthic characteristics. Prior to the cable-laying operation, all data from the route surveys were studied and a cable laying plan was developed.

One or two support boats would be required to assist the cable ship during the nearshore landing operation. The support boats would be smaller vessels, sourced from local entities. Positioning of the cable ship at the exit point for the landing pipe would be accomplished using thrusters.

Once the cable ship is properly positioned, it would begin laying out cable while personnel attach suspension floats at regular intervals, as required, to allow the cable to be floated toward the subterranean HDD conduit by divers, a small motorboat, and/or other means. Once the cable reaches the HDD conduit, the floats would be removed, allowing the cable to sink and enter the HDD conduit at the proper angle. Divers would feed the F/O cable into the open subterranean HDD conduit by attaching it to the pilot line. The cable would then be pulled through the HDD conduit toward the BMH by a winch or other suitable method, with floats being progressively removed. Once sufficient F/O cable has reached shore, the cable would be secured onshore, the remaining floats would be removed to allow the rest of the cable to sink to the sea bottom, with the F/O cable correctly positioned on the seabed, in the HDD conduit, and anchored into the BMH. The submarine portion of the F/O cable would then be spliced to the terrestrial cable, which terminates at the cable landing site. Following onshore installation, the cable landing site would be restored to pre-landing conditions.

The nearshore landing operation would occur during daylight hours and suitable conditions (calm weather and minimal swell) and is anticipated to take approximately 1 day. The cable ship and support boats would comply with applicable federal and state regulations and conventions addressing navigational safety, safe operations, and pollution prevention measures. A Local Notice to Mariners would be prepared in accordance with U.S. Coast Guard (USCG), District 14 requirements. A Local Notice to Mariners would provide information concerning aids to navigation, hazards to navigation, and other items of marine information of interest to mariners within State of Hawaiʻi waters. The Local Notice to Mariners to be issued for this Project would provide information on the presence of Project vessels within the State of Hawaiʻi waters. The USCG would issue the Local Notice to Mariners to alert other vessels of the cable ship's presence, expected time in the area, and contact information.

1.3.1.1 Cable System Operation

Once installed, the Applicant would be responsible for the operation and maintenance of the cable system. As required, replacement and maintenance of installed equipment at the cable landing station would be performed. Given the durability of the system and proven F/O cable installation methods, the need for submarine cable repairs is expected to be infrequent but would consist of recovering and splicing damaged cable. Such incidents of cable damage are rare, with a likelihood of just one or two incidents in the State of Hawaiʻi marine waters over the estimated 25-year lifespan of the Project.

1.3.1.2 Safety Protocols

During the onshore construction period (approximately 7 to 9 months), consideration may be made for a periodic security guard service. Open pits, and other potentially hazardous openings, would be covered at the cable landing site at night and on weekends to ensure public safety during non-working hours.

No ocean waters would be closed to ocean activities such as boating, surfing, diving, and swimming during the cable-laying process (approximately 0.5 day, depending on weather conditions). During the cable installation process (approximately 1 day), no nearshore ocean waters would need to be closed between the shoreline and the subsea exit point for the landing pipe. During installation, an approximately 328-foot (100.0 m) safe zone would be created around the installation area. This area would be patrolled by the use of small boats or jet skis, to keep patrons and vessels out of the work area.

Additionally, a Local Notice to Mariners would be issued prior to the arrival of the vessel to the area.

1.3.1.3 Project Timeframe

The construction timeframes for the various components of the Project are listed below. Construction of the Project components are independent of each other, and timeframes would overlap with construction of the fronthaul system, expected to begin before development of the cable landing site and telecommunication facility. At the cable landing site, construction activities for each component would generally be sequenced as listed below. The Project is planned for completion as early as the fourth quarter of 2026. However, timing and duration of each component are subject to availability of necessary permits and construction schedule.

- Conduit system (fronthaul) installation: 9 to 11 months.
  - Installation of conduits by small HDD: 7 months.
  - Installation of manholes and vaults: 2 months.
  - Demobilization and site restoration: 1 month.
- Cable landing site development: 4 to 5 months.
  - Site Preparation and mobilization: 1 week.
  - Installation of six landing pipes by HDD methods: 12 to 16 weeks.
  - Installation of BMHs: 1 week.
  - Installation of OGBs: 1 week per OGB (4 weeks total).

- Demobilization and site restoration: 2 weeks.
- Subsea cable installation: up to 2 weeks per cable (6 weeks total).
- Telecommunication facility: 9 months.

1.3.2 No Action Alternative

Under the No Action Alternative, the Project would not be constructed. No construction activities for the Project would be undertaken, and the Project would not contribute to broadband development in Hawaiʻi.

1.3.3 Alternatives Considered but Eliminated from Detailed Study

1.3.3.1 Alternative Alignments for the Landing Pipes

The initial layout for the six landing pipes included two sets of three landing pipes along a depth contour of approximately 40 to 50 feet (12.2 to 15.2 m). The exit points for the northern span of landing pipes 1 through 3 were spaced at a distance of approximately 197 feet (60.0 m), while the exit points for landing pipes 4 through 6 were spaced at a distance of approximately 246 feet (75.0 m). Dive surveys to characterize the structural and biotic characteristics of the exit points were conducted by Marine Research Consultants, Inc. (MRCI) in October 2024. This survey found that the bottom composition at five of the six proposed exit points consisted of a steeply sloping limestone fossil reef face largely covered with a veneer of algal turf and cyanobacteria. Reef corals occurred on the slope but in low densities that ranged from zero to 6 percent of bottom cover. The survey report concluded that this sloping limestone fossil reef face provides a suitable location for HDD exit points with a minimum impact on corals or other biota. One exception to this structure was at the exit point for landing pipe 3, where the designated HDD exit location occurred at a depth of 46 feet (14.0 m) and consisted of a flat, sandy area populated by expanses of seagrass and the invasive alien alga *Avrainvillea lacerata* (commonly called *mudweed*). To reduce impacts on seagrass, the spacing between landing pipes 1 through 3 was subsequently reduced so that landing pipe 3 could be relocated to the north, consistent with what is described for the Proposed Action.

1.3.3.2 Alternative Layout for the Cable Landing Site

The initial layout for the cable landing site at Barbers Point Beach Park sited five OGBs across the northeast portion of TMK (1) 9-1-026:027. Grant of easement for subsurface Project infrastructure at Barbers Point Beach Park would limit other potential future uses of the land. For example, the easement would likely restrict future construction of above-ground structures (such as buildings) and restrict subsurface excavation within areas defined by the easement. To reduce conflicts with other potential future use of the park property, the layout of the landing site was revised to reduce the number of OGBs from five to four and to relocate the OGBs from the center to the eastern perimeter of the property, leaving a larger area in the center of the parcel unencumbered.

1.3.3.3 Alternative Siting for the Telecommunication Facility

The initial site plan for the telecommunication facility sited the facility in the southwest corner of TMK (1) 9-1-016:179, immediately adjacent to Farrington Highway and Kapolei Golf Course Road. However, during preliminary engineering design, a drainage easement associated with Hawaiʻi Department of Transportation's (HDOT) planned widening project for Farrington Highway was identified, and the siting area for the telecommunication facility was shifted 70 feet (21.3 m) to the southeast to avoid conflicts with planned highway improvements.

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Chapter 2
Affected Environment and Environmental Impacts

This chapter presents the existing conditions and potential environmental impacts of the Proposed Action and No Action Alternative within the Project area. The marine portion of the Project area includes installation of six landing pipes via HDD methodology between the shoreline and HDD exit points on submerged lands and the installation of three subsea F/O cables from the territorial limit of the State of Hawaiʻi waters to Barbers Point Beach Park. The onshore portion of the Project area includes the Barbers Point Beach Park parcel, public road ROW along the proposed fronthaul system, and the parcels where the proposed telecommunication facility would be located. The analysis provided in this chapter considers direct and indirect impacts on the environment and proposed avoidance and minimization measures that would be implemented as part of Project design to reduce potential adverse impacts.

2.1 Air Quality

2.1.1 Affected Environment

Pursuant to the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) has established nationwide air quality standards to protect public health and welfare. These federal standards, known as National Ambient Air Quality Standards (NAAQS), represent the maximum allowable atmospheric concentrations for criteria pollutants (commonly emitted air contaminants that affect human health). EPA has established NAAQS for six air pollutants determined to be criteria pollutants: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter 10 and 2.5 microns or less in diameter (PM10 and PM2.5, respectively), and sulfur dioxide (SO_2). Hawaiʻi has also set state-level standards for all six criteria pollutants, in addition to hydrogen sulfide (State of Hawaiʻi Department of Health [HDOH] 2024a). In addition to establishing additional Hawaiʻi ambient air quality standards (HAAQS), the Clean Air Branch of HDOH is responsible for implementing air pollution control in the state.

Air quality is determined by measuring ground-level ambient air pollutant concentrations over certain time periods. EPA designates geographic regions as *nonattainment areas* when measured concentrations of these air pollutants exceed the NAAQS for specific pollutants and time periods and as *attainment areas* when pollutant levels are less than the NAAQS. EPA designates former nonattainment areas that have reduced pollutant levels below the NAAQS as *maintenance areas*.

Despite occasional fluctuations, particularly from volcanic activity on the Island of Hawaiʻi, air quality in Hawaiʻi is generally considered good due to the state's isolated ocean location combined with persistent northeast trade winds and a lack of substantial industry. HDOH and EPA maintain a network of air quality monitoring stations throughout the islands. Based on the most recent air quality report, the State of Hawaiʻi, including the Project area, was classified as an attainment area for all NAAQS in 2023 (HDOH 2024a).

The closest air quality monitoring station to the Project area is the Kapolei Station, located approximately 2 miles (5 km) from the Project area in the Kapolei Business Park southeast of the Kapolei Fire Station. This station monitors CO, NO_2, SO_2, PM10, and PM2.5. Air quality monitoring records show no exceedances of the NAAQS at the Kapolei Station for any monitored pollutants in

2023, the most recent year for which an annual air quality summary report is available (HDOH 2024a).

2.1.2 Impacts of the Alternatives

2.1.1.1 Proposed Action

Construction of the Proposed Action would generate criteria pollutant emissions that could result in short-term air quality effects. Emissions would be released primarily in the form of exhaust from equipment and vehicles, such as a large bore (HDD) machine, excavator, dump truck, crane, and forklift. Additionally, construction activities like excavation, vehicle travel, and cable installation would produce fugitive dust emissions, including PM10 and PM2.5.[1] Air pollutant and fugitive dust levels would be highest near the Project area, with lower levels potentially present along travel routes to and from the Project area. Although the Proposed Action would result in air pollutant emissions, these emissions would be short-term and temporary. The increase in emissions would be minor and would not lead to exceedance of the NAAQS or HAAQS, and best management practices (BMP) would be implemented to minimize their magnitude and extent (see Section 2.1.3, *Avoidance and Minimization Measures*).

Operation of the Proposed Action would generate emissions from vehicle trips for onsite maintenance, averaging three deliveries and two worker vehicle trips per day, as well as from the operation and maintenance of mechanical equipment, including six generators. Generator testing would occur monthly during daytime hours. Emissions from vehicle travel and generators during operation would be minor and are not expected to result in exceedances of the NAAQS or HAAQS.

Therefore, construction and operation of the Proposed Action are not anticipated to cause any exceedances of the NAAQS and HAAQS or to significantly affect air quality.

2.1.1.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on air quality.

2.1.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on air quality are anticipated. The following measures, which would be part of Project design, would be implemented to avoid and minimize potential impacts on air quality during implementation of the Proposed Action.

- All Project vehicles and equipment (including the generators used during operation) would be maintained in proper working order and in compliance with state and federal vehicle and emissions standards.
- State regulations require reasonable precautions to prevent visible fugitive dust from becoming airborne (HDOH 2024b). Therefore, the Project would implement BMPs to control fugitive dust during construction. BMPs may include watering the area to reduce dust movement, using wind

[1] *Fugitive emissions* are emissions that are not emitted from a stack, vent, or other specific point that controls the discharge. For example, windblown dust is particulate matter fugitive emission.

screens, keeping adjacent roads clean, using gravel as a temporary travel-path surface in the Project area instead of dirt, and covering loads of soil and materials on trucks.

2.2 Climate Change and Sea Level Rise

2.2.1 Affected Environment

Climate change is a long-term shift in patterns of temperature, precipitation, humidity, wind, and seasons. Scientific data show that the earth's climate has been warming. This warming is mostly attributable to rising levels of carbon and other greenhouse gases (GHG) generated by human activity. These changes are already affecting Hawaiʻi through rising sea levels, increasing ocean acidity, changing rainfall patterns, decreasing stream flows, and changing wind and wave patterns. While the earth's climate experiences natural change and variability over geologic time, the changes that have occurred over the last century due to human input of GHGs into the atmosphere are unprecedented (Hawaiʻi Climate Change Mitigation and Adaptation Commission [HCCMAC], 2017). A changing climate creates conditions that increase the frequency and severity of many natural hazards, as discussed in Section 2.8, *Natural Hazards*.

Sea levels are rising at increasing rates due to global warming of the atmosphere and oceans and the melting of glaciers and ice sheets (HCCMAC 2017). Recent projections of sea level rise predict 3 to 4 feet of sea level rise by 2100 as a mid-range scenario for Hawaiʻi, which is higher than previous estimates (HCCMAC 2022). These rising seas and the projection for more tropical storms in the Pacific Ocean would increase the state's vulnerability to coastal inundation and erosion.

Barbers Point Beach Park is located in a special flood hazard area and designated sea level rise exposure area (SLR-XA), projected to experience long-term, chronic flooding based on a projected 3.2-foot rise in global mean sea level by 2100. Figure 2-1 shows the 1.1-foot (0.3-meter [m]), 2.0-foot (0.6-m), and 3.2-foot (1.0-m) future sea level rise scenarios for the cable landing site and the immediate vicinity as modeled by the Pacific Islands Ocean Observing System (PacIOOS 2018). The majority of the Barbers Park Beach Park Parcel (approximately 83 percent) would be inundated under a projected 3.2-foot (1.0-m) rise in sea level by the year 2100 (Figure 2-1). For the year 2050 (that corresponds to the 25-year life of the subsea cables), the sea level rise at Barbers Point Beach Park is projected to be between 0.7 feet (0.2 m) and 1.5 feet (0.5 m) (HCCMAC 2022). The intermediate (mid-range) projection of 1.0 feet (0.3 m) of sea level rise most closely matches the 1.1-foot (0.3-m) scenario shown in Figure 2-1 (HCCMAC 2022). Potential hazards associated with sea level rise include the following.

Passive Flooding: Elevations that are below the elevation of the combined sea level rise and local mean higher high water are considered *passive flood areas*. Passive flood areas that are connected to the ocean are considered *marine inundation* areas, while areas that are not connected to the ocean are considered *groundwater inundation* areas.

- High Wave Flooding: Also known as *high tide flooding*, high wave flooding occurs when sea level rise combines with local factors to push water levels above the normal high tide mark.
- Coastal Erosion: Shoreline change and loss of coastal lands resulting from a combination of historic erosion pressures on the coastline, rising water levels, and the influence of additional water levels on erosion processes.

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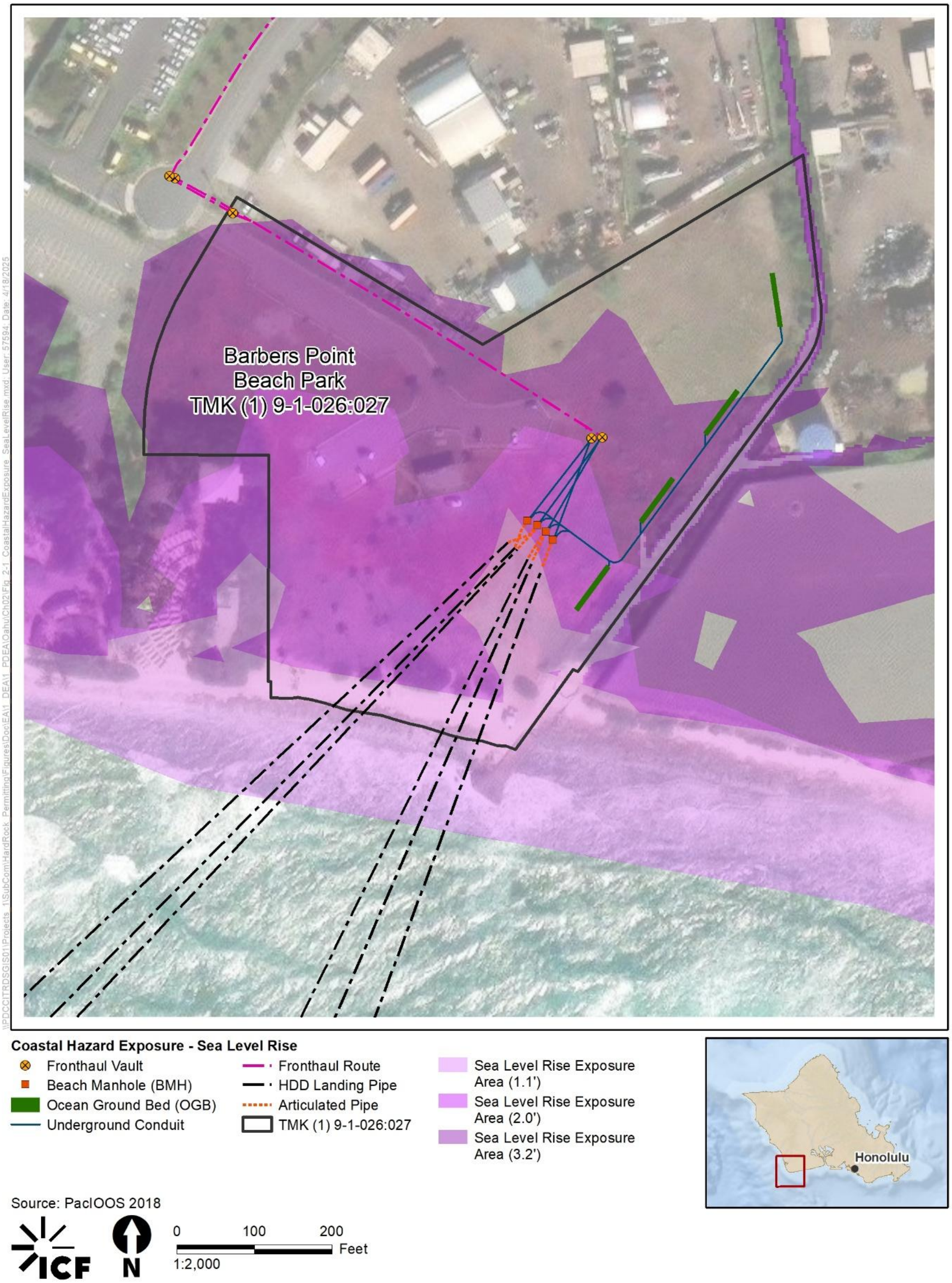

Figure 2-1. Coastal Hazard Exposure – Sea Level Rise

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2.2.2 Impacts of the Alternatives

2.2.2.1 Proposed Action

Construction of the Proposed Action would result in GHG emissions from operation of construction equipment. These emissions would be short-term and temporary and would not be substantial; therefore, construction of the Proposed Action would not have significant impacts that would exacerbate climate change.

Operation of the Proposed Action would generate GHG emissions from vehicle trips for onsite maintenance and potential operation of six emergency generators to provide backup power for the telecommunication facility. An average of three deliveries and two worker vehicle trips are anticipated per day, which would marginally increase GHG emissions from traffic in the surrounding area. Emergency generator testing would occur monthly, producing a minor amount of GHGs not expected to significantly contribute to regional or global GHG levels. These increases would not be substantial and would not be expected to have a material effect on climate change. Therefore, the Proposed Action would not result in significant adverse impacts on the regional climate or climate change.

Given that the Proposed Action would be built along the coastline, the anticipated effects of climate change, such as sea level rise, increased storm severity, and shoreline erosion, have the potential to impact Project infrastructure. As described in Section 2.2.1, *Affected Environment*, Barbers Point Beach Park is located within a special flood hazard area threatened by hazards associated with sea level rise, including passive flooding, high wave flooding, and coastal erosion. Given the potential for Project infrastructure to be affected by coastal hazards, components at the cable landing site have been designed to locate the BMHs and vaults as far inland on the parcel as reasonably practicable and would entirely avoid the projected 1.1-foot (0.3-m) sea level rise scenario (Figure 2-1). The 1.1-foot (0.3-m) sea level rise scenario corresponds to the projected sea level rise in 2050 which would also correspond to the estimated 25-year life of the subsea cables.

The cable landing site under the Proposed Action would be monitored throughout the life of the Project to identify impacts of coastal flooding and erosion from high waves and storms, which are anticipated to increase with sea level rise. The Project components are designed to be resilient to flooding and coastal erosion as they are specifically built for this environment. If required, potential erosion could be mitigated with imported fill for stabilization of buried infrastructure. If facilities become exposed, it is also possible to re-bury the facilities at a lower elevation to maintain ground clearance. Potential inundation due to sea level rise would not affect the landing pipes, subsea cables, conduits connecting to the fronthaul, or OGBs. If the BMH was inundated in the future due to sea level rise, it could become inaccessible. To remedy this, a riser could be added to the manholes. Concrete risers come in various heights and are easily added to the existing manhole structures.

2.2.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on climate change and sea level rise. Climate change and sea level rise are expected to continue and would ultimately have a potential impact on the Project site.

2.2.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on climate change or sea level rise are anticipated. The potential impact of sea level rise on the Project has been addressed through Project design. However, the following measures have been incorporated to address uncertainty around future coastal conditions over the life of the Project.

- Project infrastructure would be monitored over the life of the Project through routine maintenance. If there is evidence of erosion over time, imported fill could be used to stabilize buried infrastructure. If facilities become exposed, it would also be possible to re-bury the facilities at a lower elevation to maintain ground clearance.
- If the BMH were to become inundated in the future due to sea level rise, it could become inaccessible. To remedy this, a riser could be added to the manholes. Concrete risers come in various heights and are easily added to the existing manhole structures.

2.3 Cultural Resources and Practices

2.3.1 Affected Environment

To assess potential impacts on cultural resources and practices, a cultural impact assessment (CIA) and Ka Pa’akai analysis was conducted for the Project and is included in this EA as Appendix B, *Cultural Impact Assessment*. The purpose of the CIA is to evaluate potential impacts on traditional cultural practices that may result from the Project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawaiʻi Environmental Council on Nov. 19, 1997. For the CIA, the ahupuaʻa of Honouliuli is considered the overall study area (see Appendix B). The purpose of the Ka Paʻakai analysis portion of the CIA is to assist the State of Hawaiʻi in fulfilling its obligation to protect the following (Article XI, Section 7 of the Constitution of the State of Hawaiʻi).

> …all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.

The Ka Pa’akai analysis requires that the following specific findings and conclusions be addressed.

1. The identity and scope of valued cultural, historical, or natural resources in the Project area, including the extent to which traditional and customary native Hawaiian rights are exercised.
2. The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action.
3. The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

To prepare the CIA and Ka Paʻakai analysis, Pacific Legacy conducted archival research and consultation with cultural practitioners, cultural descendants of Honouliuli, and representatives of organizations and state agencies.

Background research found that the Project area is in close proximity to a number of significant places in Honouliuli, including Puhilele, the Barbers Point Lighthouse, Puʻu o Kapolei, Puʻu Pālailai, and Puʻu Makakilo. The area around these puʻu has association with Pele and her sisters, notably in the moʻolelo of Hiʻiakaikapoliopele, and Puʻu o Kapolei, named for "beloved Kapo" and home to Kamapuaʻa's grandmother, Kamaunuaniho. The ʻōlelo noʻeau which make reference to Honouliuli or ʻEwa describe the area's characteristic red earth and abundant marine resources, though these are generally referencing the West Loch/Puʻuloa area further to the east of the Project area. Barbers Point Beach Park lies within the uplifted coral reef of the ʻEwa Plain, which is characterized by its abundance of limestone pit features. These pits have been found to contain significant cultural and paleontological deposits, as well as burials.

During the Māhele, Honouliuli ahupuaʻa was awarded to Miriam Keʻahikuni Kekauʻōnohi. Archival research did not identify Land Commission Awards (LCAs) in the vicinity of the Project area, and the majority of LCAs in the ahupuaʻa are concentrated near Honouliuli Stream in the Puʻuloa/West Loch area. Post-Contact land use was largely focused on commercial ranching and agricultural ventures, including Honouliuli Ranch and the Ewa Plantation Company. The OR&L Railroad began operations in 1889, and a portion of the railway crosses through the Project area. The ʻEwa Plain and Puʻuloa became key sites for military development during World War II. A residential and industrial boom following the war led to the development of Makakilo, Kapolei, and Campbell Industrial Park. In 1976, West Oʻahu College opened in Kapolei, and became the UHWO in 1989.

Previous consultation efforts for projects in Honouliuli have identified a range of cultural resources, practices, and beliefs in Honouliuli, many of which are concentrated in the area around Puʻuloa. This included rich marine fisheries, salt pans, coastal freshwater sources, and limu. Farther mauka, the area around Makakilo, was known to have been exceptionally verdant, with rich soils for cultivation, and home to a number of native or Polynesian-introduced plant and animal species. Makakilo also held great spiritual significance. Observations of otherworldly or supernatural events were remarked upon by numerous participants in previous consultations, particularly in the area around the Kaupeʻa Plain. Other important features identified included the network of pre-Contact trails crosscutting the ahupuaʻa, many of which either intersect with or have been developed into modern roads, including Farrington Highway; natural coral and rock coves used for shelter; limestone pit features, and in particular their potential to contain iwi kūpuna; and the spiritual strength of burial areas in Honouliuli.

Consultation specific to this Project identified the potential for iwi kūpuna to be present in the Project area; the potential presence of access trails or resource gathering sites in or near the Project area; valued offshore cultural resources, including those identified during the desktop review (the Arthur and the Liliu) and marine resources including fisheries, limu, and coral; the possible presence of limestone pit features, which may contain cultural deposits, environmental data, and/or burials; and other resources and places which are located farther away from the Project area but still hold significant value, including Ordy Pond and the permanent settlements and expansive irrigated kalo floodplains near Puʻuloa.

2.3.2 Impacts of the Alternatives

2.3.2.1 Proposed Action

Consultation for the CIA and Ka Paʻakai analysis was initiated with distribution of a letter on December 2, 2024, inviting potential consulting parties to participate. A Public Notice inviting participation was also posted on the Ka Wai Ola notice board on January 2, 2025. Participants in the consultation to date have not expressed objections to the Project but identified multiple cultural resources and practices that could be impacted by Project activities.

The potential for the Project to encounter iwi kūpuna was a primary concern for consultation participants, who stressed the importance of treating burials and other culturally significant resources with care and respect. The importance of offshore resources, including cultural resources like the Arthur and the Liliu, as well as biocultural resources like limu, coral, and marine ecosystems, was also emphasized. Participants observed that nearshore resources, especially coral and limu, have been impacted by previous projects that included water diversion, pollution, and/or runoff. Consultation participants noted that offshore resources warranted careful documentation and preservation and should be protected from potential impacts of the Proposed Action. Participants also wanted to ensure the portion of the OR&L Railroad ROW that intersects with the Project area was not affected.

Recommended feasible actions to be taken to reasonably protect Native Hawaiian rights included: (1) performing cultural monitoring during all ground-disturbing activities; (2) ensuring legal and respectful protocols are in place in the event that iwi kūpuna are encountered during Project activities; (3) conducting an additional survey to identify pre-Contact historic properties in the Project area; (4) employing mitigation strategies to ensure the Project avoids impacts on marine ecosystems; (5) ongoing consulting and collaborating with community members throughout the Project; and (6) consulting with the State Historic Preservation Division (SHPD) and the Hawaiian Railway Society to mitigate any potential impacts on the OR&L Railroad ROW.

On March 17, 2025, a Project update letter inviting further consultation was distributed to potential consulting parties for the CIA and Ka Paʻakai analysis due to an expansion of the siting area for the telecommunication facility (Figure 1-3). The distribution for the Project update letter also included additional parties who were referred by consulting parties of the initial round of consultation. This second phase of consultation is ongoing. If additional concerns or recommendations are identified through this second phase of consultation, any new information or updates will be incorporated into the Final EA.

2.3.2.2 No Action

Under the No Action Alternative, the proposed Project would not be constructed. Therefore, the No Action Alternative would have no impact on cultural resources.

2.3.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on cultural resources and practices are anticipated. The following measures, which would be part of Project design, would be implemented to address concerns raised during consultation for the CIA and Ka Paʻakai analysis and to avoid and minimize impacts on cultural resources and practices during implementation of the Proposed Action.

- Consultation participants stressed the importance of ongoing consultation and collaboration with community members, cultural practitioners, and descendants of Honouliuli, and recommended the Project team ensures public access to findings and facilitates open dialogue with community members. To ensure that the findings of the CIA and Ka Paʻakai analysis are publicly available, the CIA and Ka Paʻakai analysis has been appended to this EA as Appendix B. The Applicants will notify consultation participants when the Draft EA has been posted for public review and will distribute an update letter to consultation participants if there are substantive changes to the Project that would warrant reopening consultation.

- Consultation participants emphasized the necessity of treating *iwi kūpuna* and other culturally significant materials with care, not only with regard to the law, but also in accordance with Native Hawaiian traditions. To address this concern, the Applicants propose to seek additional input from the consultation participants on the protocols to include in an inadvertent discovery plan to ensure that any *iwi kūpuna* and other culturally significant materials encountered during Project construction would be protected and treated with respect. The inadvertent discovery plan would define areas of highest potential cultural sensitivity that may warrant the implementation of cultural monitoring during construction and would establish communications protocols, immediate protective treatment measures, and cultural protocols in the event of an inadvertent discovery of human remains, burials, or other culturally significant materials.
- To avoid potential impacts on submerged cultural resources, sonar data collected during cable route surveys would be utilized to identify and avoid potential submerged cultural resources by a *minimum* distance of 164 feet (50 m).
- To minimize impacts on biocultural resources like *limu*, coral, and marine ecosystems, dive surveys are being utilized to identify the most favorable (least impactful) locations for siting the HDD exit points on the seafloor, seaward of Barbers Point Beach Park. These surveys are underway, and site-specific information on the final locations of the HDD exit points will be included in the Final EA. Subsea cables would be surface-laid and would not require trenching or plowing to install cables in the marine environment.
- To minimize the potential for water pollution and runoff into the marine environment, the Applicants would incorporate best management practices for erosion control, stormwater management, and pollution prevention into construction plans and adhere to all permit conditions contained in the National Pollution Discharge Elimination System (NPDES) General Permit (s); Water Quality Certification; and grubbing, grading, stockpiling, or trenching permits obtained for the Project. This would avoid and minimize erosion of soil and discharge of other pollutants into adjacent marine waters. The Applicants would also implement an inadvertent return contingency plan during construction of the landing pipes to reduce the potential for release of drilling fluid into the nearshore environment.
- To avoid impacts to previously identified or potential historic properties identified along the fronthaul route, the Applicant's would bore beneath the OR&L Railroad and other post-Contact bridges, canals, storm drains, culverts and ditches that are crossed by the fronthaul system.

2.4 Geology and Soils

2.4.1 Affected Environment

The Project is located along the western (leeward) side of the island of Oʻahu within the ʻEwa District. Oʻahu was created by the formation of two shield volcanoes forming the Waiʻanae Mountain Range to the west and the Koʻolau Mountain Range to the east. The main shield-building stage of the

Waiʻanae volcano occurred approximately 3.8 to 2.95 million years ago and, while there has possibly been post-erosional volcanic activity as recently as the Pleistocene, the volcano is now extinct (Hawaii Center for Volcanology 2018). The Waiʻanae Volcanic Series is categorized into lower, middle, and upper members. The lower member comprises the lava flows and pyroclastic deposits that formed the primary structure of the Waiʻanae shield. The middle member predominantly consists of rocks that accumulated within the caldera, progressively filling it over time. The upper member constitutes a thin layer that enveloped much of the shield in the latter stages of its geological history. The volcano is now extensively eroded, characterized by large amphitheater valleys along its western slopes (Hawaii Center for Volcanology 2018).

The area surrounding the proposed cable landing site and the southern portion of the fronthaul system is underlain by volcanics and unconsolidated calcareous reef rock and marine sediment of Pleistocene age (Qcrs), while the northern portion of the proposed fronthaul system and the telecommunication facility are underlain by older alluvial sediment of Pleistocene age (Qao) (Sherrod et al. 2021).

Figure 2-2 shows the mapped distribution of these geologic units in the onshore portions of the Project area. Elevations along the Project range from approximately 3 feet mean sea level at the cable landing site to approximately 120 feet mean sea level at the telecommunication facility. The seafloor in the vicinity of the Project area is comprised of volcanic reef bearing material overlain by occasional, fine grained sand beds (Sherrod et al. 2007).

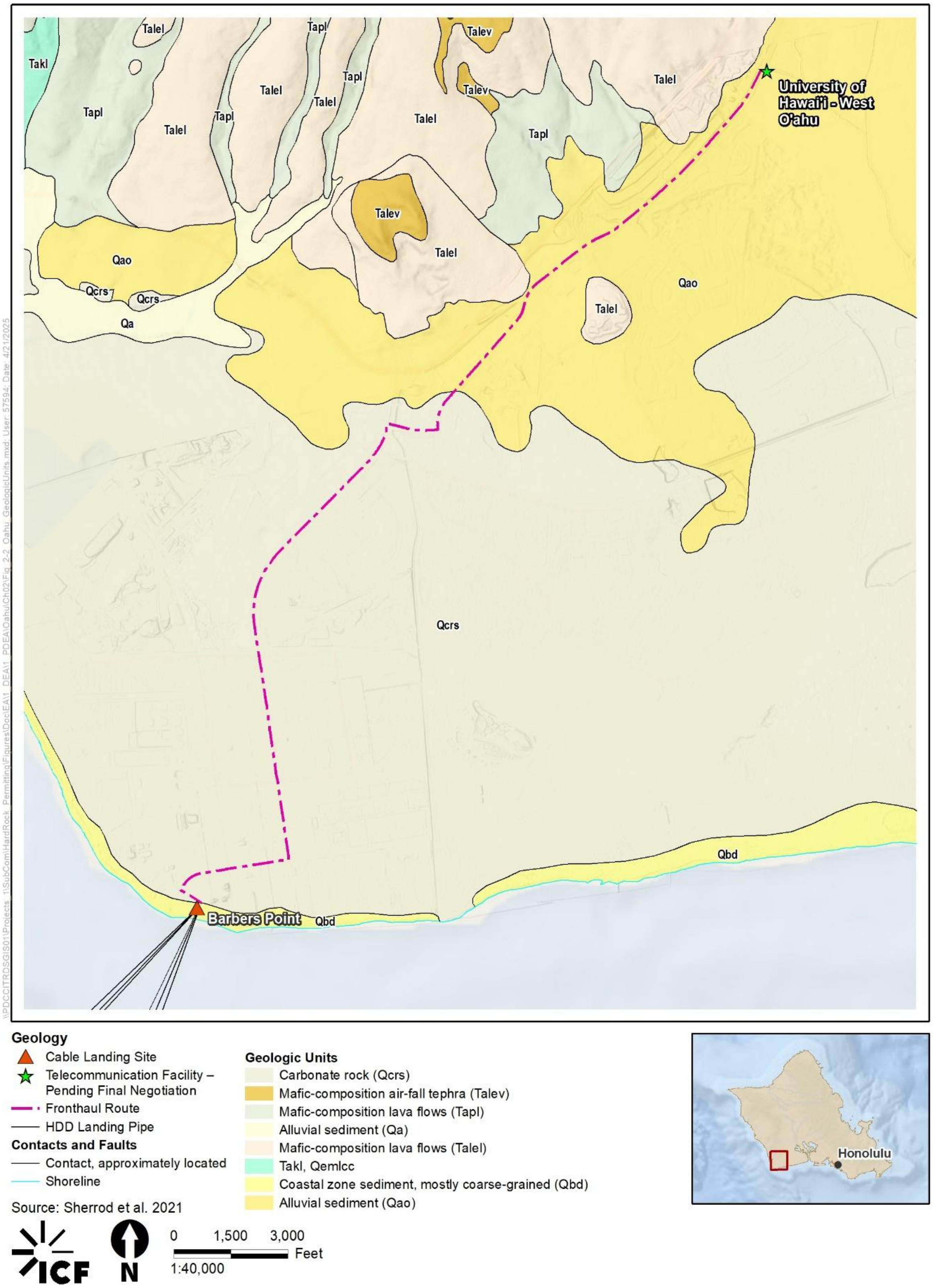

Figure 2-2. Geologic Map of the Onshore Portion of the Project Area

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Table 2-1 lists the soil types present within each of the onshore portions of the Project area as mapped by the U.S. Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (NRCS 2025). Figure 2-3 shows the mapped distribution of these soil units in the onshore portions of the Project area. The oceanfront portion of the cable landing site is mapped as beach, which occur as sandy, gravelly, or cobbly areas on all of the islands. They are washed and rewashed by ocean waves, consist mainly of light-colored sands derived from coral and seashell, and have no value for farming but are highly suitable for recreational uses and development where they are free of cobblestones and stones (U.S. Department of Agriculture [USDA] 1972). The remainder of the cable landing site and a substantial portion of the fronthaul route leaving the cable landing site are mapped as coral outcrop, which consists of coral or cemented calcareous sand on Oʻahu. Vegetation is sparce on this map unit, which has been used for military installations, quarries, and urban development (USDA 1972).

Including coral outcrops, the fronthaul route traverses 11 soil map units (see Table 2-1 and Figure 2-3). Coral outcrops underlie the majority of the fronthaul route, primarily from the cable landing site to approximately the intersection of Kalaeloa Boulevard and Kapolei Parkway. Ewa silty clay loam, which is found along the fronthaul route and underlies a portion of the telecommunication facility site, includes slopes between 3 and 6 percent, and is characterized as well draining with moderate permeability, slow runoff, and a slight erosion hazard rating (USDA 1972). The Ewa stony silty clay unit, also found along the fronthaul route and within the telecommunication facility site, is similar to Ewa silty clay loam except the surface texture includes stones that can interfere with tillage but do not make tilled crops impracticable. The Honouliuli clay soils are found along the fronthaul route and telecommunication facility site, include slopes between 0 and 6 percent, and consist of well-drained soils on coastal plans. These soils developed in alluvium derived from basic igneous material and exhibit moderate permeability, slow runoff, and a slight erosion hazard rating (USDA 1972). The Kawaihapai stony clay loam (2 to 6 percent slopes) and Mamala cobbly silty clay loam (0 to 12 percent slopes) consist of well-drained soils on the coastal plains of Oʻahu. On these soils, permeability is moderate, runoff is slow to medium, and the erosion hazard is slight to moderate. The Molokai silty clay loam (7 to 15 percent slopes) is a well-drained soil found on uplands and is characterized by moderate permeability, medium runoff, and moderate erosion hazard potential. Lastly, the Waialua soils (silty clay and stony silty clay, 0 to 8 percent slopes) exist along portions of the fronthaul route and at the telecommunication facility site, consist of moderately well drained soils on alluvial fans, and are characterized by moderate permeability, slow runoff, and slight erosion hazard potential (USDA 1972).

Table 2-1. Soils in the Project Area

Project Component	Soil Unit
Cable Landing Site	Beaches Coral Outcrop
Fronthaul System	Coral Outcrop Ewa silty clay loam, 3 to 6 percent slopes Ewa silty clay loam, moderately shallow, 0 to 2 percent slopes Ewa stony silty clay, 0 to 2 percent slopes Honouliuli clay, 0 to 2 percent slopes Honouliuli clay, 2 to 6 percent slopes Kawaihapai stony clay loam, 2 to 6 percent slopes

Project Component	Soil Unit
	Mamala cobbly silty clay loam, 0 to 12 percent slopes Molokai silty clay loam, 7 to 15 percent slopes Waialua silty clay, 0 to 3 percent slopes Waialua stony silty clay, 3 to 8 percent slopes
Telecommunication Facility	Ewa silty clay loam, 3 to 6 percent slopes

Source: NRCS 2025.

A geotechnical investigation to support the HDD and cable landing design for the Project was performed on November 18, 2024. One land boring was drilled to a depth of 128.5 feet (39.2 meters [m]) below existing ground surface with a truck-mounted drill rig. The boring was located at Barbers Point Beach Park in the approximate center of where the proposed BMHs would be located. The boring encountered surface soil classified as stiff to very stiff, brown clayey silt with traces of gravel (coralline) to a depth of about 2 feet (0.6 m). Underlying the clayey silt was medium dense tan silty gravel (coralline) to a depth of about 3 feet (0.9 m). The silty gravel was underlain by a thin layer of clayey silt to a depth of approximately 4.5 feet (1.4 m) before transitioning to a medium dense light tannish white silt sand (coralline) to a depth of nearly 10 feet (3.0 m). Medium dense light tannish white coral was encountered at approximately 10 feet (3.0 meters). Sandy gravel, coral, coralline silty sand, and sandstone layers extended to the bottom of the core. Static water was encountered in the borehole at a depth of 2.3 feet (0.7 m); this level is expected to fluctuate with tidal variations.

Offshore geophysical data collected along the HDD alignments indicate that the seabed consists mainly of sparse, migrating sand over rock and fractured rock near shore and sand with exposed sub and outcropping rock going seaward. At the HDD exit points, benthic surveys indicate a nearly flat limestone fossil reef surface that terminates in a steep sloping face (approximately 45-60 degrees). The sloping reef face extends to a distinct junction with a sand plain that extends seaward (MRC 2024).

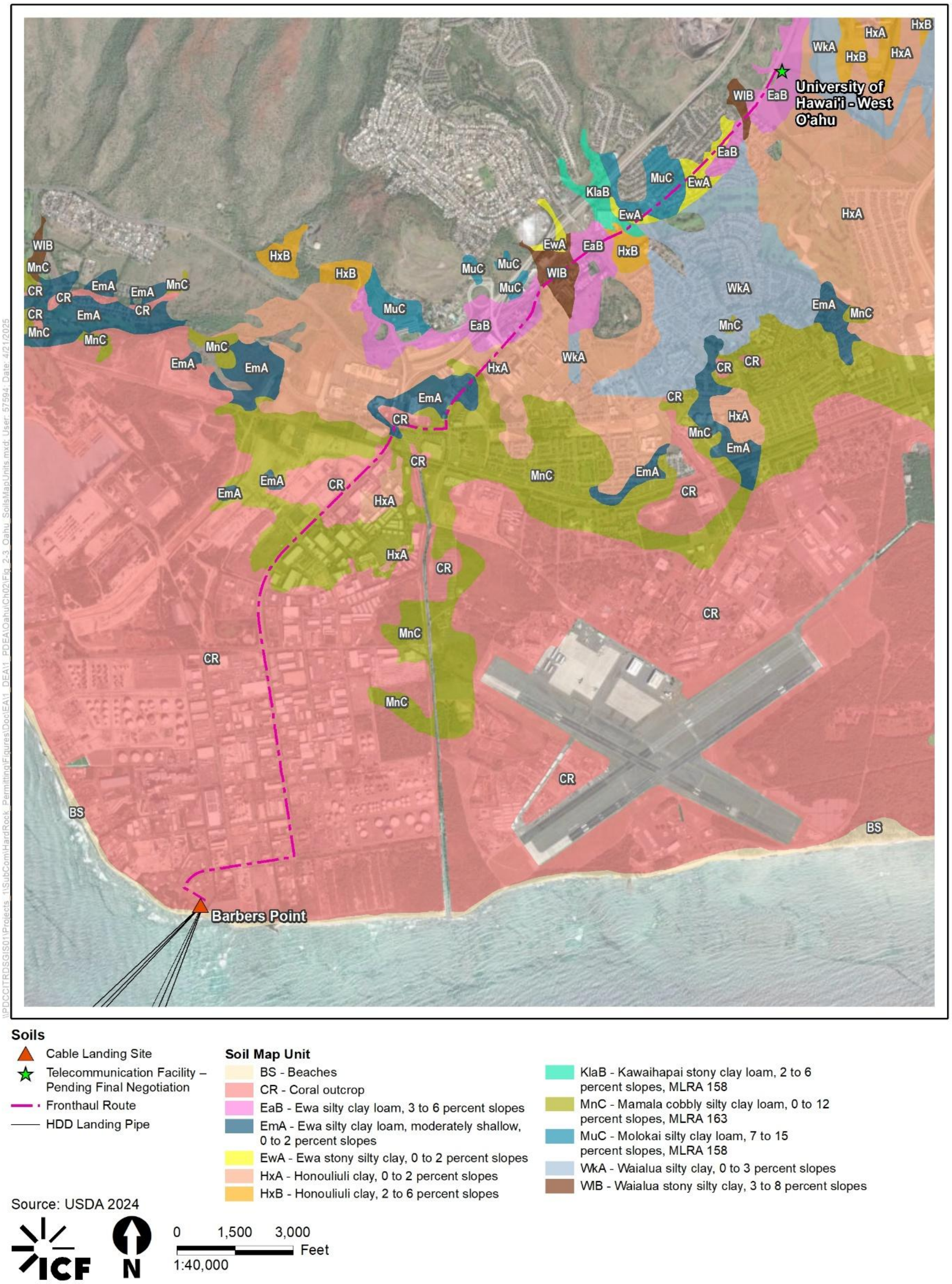

Figure 2-3. Soil Types in the Onshore Project Area

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2.4.2 Impacts of the Alternatives

2.4.2.1 Proposed Action

Construction of the Proposed Action would not permanently alter geologic resources or the topography of the Project area. During construction of the cable landing site, fronthaul system, and telecommunication facility, short-term impacts on soils would result from surface disturbance associated with site preparation and installation of the Project components. At the cable landing site, earthmoving equipment would be used to grade a portion of the site for construction vehicle access and material laydown, as well as construction of the BMHs, OGBs, and HDD drill pit. Surface disturbance at the cable landing site would be limited to 0.96 acre, entirely within Barbers Point Beach Park. Following completion of construction, the site would be restored to pre-project contours and condition. The HDD exit points would be located offshore at water depths up to 71 feet (22 m), approximately 4,400 to 5,100 feet (1,341 to 1,555 m) from the shoreline. The exit points would be located in areas of surficial sandy sediments. Steep sloping (approximately 45–60 degrees) limestone reef exposures, which would be avoided by the HDD, are present to the east of the HDD exit point locations. Under the Proposed Action, control methods would be implemented during HDD activities and installation of the landing pipes to minimize sediment dispersal. Seaward of the HDD exit points, the cable would be laid on the surface over the sandy seafloor. The level of disturbance to the areas of sediment on the seabed during HDD activities and landing pipe installation would be negligible compared to natural sediment movement in the nearshore environment.

Installation of precast concrete manholes, boring, and limited trenching activities associated with construction of the fronthaul system would also result in short-term impacts on soils. However, surface disturbances along the entirety of the fronthaul system would be limited to approximately 0.24 acre and would occur in previously disturbed areas within the public road ROW. Upon completion of construction, all areas would be restored, resulting in a 2-foot-wide underground easement corridor with only the in-ground vaults being visible at surface grade.

Construction of the telecommunication facility would result in approximately 4.30 acres of surface disturbance. An additional 9.80 acres of surface disturbance could result from access and utility connections for the telecommunication facility. Surface disturbances and associated impacts on soil and potential for erosion at the telecommunication facility site would be temporary (approximately 9 months). Following construction, the site would be restored in accordance with UHWO-approved site plans. The telecommunication facility would occupy an approximate 4-acre area, plus access roads and utility corridors.

2.4.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on geology and soils.

2.4.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on geology and soils. Grading activities associated with the Proposed Action would be in conformance with the CCH Grading Ordinance. In addition, the Applicants would obtain coverage under an NPDES General Permit for stormwater discharge associated with construction activities. As part of the permit process, the Applicants would prepare a site-specific erosion and sediment control plan (ESCP) and stormwater pollution prevention plan (SWPPP) to avoid and minimize erosion of soil and discharge of other pollutants into state waters.

BMPs contained in the ESCP and SWPPP would include some or more of the following measures.

- Water or apply dust suppressants at active work areas and Project access roads, as needed.
- Install dust screens or wind barriers around construction sites.
- Install silt fence or filter sock perimeter controls adjacent and downslope from disturbed areas.
- Clean nearby pavements and paved roads after construction.
- Cover open trucks carrying construction materials and debris.
- Limit areas to be disturbed at any given time.

BMPs would be implemented prior to surface-disturbing activities and would be inspected and maintained throughout the construction period.

2.5 Historic and Archaeological Resources

2.5.1 Affected Environment

A literature review and field inspection (LRFI) report was completed in March 2025 (Pacific Legacy 2025) to support the Project's historic preservation review process pursuant to HRS Chapter 6E. The LRFI was designed to investigate previous land use of the Project area and to determine whether historic properties exist in the Project area based on review of historical documents, historical maps, aerial photographs, other reference materials, and field inspection.

The literature review revealed diverse land use through time in Honouliuli ahupuaʻa, including pre-Contact settlement and post-Contact transformations with commercial agriculture, military activities, and commercial and residential development in the vicinity of the Project area. Previous archaeological research suggests that limestone pits may be present in the southwestern portion of the Project area, which may contain cultural and paleoenvironmental data, and remnant commercial agriculture and transportation features may be present in the northeastern portion of the Project area.

Research shows that a total of 63 archaeological studies have been conducted within a 0.5-mile (0.8 km) buffer of the Project area. These previous studies identified 78 historic properties within the 0.5-mile (0.8 km) buffer and portions of two of these historic properties have been documented in the Project area: the OR&L Railroad ROW (State Inventory of Historic Places [SIHP] 50-80-12-07387/50-80-12-09714) and a crushed limestone gravel road (SIHP 50-80-12-08933).

The 15 newly identified potential historic property features included post-Contact bridges, canals and storm drains, culverts and ditches, a berm, a road, and a push piles. The two isolated artifacts consisted of metal blade implements, potentially associated with post-Contact commercial agriculture (Swift et al. 2025). All of the newly identified potential historic property features are associated with commercial agriculture, transportation, and water management, likely relating to post-Contact commercial agriculture.

2.5.2 Impacts of the Alternatives

2.5.2.1 Proposed Action

Adverse impacts on historic and archaeological resources can be characterized as those that result in the loss, degradation, or destruction of historic properties, traditional cultural properties, or cultural landscapes. Many impacts on historic and archaeological resources are permanent because, once disturbed, a cultural resource cannot be restored to its original context. Effects on cultural resources from ground-disturbing activities, or activities that result in the alteration of a property's viewshed if the view is a contributing factor to that property's significance, can cause damage to or destruction of a site's ability to convey its significance.

Direct impacts on previously identified historic properties and newly identified potential historic properties in the Project area would be avoided through Project design to the extent feasible. The fronthaul system primarily would be installed using directional boring. However, depending on site-specific conditions, it is expected that some limited areas of trenching would be needed. The OR&L Railroad is a linear historic property that intersects with the fronthaul route (Figure 2-4). The Applicants propose to avoid impacts on this historic property by installing conduit beneath the railroad bed using directional boring. The Applicants also propose to bore beneath other potential historic properties that intersect the fronthaul system, such as post-Contact bridges, canals and storm drains, culverts and ditches. Because the fronthaul system would be installed subsurface with only manholes and vault covers visible at the ground surface, there would be no impact on the visual setting of built historic properties.

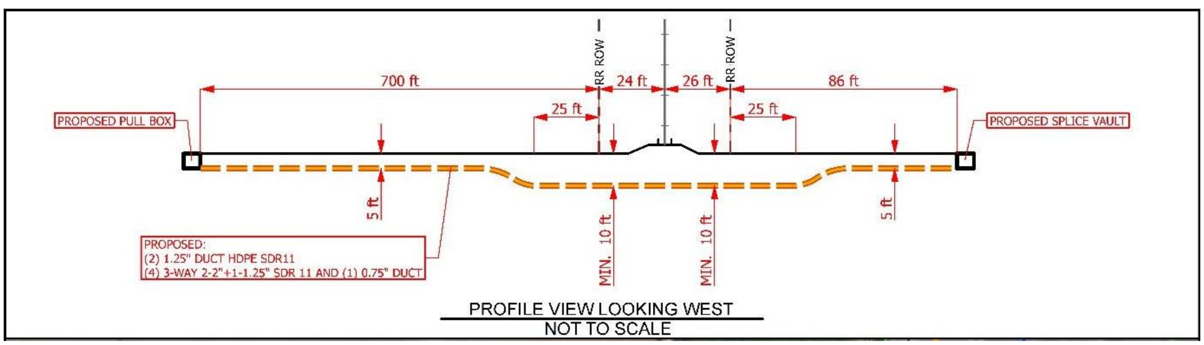

Figure 2-4. Profile Drawing for Fronthaul Crossing of the OR&L Railroad

The landing pipes would be installed by HDD, with the bore commencing at a point on land, continuing beneath the beach and surf zones, and exiting at a point on the seafloor. The bore depth for the landing pipes at the shoreline would be approximately 31 feet (9.5 m) and exit on the seafloor at water depths ranging from approximately 49 feet (15 m) to 71 feet (22 m). Therefore, the HDD installation of the landing pipes would be at a depth below where encountering archaeological resources is expected and would be unlikely to have the potential to adversely affect archaeological resources.

Potential historic properties identified within the siting area for the telecommunication facility include a berm, road, ditch and push piles (Pacific Legacy 2025).

The LRFI report completed for the Project (Pacific Legacy 2025) recommended an architectural reconnaissance level survey and archaeological inventory survey with subsurface testing be completed for the Project to fully identify and document all potential historic properties and provide significance assessments and recommendations. Consultation with SHPD pursuant to HRS Chapter 6E was initiated on April 11, 2025, and is ongoing. Any additional requirements that are confirmed through consultation with SHPD will be documented in the Final EA.

2.5.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternatives would have no impact on archaeological or historic resources.

2.5.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on historic or archaeological resources are anticipated. The following measures, which would be part of Project design, would be implemented to avoid and minimize potential impacts on archaeological and historic resources during implementation of the Proposed Action.

- The Applicant's would bore beneath the OR&L Railroad and other post-Contact bridges, canals, storm drains, culverts and ditches that are crossed by the fronthaul system to avoid impacts on previously identified or potential historic properties that intersect with the fronthaul system.
- If human remains, burials, or other culturally significant materials are inadvertently discovered during construction, all earth-moving activities in the area would stop, the area would be cordoned off, and SHPD would be notified pursuant to HAR Section 13-280-3 and Section 13-300-40.
- An inadvertent discovery plan would be developed in consultation with SHPD and cultural practitioners that participated in consultation for the CIA. The inadvertent discovery plan would define areas of highest potential cultural sensitivity that may warrant the implementation of cultural monitoring during construction and would establish communications protocols, immediate protective treatment measures, and cultural protocols in the event of an inadvertent discovery of human remains, burials, or other culturally significant materials.

2.6 Infrastructure and Utilities

2.6.1 Affected Environment

2.6.1.1 Potable Water

The Honolulu Board of Water Supply (BWS) supplies potable water service to most of Oʻahu, including the Project area, which is serviced by the BWS ʻEwa-Waipahu water system (BWS 2016). The BWS has water mains traversing through the entirety of the ʻŌlaʻi Street, Kalaeoloa Boulevard, Kapolei Parkway, Kamōkila Boulevard, and Farrington Highway ROWs. Currently, there is no water service to the proposed telecommunication facility site.

2.6.1.2 Wastewater

There are multiple sewer lines throughout the Project area. Along the fronthaul route, existing sewer lines are predominately vitrified clay with diameters ranging from 8 to 21 inches (20.3 to 53.3

cm). Reinforced concrete pipe (21 and 33 inches in diameter [53.3 and 83.8 cm]), high density polyethylene (12-inch diameter [30.5 cm]), and fiberglass reinforce polymer mortar (30-inch diameter [76.2 cm]) sewer lines are also located along the fronthaul route. There are no existing sewer lines at the parcels for the proposed telecommunication facility and its associated utility corridors.

2.6.1.3 Stormwater

Developed stormwater infrastructure exists within the public ROW along the fronthaul route and consists of ditches, reinforced concrete pipe, box culverts, high density polyethylene pipe, and open channels. The majority of these stormwater conveyances are owned and maintained by CCH; however, HDOT and private entities also own and maintain some of the stormwater infrastructure along the fronthaul route.

There is no developed stormwater infrastructure within the proposed telecommunication facility site. However, a drainage easement associated with HDOT's planned widening project for Farrington Highway is located at the northern portion of TMK (1) 9-1-016:179. At the proposed cable landing site within Barbers Point Beach Park, an existing 36-inch (91.4-cm) reinforced concrete pipe stormwater conduit runs from ʻŌlaʻi Street southeast across the parcel to an open, concrete-lined stormwater drainage channel that drains to the ocean.

2.6.1.4 Electricity, Telecommunications, and Gas

The Hawaiian Electric Company (HECO) provides all electrical service for the Island of Oʻahu. HECO joint-utility pole lines are present along the entirety of the ʻŌlaʻi Street and Kalaeoloa Boulevard ROWs. Existing HECO electric lines are generally underground along the Kapolei Parkway, Kamōkila Boulevard, and Farrington Highway ROWs. Hawaiian Telcom and Spectrum facilities are also present within the vicinity of the entire fronthaul route.

Hawai'i Gas maintains an underground 16-inch (40.6-cm) transmission line and a 4-inch (10.2-cm) distribution line within the vicinity of the Project area. Hawaiian Electric and Island Energy Services also own and operate several fuel oil and gas pipelines in the ROWs along the fronthaul route.

2.6.1.5 Solid Waste

Two existing solid waste facilities are in the general vicinity of the Project area. These facilities include the CCH Waimānalo Gulch landfill managed by Waste Management, and the privately-owned PVT landfill, which is authorized to receive construction and demolition waste. The Waimānalo Gulch landfill and PVT landfill are respectively located approximately 6.3 miles (10.1 km) and 9.9 miles (15.9 km) north of the cable landing site on Farrington Highway.

2.6.2 Impacts of the Alternatives

2.6.2.1 Proposed Action

Potable Water

Construction and operation of the Proposed Action is not expected to result in adverse impacts on public potable water supplies or public potable water infrastructure. Design and permitting of the onshore Project components includes coordination, review and approval from BWS to avoid conflicts with existing water infrastructure. During construction of the cable landing site and associated components, it is anticipated that water would come from an existing fire hydrant on ʻŌlaʻi Street and that temporary metering for construction activities would be provided by BWS. Construction of the telecommunication facility is estimated to require approximately 480,000 gallons (1,816,998 liters [l]) over a 4-month period (approximately 3,950 gallons [14,952.4 l] per day). Construction of the telecommunication facility is anticipated to require approximately 4,000 to 10,000 gallons (15,141.7 to 37,854.1 l) per day, the source of which would be identified in the contractor's logistics plan. During operation, domestic consumption for the telecommunication facility is estimated to be 500 to 1,000 gallons (1,892.7 to 3,785.4 l) per day to accommodate worker use of restrooms and a kitchen area. A new water meter and service lateral for potable water and irrigation purposes would be required for the telecommunication facility. Potable water demand would be aligned with local plumbing code standards for the operation of the telecommunication facility. The telecommunication facility would also secure an approved water supply capable of supplying the required water flow for fire protection in accordance with the National Fire Protection Association 1, 2021 Edition, Sections 18.3 and 18.4, and civil drawings would be submitted to the Honolulu Fire Department concurrent with CCH review of the building permit application.

Wastewater

Portable toilets would be provided for construction and Project-related personnel, which would generate minor amounts of wastewater. Portable toilets would be maintained in accordance with HDOH and CCH health regulations.

During operation of the telecommunication facility, wastewater would be generated by full time workers. Maximum occupancy of the telecommunication facility would be three workers at a time, rotating shifts to ensure operation of the facility 24 hours per day, 7 days per week. The telecommunication facility would require a septic tank, or a new sanitary sewer connection through a utility corridor on either or both TMK parcels (1) 9-1-016:179 and (1) 9-1-016:222, the final location of which would be determined through coordination with UHWO, a sewer capacity analysis, and permitting with the CCH Department of Planning and Permitting (DPP) Wastewater Branch. Wastewater generated during operations is anticipated to be equivalent to potable water usage.

Stormwater

Construction activities at the cable landing site and along the fronthaul system would not result in permanent impermeable surfaces or permanently alter stormwater drainage patterns. Pre-construction contours and conditions would be restored at the completion of construction. At the telecommunication facility site, areas would be converted to impermeable surfaces to accommodate the parking lot, warehouse building, office building, mechanical yard, access roads, and other infrastructure. This increase in impermeable surfaces would result in increased stormwater runoff at the site. Final design of the telecommunication facility would include plans for stormwater management in accordance with the City Storm Water Quality Guidelines and UHWO standards to minimize stormwater runoff.

Electricity, Telecommunications, and Gas

Throughout the design of the Proposed Action, the Applicants coordinated with CCH and electric, telecommunications, and gas utilities to avoid conflicts with existing infrastructure. This process included requesting as-built designs from other utility owners so that the fronthaul system could be designed to avoid conflicts with existing infrastructure and coordinating review of the Applicant's engineering drawings by other utilities as part of the Site Development Division Master Application process. Utility clearances for the Site Development Division Master Application are currently underway, and to date the proposed fronthaul route has been approved by Gasco, Inc., and Spectrum. Updates on the status of the remaining utility clearances and approvals obtained by other utility owners will be documented in the Final EA. Overall, the Proposed Action would result in beneficial impacts on telecommunications as it would provide additional connectivity between Hawai‘i and the continental United States, other Pacific Islands, Australia, and Japan.

Solid Waste

Solid waste generated during construction of the Proposed Action would include green waste and construction waste. Solid waste generated during construction of the Proposed Action is expected to be taken to the CCH Waimānalo Gulch landfill. Construction wastes could also be taken to the privately-owned PVT landfill. Operation and maintenance of the telecommunication facility would require up to nine full-time staff members; however, it is anticipated that only three staff members would be present at the facility for each shift. Up to three deliveries or visits from contractors at the telecommunication facility is anticipated per day. Therefore, solid waste generated during operation is expected to be minimal.

The amount of solid waste generated during construction and operation of the Proposed Action is not expected to adversely impact existing waste management services or facility capacity. Solid waste would also be disposed of in accordance with State and CCH regulations.

2.6.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on infrastructure and utilities.

2.6.3 Avoidance and Minimization Measures

The Proposed Action would be implemented in accordance with permit requirements and easement agreements and include the review and approval of other utility owners and operators in the Project area. Therefore, under the Proposed Action, no significant impacts on existing infrastructure and utilities, including potable water, wastewater, stormwater, electricity, telecommunications, gas, or solid waste, are anticipated. While the Proposed Action would have the potential to increase stormwater runoff, BMPs would be implemented in accordance with the City Storm Water Quality Guidelines and UHWO standards to minimize stormwater impacts. Additionally, an ESCP and SWPPP would be implemented during construction of the Proposed Action to avoid and minimize stormwater impacts.

2.7 Marine and Nearshore Biological Resources

2.7.1 Affected Environment

This section covers the marine and nearshore biological resources found in the marine portion of the Project area, which includes the proposed HDD alignments, HDD exit points, subsea cables, and offshore waters up to the territorial limit of the State of Hawaiʻi. The following sections discuss nearshore habitat, essential fish habitat (EFH), sea turtles, and marine mammals in the marine portion of the Project area.

2.7.1.1 Nearshore Benthic Habitat

The nearshore benthic habitat between the shoreline and the proposed HDD exit points consists of alternating areas of flat limestone pavement and sand channels with no dense aggregation of corals. The overall physical structure in the vicinity of the HDD exit points consists of a nearly flat fossil limestone reef surface that terminates in a steep sloping face (approximately 45 degrees). The sloping reef face extends to a distinct junction with a sand plain that extends seaward. The top of the slope is on the order of 28 to 30 feet (8.5 to 9.1 m) of water depth, and the bottom edge is at a depth of approximately 50 to 55 feet (15 to 17 m). The seaward terminus of the sloping reef face consists of a juncture with flat plains consisting of white calcareous sand. Sand plains are populated by patches of seagrass (*Halophila sp.*) interspersed with expanses of *Avrainvillea lacerate (A. lacerate)*.

Dive surveys completed in October 2024 identified four coral species at the preliminary HDD exit point locations: rice coral (*Montipora capitata),* Cauliflower coral (*Pocillopara meandrina*), brown lobe coral (*Porites evermanni*), and lobe coral (*Porites lobata*) (MRC 2024). Coral cover ranged from 0 to 6 percent. All of these coral species are commonly found on Hawaiian reefs and are not considered rare or unique. Small corals occurred only rarely on the sand flats. Based on the preliminary results of the 2024 surveys, additional surveys were conducted in March 2025 to help refine and micro-site the HDD exit point locations to further reduce potential impacts on seagrass and coral. The results of second-round surveys will be included in the Final EA.

2.7.1.2 Designated Critical Habitat and Essential Fish Habitat

A desktop review of published literature and federal databases indicate that there is potentially suitable habitat within the Project area for 14 National Marine Fisheries Service (NMFS) Endangered Species Act (ESA)-listed species (Table 2-2). The Project area overlaps NMFS ESA-designated critical habitat for the false killer whale (*Pseudorca Crassidens*) and Hawaiian monk seal (*Monachus schauinslandi*) and proposed critical habitat for green sea turtle (*Chelonia mydas*).

Table 2-2. Special-Status Marine Species with Potentially Suitable Habitat in the Project Area under the Endangered Species Act

Common Name	Scientific Name	Federal Status	State Status	Critical Habitat Designated?	Critical Habitat in Project Area?
Cetaceans					
Blue whale, Central North Pacific population	*Balaenoptera musculus*	E	E	No	No
False killer whale, Main Hawaiian Islands Insular Distinct Population Segment (DPS)	*Pseudorca crassidens*	E	E	Yes	Yes

Common Name	Scientific Name	Federal Status	State Status	Critical Habitat Designated?	Critical Habitat in Project Area?
Fin whale	*Balaenoptera physalus*	E	E	No	No
North Pacific right whale	*Eubalaena japonica*	E	E	Yes	No
Sei whale	*Balaenoptera borealis*	E	E	No	No
Sperm whale	*Physeter macrocephalus*	E	E	No	No
Sea Turtles					
Green sea turtle, Central North Pacific DPS	*Chelonia mydas*	T	T	Yes*	Yes*
Hawksbill sea turtle	*Eretmochelys imbricata*	E	E	Yes	No
Leatherback turtle, West Pacific DPS	*Dermochelys coriacea*	E	E	Yes	No
Loggerhead turtle, North Pacific DPS	*Caretta caretta*	E	E	No	No
Olive ridley turtle	*Lepidochelys olivacea*	T	T	No	No
Pinnipeds					
Hawaiian monk seal	*Monachus schauinslandi*	E	E	Yes	Yes
Fish					
Giant Manta Ray	*Mobula birostris*	T	T	No	No
Oceanic Whitetip Shark	*Carcharhinus longimanus*	T	T	No	No

DPS = Distinct Population Segment; E = listed as endangered under the federal or state ESA; T = listed as threatened under the federal or state Endangered Species Act.
* National Marine Fisheries ESA proposed critical habitat.

The Magnuson-Stevens Fishery Conservation Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a federal fishery management plan. Section 305(b)(2) of the Magnuson-Stevens Act requires federal action agencies to consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S. Code 1802[10]). Management unit species (MUS) are those species that are managed under each fishery management plan or fishery ecosystem plan and typically include those species that are caught in quantities sufficient to warrant management or specific monitoring by NMFS and the Western Pacific Regional Fishery Management Council (WPRFMC). In addition to EFH, WPRFMC identified habitat areas of particular concern (HAPC) in EFH that are essential to the life cycle of important coral reef species. In determining whether a type or area of EFH should be designated as an HAPC, one or more of the following criteria established by NMFS must be met: (a) the ecological function provided by the habitat is important; (b) the habitat is sensitive to human-induced environmental degradation; (c) development activities are, or will be, stressing the habitat type; or (d) the habitat type is rare.

The Project would require construction activities within four EFH MUS groups: Pelagic Species, Bottomfish and Seamount Groundfish, Crustaceans, and Coral Reef Ecosystems. Table 2-3 describes the EFH and HAPCs for each of the five MUS groups and HAPCs in state and federal waters coinciding with the Project area.

Table 2-3. Essential Fish Habitat and Habitat Areas of Particular Concern Designations for the Hawai`i Archipelago Fishery Ecosystem Plan Management Unit Species

		EFH		
Management Unit	Species Complex	Juveniles/Adults	Eggs/Larvae	HAPC
Pelagic	All highly migratory pelagic fishes (tuna, billfish, sharks, other select taxa and pelagic squids) identified as Pelagic Management Unit Species	EFH includes the water column to a depth of 3,281 ft (1,000 m) from the shoreline to the outer limit of the EEZ.	EFH includes the water column to a depth of 656 ft (200 m) from the shoreline to the outer limit of the EEZ.	From the ocean surface to 3,281 ft (1,000 m) deep superadjacent to seamounts and banks rising from depths of ≥ 6,562 ft (2,000 m).
Bottomfish and Seamount Groundfish	**Shallow-water species 0–50 fm (0–300 ft [0–164 m]):** uku (*Aprion virescens*), thicklip trevally (*Pseudocaranx dentex*), giant trevally (*Caranx ignoblis*), black trevally (*C. lugubris*), amberjack (*Seriola dumerili*), taape (*Lutjanus kasmira*) **Deep-water species 50–200 fm (300–1,200 ft [91–366 m]):** ehu (*Etelis carbunculus*), onaga (*E. coruscans*), opakapaka (*Pristipomoides filamentosus*), yellowtail kalekale (*P. auricilla*), kalekale (*P. sieboldii*), gindai (*P. zonatus*), hapuupuu (*Epinephelus quernus*), lehi (*Aphareus rutilans*) **Seamount groundfish species 50–200 fm (300–1,200 ft [91–366 m]):**	Water column and bottom habitat down to 1,312 ft (400 m) (bottomfish) and water column and bottom from 262 to 1,969 ft (80 to 600 m), bounded by 29°–35° N and 171°–179° W (seamount groundfish; adults only)	Water column down to 1,312 ft (400 m) (bottomfish) and epipelagic zone (0 – 200 nm) bounded by 29°–5° N and 171° E–179° W (seamount groundfish; includes juveniles)	All escarpments and slopes between 131–919 ft (40–280 m) and three known areas of juvenile opakapaka habitat

Management Unit	Species Complex	EFH		HAPC
		Juveniles/Adults	Eggs/Larvae	
	armorhead (*Pseudopentaceros richardsoni*), ratfish/butterfish (*Hyperoglyphe japonica*), alfonsin (*Beryx splendens*)			
Crustacean	**Spiny and slipper lobster complex:** Hawaiian spiny lobster (*Panulirus marginatus*), spiny lobster (*P. penicillatus, P.* spp.), ridgeback slipper lobster (*Scyllarides haanii*), Chinese slipper lobster (*Parribacus antarcticus*) **Kona crab :** Kona crab (*Ranina ranina*)	All of the bottom habitat from the shoreline to a depth of 328 ft (100 m)	The water column from the shoreline to the outer limit of the EEZ down to a depth of 492 ft (150 m)	All banks in the NWHI with summits less than or equal to 98 ft (30 m) from the surface
Coral reef ecosystems	All currently harvested and potentially harvested coral reef ecosystem taxa	EFH for the Coral Reef Ecosystem management unit species includes the water column and all benthic substrate to a depth of 50 fm (150 ft [91 m]) from the shoreline to the outer limit of the EEZ	Includes all no-take marine protected areas identified in the Coral Reef Ecosystems Fishery Management Plan; all Pacific remote islands; and numerous marine protected areas, research sites, and coral reef habitats throughout the western Pacific	Coral reef ecosystems

Source: WPRFMC 2009a.

Notes: EEZ = Exclusive Economic Zone; EFH = essential fish habitat; fm = fathom; ft = feet; HAPC = habitat area of particular concern; m = meter; NWHI = Northwestern Hawaiian Islands.

2.7.1.3 Sea Turtles and Marine Mammals

Sea turtles in Hawaiʻi are listed under ESA, along with several marine mammal species, such as Hawaiian monk seal and the locally endemic population of false killer whale. Marine mammals also receive protection under the Marine Mammal Protection Act. Additionally, sea turtle and marine mammal species are covered by HAR Chapter 124, which grants DLNR authority over the conservation, protection, and preservation of the state's natural resources.

2.7.1.4 Sea Turtles

Green sea turtles (*Chelonia mydas*) of the Central North Pacific Distinct Population Segment (DPS) both forage and reproduce in coastal Hawaiian waters. The Project area extends through proposed critical habitat for this species, thus they are likely to be found in the nearshore waters of the Project area. The green sea turtle has been documented to nest along ʻEwa Beach within 5 miles of the cable landing site (Parker and Balazs 2015, 2016). The deeper, offshore waters of the Project area do not contain important foraging resources or nesting habitat, and green sea turtles are unlikely to be found there, though they may transit through those regions before and after the nesting season, which ranges from April through October. Similarly, hawksbill sea turtles (*Eretmochelys imbricata*) both forage and reproduce in coastal Hawaiian waters; however, based on its habitat preferences and reported movements, the hawksbill sea turtle could be encountered in the Project area but this possibility is remote. The deeper, offshore waters of the Project area do not contain important foraging resources or nesting habitat for hawksbill sea turtles.

Leatherback turtles (*Dermochelys coriacea*) of the West Pacific DPS are transient visitors around the Hawaiian Islands and rarely seen in nearshore coastal waters, but they may be seen offshore in pelagic waters which constitute foraging habitat and migratory pathways for the species. In earlier years, regular sightings of leatherbacks and interactions with the Hawaiʻi swordfish fishery were reported (Skillman and Balazs 1992). Since 2006, there has been a marked increase in the number of interactions between leatherback turtles and the Hawaiʻi-based shallow-set fishery, primarily occurring north of the Hawaiian Islands where leatherbacks are known to use the North Pacific Subtropical Frontal Zone system as a migration pathway and an important foraging area (Howell et al. 2015). Both summer nesting leatherbacks and winter nesting leatherbacks traverse tropical waters, and it is possible that leatherbacks may be encountered year-round in the Project area, particularly in offshore waters.

Historically, loggerhead sea turtles (*Caretta caretta*) may have occurred in the waters around all the Hawaiian Islands. Today, juveniles are very rarely seen in the Hawaiian Islands but are encountered in deep offshore waters. Juveniles of the North Pacific DPS are known to use the offshore waters of the Central North Pacific Ocean for developmental habitat, before they transition to foraging habitat in the eastern and western North Pacific (Turner Tomaszewicz et al. 2017). Foraging turtles target productivity hotspots such as the Transition Zone Chlorophyll Front (Kobayashi et al. 2008), and it is possible that loggerheads may be encountered in the Project area.

Olive ridley sea turtles (*Lepidochelys olivacea*) in Hawaiʻi are likely from the eastern Pacific breeding population. In the eastern Pacific, olive ridleys are highly migratory and appear to spend most of their non-breeding life cycle in the oceanic zone (Cornelius and Robinson 1982; Pitman 1991, 1993; Arenas and Hall 1992; Plotkin 1994, 2010; Plotkin et al. 1994, 1995; Beavers and Cassano 1996); they occur from Southern California to Northern Chile. Information is sparse about the condition of these habitats and their impact on olive ridley populations. Olive ridleys appear to forage throughout the eastern tropical Pacific Ocean, and therefore, they may be occasionally present in the Project area.

2.7.1.5 Marine Mammals

Several marine mammal species, including ESA-listed species, inhabit waters around the Hawaiian Islands. The species most likely to occur in the Project area are addressed in this section.

Hawaiian monk seal was listed as endangered under the ESA in 1976 (41 *Federal Register* [FR] 51611). A final recovery plan was published on August 22, 2007 (72 FR 46966), and NMFS first designated critical habitat for Hawaiian monk seal in 1986 (51 FR 16047). NMFS revised the habitat in 1988 (53 FR 18988) and again in August 2015 (80 FR 50926) to include terrestrial and marine areas in the Northwestern Hawaiian Islands and the Main Hawaiian Islands. Hawaiian monk seal is one of the National Oceanic and Atmospheric Administration Fisheries' *Species in the Spotlight*, an agency-wide effort launched in 2015 to spotlight and save the most highly at-risk marine species (NOAA Fisheries n.d.).

Endemic to Hawaiʻi, Hawaiian monk seal is the most endangered seal species in the world. Its population had been declining since the 1950s, and current numbers, though increasing, are only about one-third of historic population levels. Marine habitats are used for foraging, resting, thermoregulation, and social interaction. Diet studies indicate that they forage at or near the seafloor and prefer prey that hides in the sand or under rocks. Foraging occurs in depths from 3 feet (1 m) to at least 1,640 feet (500 m) and in a wide variety of marine habitat types, including sea mounts, banks, marine terraces, and reefs (Parrish 2004, Cahoon 2011), sometimes visiting patches of deep corals (Parrish et al. 2002). Hawaiian monk seals can hold their breath for up to 20 minutes and dive more than 1,800 feet (548 m); however, they usually dive an average of 6 minutes to depths of less than 200 feet (61 m) to forage at the seafloor. Hawaiian monk seals are feeding generalists and forage on a wide variety of fish, cephalopods, and crustaceans.

Designated critical habitat in the Northwestern Hawaiian Islands and the Main Hawaiian Islands includes one marine feature essential for the conservation of Hawaiian monk seals: marine areas from 0 to 656 feet (0 to 200 m) in depth that support adequate prey quality and quantity for juvenile and adult monk seal foraging. The Project area extends through designated Hawaiian monk seal critical habitat, and it is possible that monk seals occur in the Project area.

The Main Hawaiian Islands insular false killer whale (*Pseudorca crassidens*) DPS was classified as endangered under ESA in 2012 (77 FR 70915). It is a small, discrete population (less than 200 individuals) that lives exclusively in nearshore waters of the Main Hawaiian Islands and is the only false killer whale population protected under ESA. On July 24, 2018, NMFS published a final rule to designate critical habitat for the Main Hawaiian Islands insular false killer whale by designating waters from the 147.6-foot (45-m) depth contour to the 10,498.7-foot (3,200-m) depth contour around the main Hawaiian Islands from Niʻihau east to Hawaiʻi (83 FR 35062). Designated critical habitat for the Main Hawaiian Islands insular false killer whale DPS consists of one specific marine feature essential for the conservation of false killer whales, which is island-associated marine habitat. The Project area extends through designated habitat for this false killer whale DPS, thus it is possible that this species occurs in the Project area.

2.7.1.6 Fish

Two ESA-listed marine fish species inhabit waters around the Hawaiian Islands and have potential to occur in the Project area: giant manta ray and oceanic whitetip shark.

Giant manta ray was classified as threatened under ESA in 2018 (83 FR 2916). NMFS developed a recovery plan in 2019, but a final recovery plan has not been approved as of the publishing of this EA. There is no critical habitat designated for giant manta ray. Giant manta ray is a migratory species and inhabits tropical, subtropical, and temperate waterbodies worldwide. They are commonly found offshore in pelagic waters and near productive coastlines and may conduct seasonal migrations following prey abundance. Within waters under U.S. jurisdiction, giant manta ray can be found along the east coast, within the Gulf of Mexico, and off the coasts of the U.S. Virgin Islands, Puerto Rico, Hawaiʻi, and Jarvis Island (one of the U.S. Pacific remote island areas). Giant manta rays are often found in the upper 33 feet (10 m) of the ocean during the day, but can dive to depths of up to 1,417 feet (432 m) at night (Clark 2010; Braun et al. 2014) to feed on zooplankton and other organisms such as euphausiids, copepods, mysids, shrimp, as well as fishes (Bigelow and Schroeder 1953; Carpenter and Niem 2001; HAMER 2005; Rohner et al. 2017; Stewart et al. 2017).

There is considerable uncertainty regarding historical and current abundances, and there are no current or historical estimates of the global abundance for giant manta ray. Several areas in Hawaiʻi have been documented as feeding areas for giant manta ray including the Kona coast of the Island of Hawaiʻi and the French Frigate Shoals. Given the documented feeding areas and pelagic behavior of this species, it is possible that giant manta rays occur within the Project area.

The oceanic whitetip shark was classified as threatened under the ESA in 2018 (83 FR 4153). On July 11, 2024, NMFS published a recovery plan for the species; there is currently no critical habitat designated for the species. The oceanic whitetip shark is a highly migratory pelagic shark that is distributed globally in tropical and subtropical waters. These sharks live offshore in deep water but spend most of their time in the upper part of the water column near the surface (to 656 feet [200 m]) but can make deep dives over 3,280 feet (1,000 m). Oceanic whitetip sharks are relatively long-lived, with low-moderate productivity and low reproductive rates. Although the species is currently thought to consist of a single population, some population structuring is evident between the Atlantic and Indo-Pacific (Camargo et al. 2016; Ruck 2016). Oceanic whitetip sharks in Hawaiʻi are considered part of the Western and Central Pacific Ocean management unit by NMFS. Given the surface-dwelling behavior and pelagic distribution of this species, it is possible that oceanic whitetip sharks may occur in the Project area, particularly in offshore waters.

2.7.2 Impacts of the Alternatives

2.7.2.1 Proposed Action

Nearshore Benthic Habitat

The Proposed Action would include construction activities in nearshore marine waters adjacent to shallow-water coral reef habitat associated with HDD, landing pipe installation, and cable laying on the seafloor surface seaward of the HDD exit points. HDD use would eliminate disturbance to corals, reefs, and benthic habitat in the shallower nearshore area. Under the Proposed Action, there is potential for temporary, localized suspension of sediments and the potential release of bentonite drilling fluid into the water column. The amount of seabed disturbance around each HDD exit point would be up to 10 feet by 10 feet (3 m by 3 m). Any generated turbidity would be localized and expected to dissipate quickly. An accidental release of drilling fluid to the seafloor could result in a temporary, localized, negative impacts on the marine environment and associated marine life. However, the potential for substantial releases of drilling fluid into the environment would be minimized through several measures, including implementation of an inadvertent drilling fluid release (IDFR) Plan (Appendix A, *Inadvertent Drilling Fluid Release Contingency Plan*). Changing from bentonite drilling fluid to water in the latter stages of drilling is designed to minimize the potential for inadvertent release of drilling fluid.

Subsea F/O cables laid on the seafloor would contact or displace a very small area of seafloor habitat along the cable path. The physical effects resulting from cable-laying activities would be limited to the area around the up to 1.4-inch (3.6-cm) diameter cables. Impacts on coral and seagrass would be minimized through Project design and by micro-siting the HDD exit points utilizing dive surveys to help identify locations with low coral and seagrass cover. The indirect impacts of turbidity or shading would be temporary, occurring only during the construction period. Therefore, the impacts on nearshore benthic habitat, including coral reef habitat, would be temporary, minor, and less than significant.

Protected Species, Designated Critical Habitat and Essential Fish Habitat

Construction activities under the Proposed Action have the potential to result in adverse impacts on marine and nearshore biological resources, including ESA-listed sea turtles, giant manta ray, oceanic whitetip shark, Hawaiian monk seal, false killer whale – Main Hawaiian Islands Insular DPS, and other marine mammals. However, construction activities under the Proposed Action would be temporary and would not result in the permanent alteration of habitats, including designated critical habitat in the Project area. Implementation of avoidance and minimization measures would reduce any potential impacts on protected species present during construction (see Section 2.7.3, *Avoidance and Minimization Measures*).

The Proposed Action is not anticipated to reduce the quality or quantity of EFH for the Pelagic Species, Bottomfish and Seamount Groundfish, Crustacean, or Coral Reef Ecosystems Fishery Management Plan MUS groups. Under the Proposed Action, in-water work would consist of the HDD bores exiting the seabed at six finite points, minor work around each HDD exit point to remove the drill head, and a cable laying vessel, with support vessels for cable installation. Impacts on EFH from the Proposed Action could include potential sediment disturbances, noise, and inadvertent releases. HDD activities would take place mainly on land during daytime hours and no lights would be over the water during construction. All impacts under the Proposed Action are anticipated to be temporary and localized and would be minimized through the implementation of avoidance and minimization measures (see Section 2.7.3).

ESA Section 7 requires that federal agencies consult with NMFS prior to the start of Project activities that have the potential to adversely impact endangered or threatened species. ESA reviews for protected species and critical habitat under NMFS jurisdiction will be submitted as part of the Nationwide Permit 57 application to the U.S. Army Corps of Engineers (USACE). A Biological Assessment (BA) will be prepared to facilitate consultation between USACE and NMFS under ESA Section 7. An EFH assessment will also be included to fulfill the requirements of Section 305(b)(2) of the Magnuson-Stevens Act. The results of Section 7 consultation with NMFS for Nationwide Permit 57 will be incorporated into the Final EA.

2.7.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on marine and nearshore biological resources.

2.7.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on marine or nearshore resources are anticipated. The following measures, which are part of Project design, would be implemented to avoid and minimize impacts on ESA-listed marine species during implementation of the Proposed Action.

- The cable laying vessel would be signed up to local whale alert systems.
- The cable laying vessel would have staff on board who have completed marine mammal awareness training and have prior protected species observing experience. Trained observers would keep constant vigilance for the presence of ESA-listed marine species during all aspects of subsea cable installation.
- All in-water work would be postponed or halted when any ESA-listed marine species is observed by a trained observer within 164 feet (50 m) of the vessel (or within 328 feet [100 m] for whales) and would begin or resume only after a trained observer has determined that the animal(s) have voluntarily departed the area.
- The cable laying vessel would travel at a speed of 5 knots or less during subsea cable installation to reduce the risk of collision with ESA-listed marine species.
- To minimize entanglement risk, subsea cable would be laid with the minimum cable length necessary to account for expected fluctuations in water depth due to tides and waves. The cable laying vessel would maintain slack control to keep the line as tight as possible and eliminate the potential for loops to form. Cable lines would consist of a single line. No additional lines or material capable of entangling marine life would be attached to the line or any other part of the deployed system.
- All objects lowered to the seafloor shall be lowered in a controlled manner. This can be achieved by the use of buoyancy controls such as lift bags, or the use of cranes, winches, or other equipment that affect positive control over the rate of descent.
- HDD would utilize an inert, nontoxic mixture of water and bentonite clay as drilling fluid. For the final approximately 30 feet of the bore hole offshore, the drilling fluid would be changed to water to minimize the release of drilling fluid into the ocean floor when the drill bit exits offshore.
- The Applicants would implement the IDFR Plan (Appendix A) in the event there is an inadvertent release of drilling fluid during installation of the landing pipes.
- Pre-work inspections of heavy equipment and vessels for cleanliness and leaks would be completed daily and all heavy equipment operations and vessel use would be postponed or halted until leaks are repaired and equipment is cleaned.
- Debris and other wastes would be prevented from entering or remaining in the marine environment during the Project.

2.8 Natural Hazards

2.8.1 Affected Environment

Natural hazards are environmental phenomena that have the potential to affect people, infrastructure, and the environment. Flooding, tsunamis, hurricanes and tropical storms, and earthquakes are the most frequent natural hazards on Oʻahu with the potential to affect the Project area. The U.S. Geological Survey (USGS) indicates that Barbers Point coastline has a moderate Overall Hazard Assessment rating, primarily due to high storm and tsunami hazards (Fletcher et al. 2002).

2.8.1.1 Flooding

Flooding is the most frequent type of natural hazard and occurs when an overflow of water submerges land that is typically dry. On Oʻahu, flooding is typically caused by heavy rainfall and storm surges from hurricanes and tropical storms (FEMA and NOAA 2010). Floods can occur during any time of the year but are most common on Oʻahu during the wet season from October to April (Mitchell et al. 2023). Potential flood hazards are identified by FEMA's National Flood Insurance Program and are mapped on Flood Insurance Rate Maps (FIRM). The FEMA FIRM flood zone designations are as follows (FEMA 2025).

- A – Areas of 100-year flood, base flood elevations not determined.
- AE – Areas of 100-year flood, base flood elevation determined.
- XS – Areas of 500-year flood; areas of 100-year flood with average depths of less than one foot or within the drainage area less than one square mile, and areas protected by levees from 100-year flood.
- X – Areas determined to be outside the 500-year floodplain.
- D – Areas in which flood hazard is undermined.
- VE – Areas of 100-year coastal flood with velocity (wave action), base flood elevations determined (Coastal High Hazard District).

As shown in Figure 2-5, approximately 2.3 acres (31 percent) of the Barbers Point Beach Park parcel is mapped Flood Zone AE (areas of 100-year, base flood elevation determined). Approximately 0.3 acre (4 percent) of the parcel, along the beach, is located in Flood Zone VE (Coastal High Hazard District). The low slope of the Barbers Point coastline makes this area vulnerable to inundation; however, USGS ranks storm flooding risk as moderately low to low because the region is very arid and far removed from the drainages of the Koʻolau and Waiʻanae mountain ranges (Fletcher et al. 2002). The remainder of the Project area along the fronthaul route and telecommunication facility site is designated as Zone D, which represents areas of undetermined but possible flood hazards where detailed flood hazard analyses have not been conducted by FEMA.

2.8.1.2 Hurricanes and Tropical Storms

Hurricanes and tropical storms are two categories of tropical cyclones. A tropical storm is an organized system of showers and thunderstorms with a well-defined circulation center with maximum sustained winds of 39 miles per hour [mph] (63 kilometer per hour [kph]) to 73 mph

(118 kph). A hurricane is a well-defined system of showers and thunderstorms with a well-defined circulation center with maximum winds of 74 mph (119 kph) or greater. Hurricane season in Hawaii occurs between June 1 and November 30. Hurricanes very rarely make landfall on the Hawaiian Islands. Near misses that pass close to the islands are more common, which generate large swell and moderately high winds that cause varying degrees of damage (Fletcher et al. 2002). Tropical storms occur more frequently in Hawaii than hurricanes and typically pass sufficiently close enough to the islands every 1 to 2 years to affect the weather or cause damage (Western Regional Climate Center 2025). USGS ranks the storm threat for Barbers Point coastline as high as hurricane inundation, including that from Iniki in 1992 and Iwa in 1982, has historically been damaging to Barbers Point and other south-facing coastlines (Fletcher et al. 2002).

2.8.1.3 Earthquakes and Seismicity

Earthquakes occur frequently on the Hawaiian Islands and are usually associated with volcanic activity; however, very few are large enough to cause significant damage (Hawaiian Volcano Observatory 2023). Most earthquakes in the region are triggered by eruptions and magma movement within the active volcanoes of Kīlauea, Hualalai, and Mauna Loa on the Island of Hawaiʻi and Lōʻihi off the coast of the Island of Hawaiʻi. Over the past 120 years, Honolulu has only experienced damaging shaking levels from three earthquakes (Petersen et al 2021).

The International Building Code (IBC) categorizes seismic zones to help ensure buildings are designed to withstand earthquake factors. The IBC assigns buildings to one of six Seismic Design Categories (A through F), with Category A representing the lowest seismic risk and Category F the highest (International Code Council 2021). Seismic hazard mapping for Oʻahu indicates that the Project area is within Seismic Design Category C (FEMA 2023).

2.8.1.4 Tsunamis

Tsunamis are large, rapidly moving ocean waves that are typically caused by other natural hazards, including submarine earthquakes, landslides, or volcanic eruptions. The fast-moving waves can carry debris as they move across land and result in flooding of low lying areas, causing destruction and potential loss of life. Between 1812 and 2022, at least 175 tsunamis have made landfall on the Hawaiian Islands, although only a small number resulted in significant destruction (Fisher et al. 2023). As shown in Figure 2-6, the cable landing site at Barbers Point Beach Park is within a tsunami evacuation zone while potions of the route for the fronthaul system from the intersection of ʻŌlaʻi Street and Kalaeloa Boulevard north past the intersection of Kalaeloa Boulevard and Malakole Street are within an extreme tsunami evacuation zone. The remainder of the Project area is within the tsunami safe zone (CCH GIS 2025). The Alaskan earthquake of 1946 brought 12-foot tsunami waves to the Barbers Point coastline, while the most recent tsunami to make landfall at the Barbers Point coastline, caused by the March 11, 2011, Honshu, Japan earthquake, brought approximately 2.4-foot peak waves (Fletcher et al. 2002; NOAA 2025).

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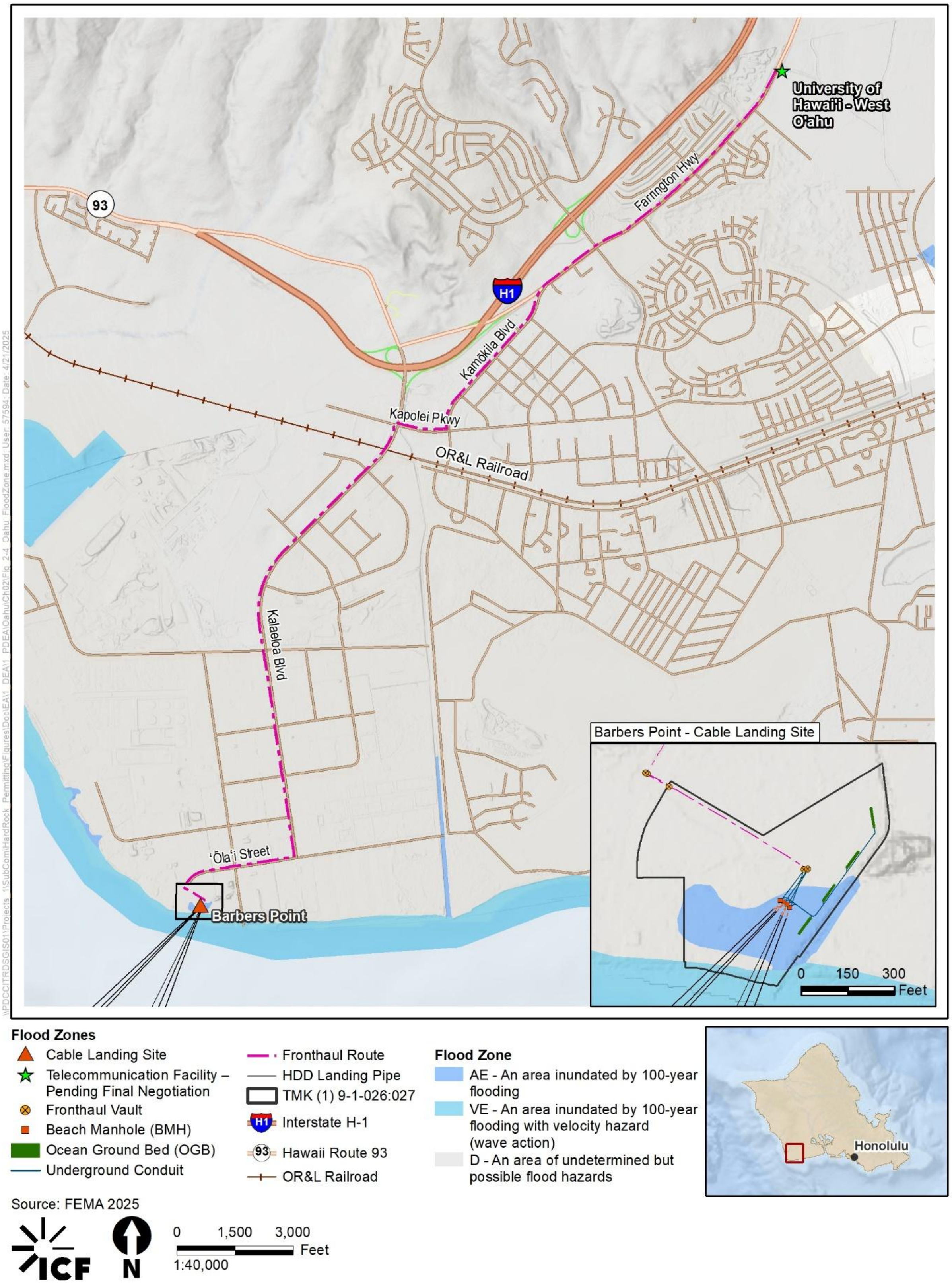

Figure 2-5. Flood Zones

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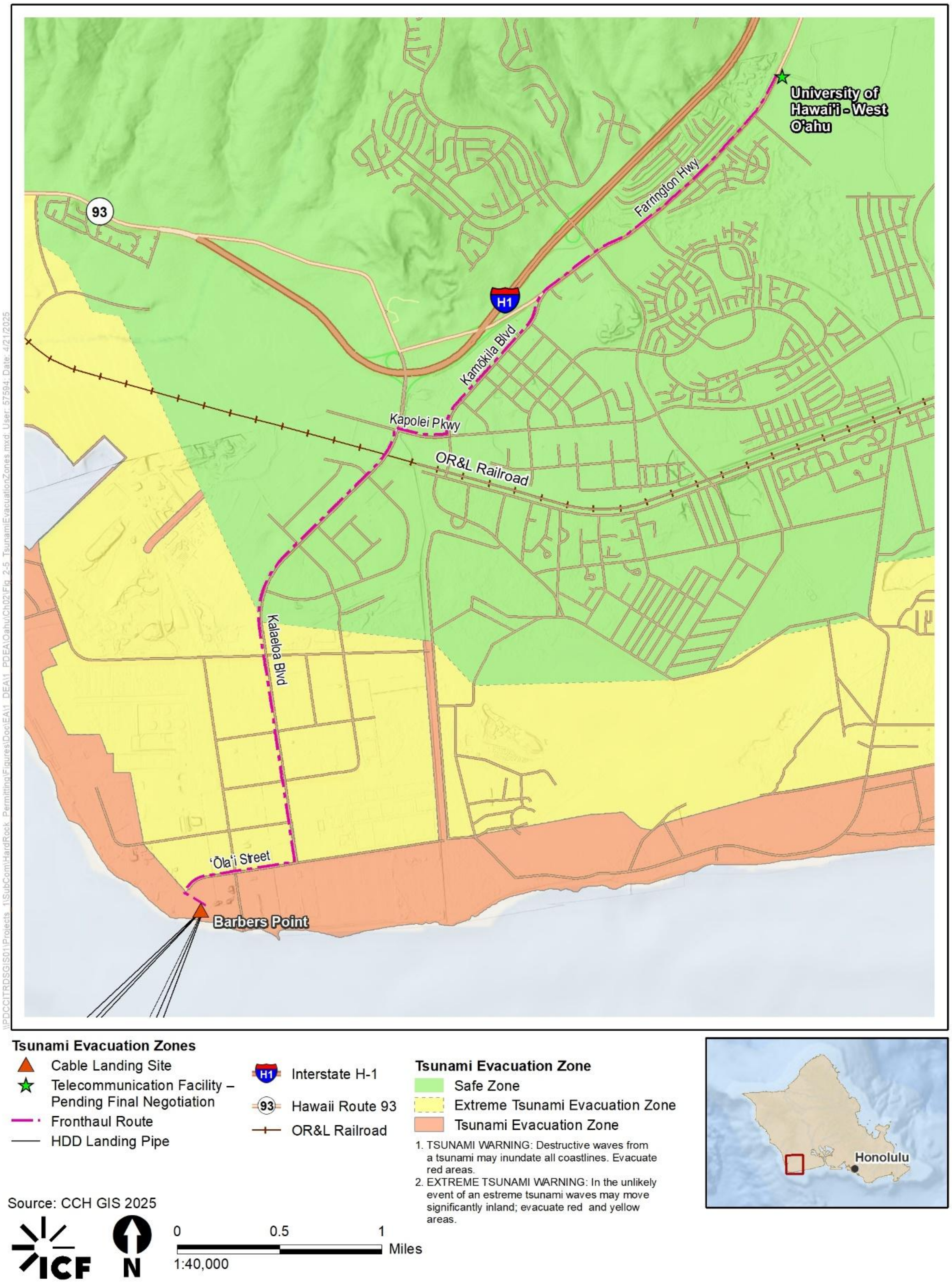

Figure 2-6. Tsunami Evacuation Zones

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2.8.2 Impacts of the Alternatives

2.8.2.1 Proposed Action

Flooding

Most of the Project area, including the entirety of the fronthaul system and telecommunication facility, is situated within Flood Zone D, which denotes regions where flood hazard analysis has not been performed, and flood risks remain undetermined. The National Flood Insurance Program does not impose any regulations concerning development within Flood Zone D. Portions of the cable landing site, including the landing pipes, BMHs, and two of the OGBs are located within Flood Zone AE, which is within the 100-year floodplain. Segments of the landing pipes (approximately 1,300 feet [396 m] extending seaward from the beach) are within Flood Zone VE, which is designated as a special flood hazard or high-risk area within the 100-year floodplain. However, because these Project components would be installed below ground and no permanent aboveground structures would be built at the site, only a minimal risk of impacts from flooding would occur during construction and operations. Additionally, the Proposed Action would not alter existing drainage patterns within Flood Zones AE and VE. During construction of the Proposed Action, the site construction safety manager would be responsible for implementing procedures in accordance with the Site Safety Plan to ensure the safety of workers in the event of a flood.

Hurricanes and Tropical Storms

Under the Proposed Action, the telecommunication facility would be designed and constructed to meet CCH building codes and all infrastructure in the mechanical yard of the telecommunication facility would be concealed by an approximately 20-foot-tall (6.1-m-tall) metal hurricane louver screening wall. The fronthaul system would be installed below ground and would not be affected by hurricane-force winds (see *Flooding* section for discussion of flooding that could result from hurricanes or tropical storms). These Project design elements would mitigate potential adverse impacts from hurricanes and tropical storms. Therefore, significant impacts from hurricanes and tropical storms are not anticipated under the Proposed Action.

Earthquakes and Seismicity

The entirety of the Project area is within a relatively low-risk seismic zone. Under the Proposed Action, the telecommunication facility would be designed and constructed in accordance with current building code requirements and standards for Seismic Design Category C or local building code equivalent for seismicity standards at the Project site. Therefore, no significant impacts from earthquakes or seismicity are anticipated under the Proposed Action.

Tsunamis

Under the Proposed Action, the cable landing site would be located in the tsunami evacuation zone, while a portion of the fronthaul system would be located within the extreme tsunami evacuation zone. These Project components would be installed below ground and would be resilient to wave action and flooding associated with a tsunami (see *Flooding* section for discussion of flooding that could result from a tsunami). Further, the likelihood of an extreme tsunami during construction of the Proposed Action is minimal. The telecommunication facility would be located in the tsunami safe zone and therefore would not be impacted by a tsunami during construction or operation. The CCH Department of Emergency Management coordinates the emergency management activities and functions of the Island of Oʻahu with state, federal, and other public and private organizations. In the event of a tsunami, warnings are issued by the Pacific Tsunami Warning Center. In the event of a tsunami warning, construction would halt and loose construction material and equipment would be removed from the site or secured until such time as the warning is lifted.

2.8.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact related to natural hazards.

2.8.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts related to natural hazards are anticipated. The following measures, which would be part of Project design, would be implemented to avoid and minimize potential impacts associated with natural hazards during implementation of the Proposed Action.

- A Site Safety Plan would be prepared for construction and operations.
- In the event of a severe weather advisory (e.g., hurricanes, tropical storms, tsunami) or when deemed necessary, construction operations would stop, and the work crew would secure the Project site and evacuate until the advisory is lifted.
- The Proposed Action would be designed and constructed to withstand natural hazards. All structural elements of the Proposed Action would meet building code requirements on Oʻahu.

2.9 Noise

2.9.1 Affected Environment

The State of Hawaiʻi regulates noise through HAR, Title 11, Chapter 46, "Community Noise Control," and provides for the prevention, control, and abatement of noise pollution in the State. The Hawaiʻi noise limits (Table 2-4) are absolute (i.e., not relative to ambient conditions) and are prescribed by receiving zoning class and time period.

Table 2-4. Hawaiʻi Maximum Permissible Sound Levels

Zoning Districts	Daytime (7:00a.m.–10:00a.m.)	Nighttime (10:00a.m.–7:00a.m.)
Class A – All areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.	55 dBA	45 dBA
Class B – All areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type.	60 dBA	50 dBA

Zoning Districts	Daytime (7:00a.m.–10:00a.m.)	Nighttime (10:00a.m.–7:00a.m.)
Class C – All areas equivalent to lands zoned agriculture, country, industrial, or similar type.	70 dBA	70 dBA

Source: HAR Section 11-46, *Community Noise Control*.

dBA = A-weighted decibel, the noise level with a frequency-based weighting filter applied to compensate for the frequency response of the human auditory system.

Notes:

The maximum permissible sound levels shall apply to any excessive noise source emanating within the specified zoning district, and at any point at or beyond (past) the property line of the premises.

Noise levels shall not exceed the maximum permissible sound levels for more than 10 percent of the time within any 20-minute period, except by permit or variance.

For mixed zoning districts, the primary land use designation shall be used to determine the applicable zoning district class and the maximum permissible sound level.

The maximum permissible sound level for impulsive noise shall be 10 dBA above the maximum permissible sound levels specified.

The cable landing site is within Barbers Point Beach Park, which is zoned by CCH as P-2 (General Preservation) is a Class A noise-sensitive land use. Immediately west of the park is Germaine's Lūʻau, which is also zoned P-2 (General Preservation); however, Germaine's Lūʻau is a business use that is consistent with the Class B maximum permissible sound level under HAR 11-46. These land uses are exposed to moderate levels of existing noise from natural and manmade sources, including ocean surf to the south and industrial and commercial uses to the north, east, and west. The fronthaul route would be within public road ROW and would run past various land uses including industrial, commercial/retail businesses, offices, and homes. These land uses are exposed to varying levels of existing noise from surrounding land uses and traffic. The siting area for the telecommunication facility is within Class B-zoned land. Adjacent land use to the north, east and west is agricultural; residential uses and a golf course are adjacent to the south. The closest noise sensitive receptors (e.g., residences) are located across Kapolei Golf Course Road to the southwest of the telecommunication facility site.

2.9.2 Impacts of the Alternatives

2.9.2.1 Proposed Action

Project-related construction activities would create noise that could affect nearby noise-sensitive areas, including Barbers Point Beach Park, Germaine's Lūʻau, and residences. Heavy construction equipment would generate short-term noise that would likely exceed local ambient noise levels and be clearly audible at land uses adjacent to the construction route. For instance, an excavator would produce maximum noise levels of approximately 81 dBA (A-weighted decibels) and average noise levels of approximately 77 dBA at a distance of 50 feet (15.2 m) (FHWA 2008). Construction of the fronthaul system would require excavation equipment for horizontal bore pits and small HDD machines. Construction at the cable landing site would involve noise-generating equipment such as a large bore HDD machine, excavator, dump truck, crane, forklift, mud mixer-separator, generators, and pumps. The highest continuous noise levels would occur during landing pipe installation when the HDD machine is running and drilling fluid is being circulated (pumped) through the bore hole. Although the precise equipment schedule is not known, the representative noise levels can be estimated by assuming an HDD machine would run simultaneously with a pump and a generator. Based on published manufacturer's data, an HDD machine may have a sound power level of 112 dBA, which equates to a noise level of approximately 80 dBA at 50 feet (15.2 m) (Vermeer 2023). Maximum noise levels for a pump and generator would both be approximately 81 dBA at 50 feet (15.2 m) (FHWA 2008). Assuming the equipment would all run continuously, the combined noise level would be approximately 85 dBA at 50 feet (15.2 m). Noise levels in Barbers Point Beach Park would vary depending on the distance from the construction equipment, from approximately 85 dBA at 50 feet (15.2 m) to approximately 65 dBA at the farthest areas of the park (approximately 500 feet [152.4 m] from the construction equipment). The closest offsite noise-sensitive receptor would be Germaine's Lūʻau, approximately 320 feet (97.5 m) to the west; at this distance, noise levels would be approximately 69 dBA. Once construction is complete, operation of the cable landing site and fronthaul system would not generate any notable noise, and these Project elements would be installed entirely underground (with access via manholes).

Noise modeling indicated that sound during construction of the telecommunication facility could be periodically audible at offsite locations; however, it is anticipated that any noise emanating from the site would be temporary and reduced through implementation of measures in Section 2.9.3, *Avoidance and Minimization Measures*. Operational noise sources would include emergency generators, which would only be operated in the event of an emergency and for monthly testing, and a load bank. Additionally, emergency generators and load banks are exempt under the community noise control standards (HAR § 11-46-5[4]). Modeled operational noise levels for the telecommunication facility were found to comply with the 60 dBA daytime and 50 dBA nighttime limits at the property boundary. Therefore, noise impacts from construction and operation of the telecommunication facility are expected to be minor.

Noise levels from construction of the cable landing site, fronthaul system, and the telecommunication site would exceed HAR noise limits. The Applicants and/or their construction contractor would apply for a permit or variance to authorize temporary construction noise levels in excess of applicable standards. The permit or variance would be obtained consistent with HAR Section 11-46-7 *Permits* or Section 11-46-8 *Variances*. Additionally, the measures described in Section 2.9.3, *Avoidance and Minimization Measures*, would reduce noise impacts.

2.9.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on noise.

2.9.3 Avoidance and Minimization Measures

Under the Proposed Action, significant impacts related to noise are not anticipated. The following measures, which would be part of Project design, would be implemented to avoid and minimize potential impacts on noise during implementation of the Proposed Action.

1. Temporary construction noise fencing would be erected around the HDD work area in Barbers Point Beach Park, as follows.
    a. The noise fencing would enclose all stationary equipment (HDD machine, pumps, compressors, generators, etc.) on all sides throughout the duration of HDD activities.
    b. The noise fencing would consist of chain link fencing, 8 feet (2.4 m) tall that would be padded with acoustical barrier materials consisting of one or more of the following.

1) Acoustical blankets hung over or from a supporting frame. The blankets would provide a minimum sound transmission class (STC) rating of 24 and a minimum noise reduction coefficient (NRC) of 0.70 and would be firmly secured to the framework with the sound absorptive side of the blankets oriented towards the construction equipment.

2) Commercially-available acoustical panels. If the panels include a sound absorptive side, that side would face the construction equipment.

3) Common solid construction materials (such as plywood) with a minimum weight of at least 1.5 pounds per square foot (.68 kilograms per square meter).

c. The noise barrier would be located as close to the construction equipment as is safe and practicable.

d. The noise barrier would extend fully to the ground to eliminate any gaps at the base of the barrier. There would be no gaps between adjacent barrier sections or panels. Acoustical blankets, if used, would be overlapped at the seams and taped or otherwise secured so that no gaps exist.

2. HDD activities at the cable landing site would be limited to daylight hours Monday through Saturday until 30 minutes prior to the lūʻau beginning at Germaine's Lūʻau on the days the lūʻau takes place. No construction would occur on Sundays or Holidays. The construction contractor would coordinate with the management of Germaine's Lūʻau to avoid noise interference with events and performances. This may include pausing drilling activities and switching off all noncritical construction equipment during nightly lūʻaus or other special events.

3. The following best management practices would be implemented for all Project construction activities.

a. Construction site and access road speed limits would be established and enforced during the construction period.

b. Material stockpiles and mobile equipment staging, parking, and maintenance areas would be located as far as practicable from noise-sensitive receptors.

c. The use of noise-producing signals, including horns, whistles, alarms, and bells, would be for safety warning purposes only. Where feasible, broadband "white noise" type warning signals would be used instead of tonal alarms.

d. Project-related public address or music system would not be used where they would be audible at any adjacent noise-sensitive receptor.

e. All noise-producing construction equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification.

f. A noise/dust fence would be erected along the southern boundary of the siting area for the telecommunication facility during construction activities.

g. A noise complaint hotline would be made available to address any noise-related issues.

2.10 Public Services and Facilities

2.10.1 Affected Environment

CCH provides police and fire services on Oʻahu. The Project area and vicinity is served by District 8 (Kapolei/Wai'anae) of the Honolulu Police Department. The closest police station to the Project area is the Kapolei District Station (1100 Kamokila Boulevard, Kapolei Hawaii), located approximately 3.8 miles (6.1 km) northeast of the proposed cable landing site and approximately 1.7 miles (2.7 km) southwest of the proposed telecommunication facility. The nearest fire station to the Project area is the East Kapolei No. 43 (91-1211 Kinoiki St, Kapolei, Hawaii), located approximately 5.4 miles (8.7 km) northeast of the cable landing site and 2.4 miles (3.9 km) south of the proposed telecommunication facility.

Emergency medical service is provided by the CCH Emergency Services Department, Emergency Medical Services Division. CCH has 21 ambulance units within three districts; the Project area is served by District 1, which encompasses the western region of Oʻahu. The nearest hospital to the Project area is the Queen's Medical Center – West Oʻahu, located approximately 3.8 miles (6.1 km) and 9.6 miles (15.5 km) northeast of the proposed telecommunication facility and cable landing site, respectively.

2.10.2 Impacts of the Alternatives

2.10.2.1 Proposed Action

Construction and operation of the Proposed Action is not expected to have significant adverse impacts on public services and facilities, including emergency services. The Proposed Action would not substantially increase demand for police protection or response during construction or operation of the Project and the Honolulu Police Department responded to the Project's early consultation letter that "the Honolulu Police Department does not have any concerns at this time" (see Section 7.1, *Early Consultation*). The Project area and vicinity are well served by emergency medical services and a hospital, and the Project is not expected to substantially increase demand for emergency medical services. Should an incident occur during construction or operation of the Project, standard protocols would be employed to request emergency medical services.

Equipment rooms within the telecommunication facility would be equipped with automatic fire detection and suppression systems, including smoke detectors and automated extinguishing systems. Generator and office spaces would also be fitted with smoke detectors and fire sprinkler systems, and no combustible packaging materials would be permitted within equipment rooms. Additionally, there would be no long-term or bulk storage of fuel at the telecommunication facility; diesel fuel would be stored in belly tanks equipped on the emergency generators, and refueling is anticipated to be conducted via mobile fueling truck. Access roads for fire apparatus would be designed in accordance with National Fire Protection Association 1, 2021 Edition, Section 18.2.3, to ensure that fire engines are able to reach the telecommunication facility in the event of a structure fire or other emergency. Civil drawings for the telecommunication facility would be routed to the Honolulu Fire Department for review and approval concurrently with application for a building permit.

2.10.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on public services and facilities.

2.10.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on public services and facilities are anticipated. Implementation of a Site Safety Plan and safe working practices during construction and operation are anticipated to reduce the potential for emergency incidents that could increase burden on local emergency and medical services. These measures, which would be part of Project design, would be implemented to avoid and minimize potential impacts on public services and facilities during implementation of the Proposed Action.

2.11 Recreational Resources

2.11.1 Affected Environment

2.11.1.1 Recreation Areas

The CCH Department of Parks and Recreation (DPR) manages and maintains a system of parks on the Island of Oʻahu. The Project area is located in DPR District 3 (Leeward). The only public park intersected by the Project area is Barbers Point Beach Park, where the cable landing site is proposed. Kapolei Regional Park is located adjacent to the proposed fronthaul system along Farrington Highway/Kamōkila Boulevard.

Barbers Point Beach Park is on a 7.4-acre parcel within an industrial area (James Campbell Industrial Park) of Kapolei and provides the only beach access and park space within an approximately 2-mile radius. Park amenities include restrooms, showers, parking, and picnic areas. While swimming is typically not recommended due to strong currents, dangerous shorebreak, and the presence of rocks and reef, surfing and day use of the picnic area and recreational fishing from the shoreline is common at the beach park. Additionally, Barbers Point Lighthouse is located approximately 500 feet (152.4 m) west of the beach park and is a popular attraction of the area.

Kapolei Regional Park is a 73-acre park that was donated to CCH from the James Campbell Estate in 1994. This park features large open spaces, restroom facilities, and an archery facility. Additionally, Kapolei Regional Park is the location of Puʻuokapolei that once housed a heiau and has cultural, historical, and archaeological significance (DHHL 2022). With the exception of Kapolei Golf Club located adjacent to the proposed telecommunication facility, there are no other publicly or privately owned or managed recreation resources within the immediate vicinity of the Project.

2.11.2 Impacts of the Alternatives

2.11.2.1 Proposed Action

Under the Proposed Action, construction of the cable landing site and installation of the landing pipes would introduce the physical presence of construction equipment, workers, and construction noise during daylight hours at Barbers Point Beach Park, resulting in temporary adverse impacts on recreational uses at the beach park. Construction at the cable landing site would be completed within 4 to 5 months. Access to the beach park would not be restricted during construction; however, the construction work area would occupy approximately 0.96 acre of the property, primarily on the east side of the parcel (see Figure 1-2). The installation of noise fencing around all stationary equipment (HDD rig, pumps, compressors, generators, etc.) during construction of the cable landing site would reduce noise emanating from the work area and reduce impacts on recreational uses at the beach park. Public access to the shoreline and park facilities, including bathrooms and showers, would not be affected during construction.

Potential temporary impacts on recreationists using offshore waters could occur during construction activities when the drill for the landing pipes reach the exit point locations, approximately 4,400 to 5,100 feet (1,341 to 1,555 m) from the shoreline, and during installation of the cable system by the cable laying vessel. The cable laying vessel and up to two support boats would be required for approximately 1 day per cable to complete installation. Nearshore activities would occur during daylight hours and ocean waters would not need to be closed to ocean activities such as boating, surfing, diving, fishing, or swimming during the cable laying or cable installation process, including the area between the shoreline and HDD exit points. However, the areas immediately surrounding the HDD exit points would be patrolled by small boats during cable installation into the landing pipes. A Local Notice to Mariners would be prepared and published and mariners would be advised to avoid the area during cable installation. Once cable installation is complete, there would be no further disruption to offshore recreation.

Construction of the fronthaul system and the telecommunication facility would have no direct impacts on recreational resources and would not cause temporary or permanent losses of opportunity to any recreational resource in the Project area. A potential for indirect impacts on recreational resources in the Project area could result from Project-related traffic; however, impacts would be temporary, intermittent, and minor.

2.11.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on recreational resources.

2.11.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on recreational resources are anticipated. While the Proposed Action would have the potential to result in temporary impacts during construction, the following standard measures, which would be part of Project design, would be implemented to avoid and minimize impacts on recreational uses during implementation of the Proposed Action.

- The Applicants would continue to coordinate with the CCH DPR and the Department of Public Works regarding access to Barbers Point Beach Park, including obtaining a right-of-entry and grant of easement.
- Noise fencing consisting of an 8-foot (2.4-m) chain link fence with sound matting would be placed around the HDD work area to reduce noise impacts.
- Construction equipment and work areas at Barbers Point Beach Park would be secured and inaccessible to the public. HDD activities would occur from dawn to 30 minutes prior to the lūʻau

commencing at Germaine's Lūʻau Monday through Saturday. Construction activities would not occur on Sundays or holidays.

- A Local Notice to Mariners would be prepared and published and mariners would be advised to avoid the area during cable installation.

2.12 Roadways and Transportation

2.12.1 Affected Environment

The Project area is primarily located in Kapolei, which is a planned community within the city and county of Honolulu. The Project area is generally served by a multimodal transportation system comprised of a highway system, county roads, local roads, bicycle and pedestrian facilities, rail system,[2] and airport facilities. Interstate H-1 (H-1) and Farrington Highway/Route 93 provide the primary access to the Project area and serve as the major highway corridors to the leeward portion of Oʻahu. Roadways that would be used for the Project include ʻŌlaʻi Street, Kalaeloa Boulevard, Kapolei Parkway, Kamōkila Boulevard, and Farrington Highway (Figure 2-7). Bike lanes are provided along all of these roads, with the exception of ʻŌlaʻi Street. Sidewalks are also provided along all of the streets that would be used by the Project, with the exception of ʻŌlaʻi Street and the segment of Kalaeloa Boulevard south of Malakole Street. The state-owned parcel of the Farrington Highway and OR&L ROW that would be passed under by the fronthaul route is occupied by Kalaeloa Boulevard, a CCH-owned divided boulevard consisting of six lanes (three northbound and three southbound). Along the northeastern portion of the fronthaul route, Farrington Highway is a HDOT divided highway consisting of two lanes westbound to Kapolei and two lanes eastbound toward Waipahu. Additional information, including street classifications and annual average daily traffic (AADT) volumes (where available) for the roadways in the Project area is provided in Table 2-5. Information for H-1 and Route 93 are also included because they would likely serve as the main transportation routes to the vicinity of the Project area.

Table 2-5 Roadway Information for the Project Area

Road Name	Description of Segment in Project Area	Classification	Annual Average Daily Traffic Volume (2023)
ʻŌlaʻi Street	Barbers Point Beach Park to Kalaeloa Boulevard	City Street	Not available
Kalaeloa Boulevard	ʻŌlaʻi Street to Kapolei Parkway	City Street	34,800
Kapolei Parkway	Kalaeloa Boulevard to Kamōkila Boulevard	City Street	21,300
Kamōkila Boulevard	Kapolei Parkway to Manawai Street	City Street	12,200
Farrington Highway	Manawai Street to Kapolei Golf Course Road	Highway	21,000

[2] The Honolulu rail system, known as *Skyline*, began operations for Segment 1 with service between Aloha Stadium in Hālawa to Kualakaʻi in East Kapolei in 2023 (HART 2025).

Road Name	Description of Segment in Project Area	Classification	Annual Average Daily Traffic Volume (2023)
Interstate H-1	Northwest of Project area approximately 0.10 mile (0.16 km)	Freeway	88,800
Route 93	Northwest of Project area approximately 0.25 mile (0.40 km)	Highway	69,700

Source: CCH 2025; HDOT 2023.

The CCH bus transit service, TheBus, runs several routes servicing the Project area, including Route 413 (service to Campbell Industrial Park and Barbers Point Harbor), Route 46 (Kapolei Commons to UHWO), and Route 40 (Honolulu to Makaha with service along Farrington Highway). There are 22 bus stops in the Project area, 17 of those being on Kamōkila Boulevard and Farrington Highway. Benches and shelters exist at most bus stops. The Kapolei Transit Center is located on Haumea Street between Ulu‘ōhia Street and Wakea Street, one block south of Kamōkila Boulevard.

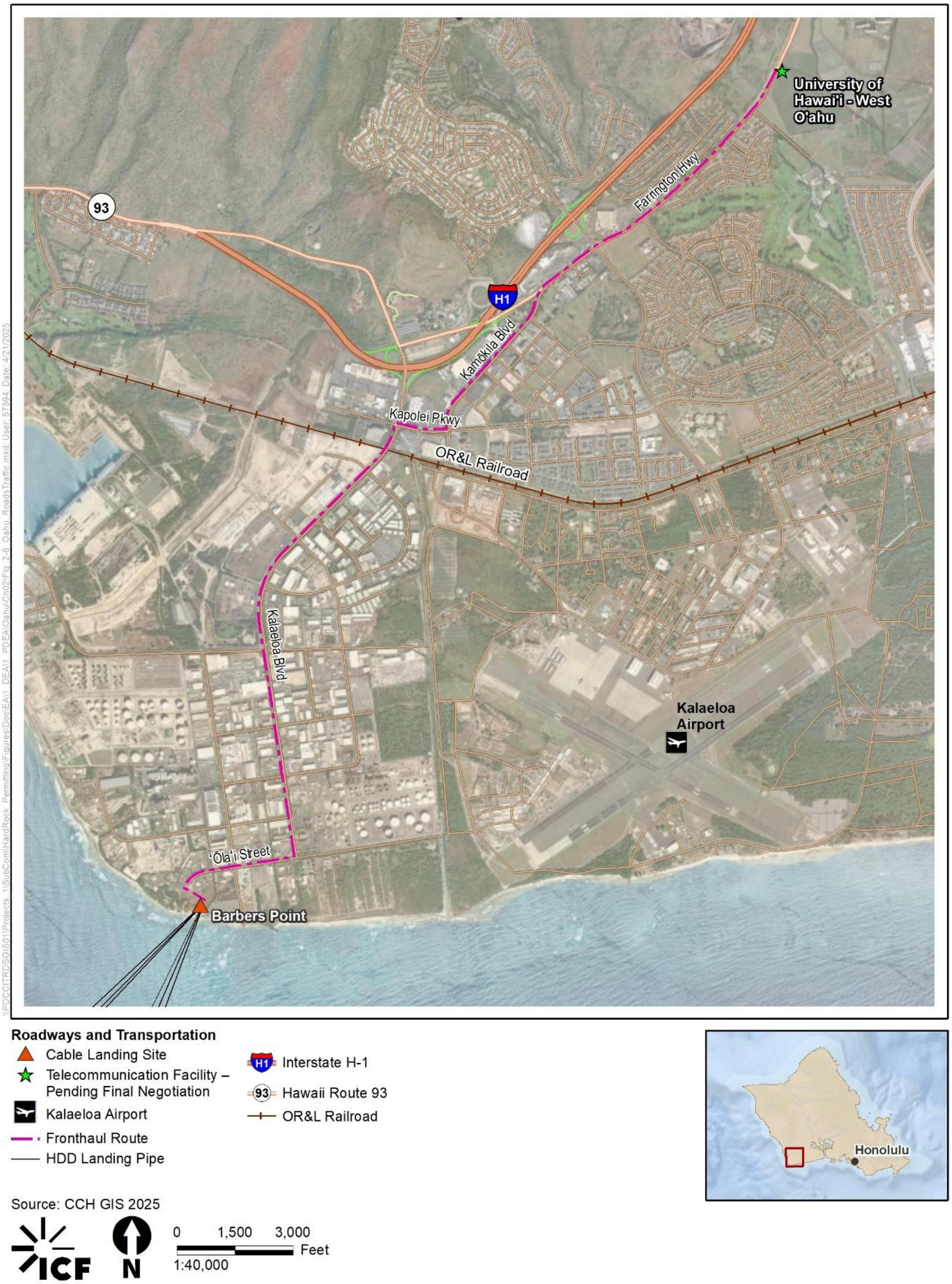

Figure 2-7. Roadways and Transportation

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2.12.2 Impacts of the Alternatives

2.12.2.1 Proposed Action

Construction of the Proposed Action is expected to commence upon receipt of necessary permits and approvals. The construction of each Project component would be independent of each other and timeframes would overlap with construction of the fronthaul system, which is expected to begin before the development of the cable landing site and telecommunication facility. It is anticipated that construction of the Proposed Action would commence in the fourth quarter of 2025 and be completed by the fourth quarter of 2026. Short-term traffic impacts from construction activities are anticipated during this duration as the result of increases in truck traffic associated with removal and redistribution of excavation spoil or with imported fill materials and delivery of construction materials, as well as increases in automobile traffic associated with construction workers travelling to and from work sites. Under the Proposed Action, an average of 16 trips per day are anticipated during the construction of the cable landing site. The majority of these trips (approximately 11 per day) would be trucks and cars for work crews while the remaining (approximately 5 trips per day) would be made by heavy trucks for the transport of equipment, water, fuel, worksite spoil, and miscellaneous supplies. While traffic volume data are not available for ʻŌlaʻi Street, it assumed trips to the cable landing site would require travel along Kalaeloa Boulevard. Construction vehicle trips associated with the cable landing site under the Proposed Action would not significantly contribute to average daily traffic and would amount to approximately 0.04 percent of the 34,800 annual average daily traffic volume along Kalaeloa Boulevard.

Along the fronthaul route, construction would be completed via directional boring in segments along the ROW measuring 300 to 400 feet (91.4 to 121.9 m); however, to account for additional work areas at entry and exit points for the bore and buffer space around construction crews for traffic control (e.g., 35 mph [56 kmh] speed limits within 250 feet [76.2 m) of the construction segment), approximately 600 to 800 feet (182.9 to 243.8 m) of ROW would be affected at a time for each fronthaul system construction segment. Construction activities and associated traffic impacts are anticipated to last 2 to 3 days for each segment along the fronthaul route. To decrease the overall duration of impacts along the ROW, multiple construction segments along the fronthaul route may be active at the same time.

Construction of the Proposed Action would not permanently modify existing bike lanes or sidewalks, including those along Kalaeloa Boulevard. However, temporary impacts would result from the installation of vaults and traffic-rated manhole lids associated with the fronthaul system in limited locations of both sidewalks and bike lanes. During construction, warning and directional signage would be implemented to direct pedestrian and bicycle traffic in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) (FHWA 2025) and CCH standards found at Revised Ordinances of Honolulu (ROH) Section 645, *Work Zone Traffic Control*. If construction requires temporary closure or blockage of a sidewalk or bike lane, a street usage permit would be obtained from the CCH Department of Transportation Services (DTS). As a result, pedestrian and bicycle facilities would remain operational throughout the duration of construction activities. Once construction of the fronthaul system is completed, all affected areas would be restored to existing conditions or better. Additionally, Project plans would be coordinated with and submitted to the CCH DTS to minimize impacts on public transit services, including bus stops. During construction, the Applicant's contractors would inform the surrounding community of potential impacts on the surrounding multi-modal facilities as needed. No long-term impacts on public transit facilities are anticipated.

An average of 10 deliveries and a total of 36 vehicle trips per day are anticipated during construction of the telecommunication facility. It is anticipated that construction workers and delivery vehicles would access the site via Farrington Highway for the 9-month construction period for the telecommunication facility. Construction vehicle trips under the Proposed Action would not significantly contribute to average daily traffic and would amount to approximately 0.2 percent of the 21,000 annual average daily traffic volume along Farrington Highway.

Upon completion of construction, the Proposed Action is not anticipated to adversely affect traffic or transit operations in the vicinity of the Project area. Traffic operations in the vicinity of the Project area are expected to remain similar to baseline. The telecommunication facility would accommodate 10 parking spaces onsite, and there would be approximately 10 vehicle trips per day to the site during operation (up to 9 workers and 3 deliveries per 24-hour period). Project plans for sidewalks, parking, and vehicular ingress/egress at the telecommunication facility would be reviewed and approved by the Disability and Communication Access Board to ensure compliance with the Americans with Disabilities Act (ADA) requirements. Operation of the cable landing site and fronthaul system would not generate vehicle trips unless required for occasional maintenance activities.

2.12.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on roadways and transportation.

2.12.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on traffic, pedestrian facilities, bike lanes, or public transit are anticipated. While the Proposed Action would have the potential to result in temporary impacts during construction, standard measures, which would be part of Project design, would be implemented to avoid and minimize conflicts during construction of the Proposed Action, including the following.

- Site-specific temporary traffic control plans that conform with the latest edition of MUTCD as well as standards from HAR Section 19-129 (Use of Traffic Control Devices at Work Sites on or Adjacent to Public Streets and Highways) and CCH standards found at ROH Section 645 (Work Zone Traffic Control) would be submitted as part of the site development application to the CCH DTS and HDOT.
- Traffic control would follow all standard construction plans and traffic control notes provided by the CCH Traffic Review Branch.
- Applicable permits would be obtained from CCH DTS and/or HDOT for any work within their designated ROWs before work on any portion of a public street or highway may begin. Construction traffic control plans approved by DTS and/or DPP would be provided when applying for the permit.
- Project area ingress and egress would be monitored to allow safe passage of pedestrians and ensure effectiveness of management strategies along construction areas.

- BMP controls would be implemented at the construction site to prevent dirt and debris from being carried offsite onto the surrounding roadways.
- Existing roadway conditions would be documented prior to the start of construction and repair any damages that result from construction of the Project. Ensure repairs meet ADA requirements.
- Throughout construction activities, communicate the status of the Project and any impacts on the adjoining local street area network with area representatives, including neighborhood boards, businesses, emergency response personnel, and Oʻahu Transit Services.

2.13 Scenic and Visual Resources

2.13.1 Affected Environment

The Project area is located in the ʻEwa District of Oʻahu. Policies and objectives for CCH are outlined in the *Oʻahu General Plan*, which contain the objective to "locate and design public facilities, infrastructure and utilities to minimize the obstruction of scenic views" (DPP 2021). The Project area is also within the ʻEwa sustainable community plan area, specifically classified as Urban - Fringe, which is regulated by the *ʻEwa Development Plan* (DPP 2020). The *ʻEwa Development Plan* includes a general policy of protecting scenic views and identifies scenic resources that occur in the plan area (DPP 2020). Section 3.15 of the *ʻEwa Development Plan* also contains general policies for development within the UHWO property, including general architecture or design, landscaping, and transportation requirements (DPP 2020).

The UHWO implements policies via the *Non-Campus Lands Urban Design Plan*. Non-campus lands are predominantly flat and composed of agricultural lands that are either fallowed or actively cultivated and do not contain any landforms that could serve as a regional visual landmark or scenic resource. The parcels selected for siting the telecommunication facility and associated infrastructure are currently in agricultural use and are otherwise bordered by developed areas, including Kualakaʻi Parkway to the east, dense residential areas and the Kapolei Golf Club and golf course to the south and southeast, and the 150-acre Grace Pacific Makakilo Quarry to the northwest. Vegetative corridors that provide screening occur throughout the surrounding agricultural fields, along portions of Farrington Highway and H-1, and along Kapolei Golf Course Road. The elevation surrounding the proposed site for the telecommunication facility slopes generally south/southeast from the Waiʻanae Mountain Range to the Pacific Ocean and Pearl Harbor.

A visual impact assessment was completed for the telecommunication facility and is included as Appendix C, *Visual Impact Assessment*, of this EA. The scenic resources that could potentially be affected by construction and long-term operation of the telecommunication facility include the following.

- Distant vistas of the shoreline from the scenic portion of H-1 above the ʻEwa Plain.
- Views of Nā Puʻu at Kapolei, Pālailai, and Makakilo.
- Mauka and makai views.
- Views of central Honolulu and Diamond Head from Puʻu Makakilo.

Existing uses along the fronthaul route include public road ROW, overhead utility corridors (i.e., powerlines), residences, commercial properties, and industrial uses in the Barbers Point Industrial Area. Aside from Germaine’s Lūʻau immediately west of Barbers Point Beach Park, existing land uses surrounding the cable landing site are predominately industrial. Existing scenic resources near the cable landing site include Barbers Point Beach Park and the Barbers Point Lighthouse, from which there are unobstructed views of the ocean.

The ʻEwa Development Plan states that “...public views which include views along streets and highways, *mauka-makai* view corridors, panoramic and significant landmark views from public places, views of natural features, heritage resources, and other landmarks, and view corridors between significant landmarks, can be important cultural resources.” Additionally, the ʻEwa Development Plan states that the major entry point to the shoreline easement at the Barbers Point Beach Park and lighthouse area should be continued (DPP 2020).

The cable landing site and approximately 50 feet (15.2 m) of the fronthaul system along ʻŌlaʻi Street would be located within the SMA boundary where development must be reviewed by CCH under the SMA provisions set forth in the ROH Chapter 25. Under ROH Section 25-3.2(c)(4), the Honolulu City Council must seek to minimize, where reasonable, any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast.

2.13.2 Impacts of the Alternatives

2.13.2.1 Proposed Action

Construction and operation of the cable landing site and fronthaul system would not significantly affect scenic vistas and view planes identified in CCH plans and policies. The construction phase would involve the temporary presence of cable laying vessels and construction equipment visible to users of Barbers Point Beach Park, but this would not significantly affect the vista or view planes of the Project area. Upon completion of the installation, vessels and construction equipment would be removed, and only ground-level manholes and vault covers would be visible at the beach park and along the fronthaul route, leaving no permanent impact on vistas or view planes.

The telecommunication facility would be located near the corner of Farrington Highway and Kapolei Golf Course Road and would consist of a warehouse building, external mechanical yard, an access road, and parking area. All infrastructure would be designed and constructed in accordance with UHWO-approved site plans, including the *Non-Campus Lands Urban Design Plan*. As part of the telecommunication facility design process, the CCH Land Use Ordinance was reviewed to identify scenic resources or associated development standards relevant to the applicable zoning districts.

Construction and operation of the telecommunication facility would introduce visual contrast and have visual effects from locations where the new facility would be visible and noticeable. Development of the telecommunications facility would entail construction activities that would include the clearing and grubbing of existing vegetation, grading, and installation of facility components. Visual impacts of construction would be temporary and are expected to occur over an approximately 9-month construction duration. Long-term operation of the telecommunication facility would introduce a new structure that would be visually prominent from locations around the perimeter of the site and from Farrington Highway (see the visual simulations in Appendix C) but would be increasingly muted and less noticeable at greater viewing distances.

Identified scenic resources are predominately located within the middleground viewing distance from the telecommunication facility. Views of the distant shoreline vistas and ocean (i.e., makai views) from the defined scenic portion of H-1 (i.e., the single scenic resource located within a foreground viewing distance) would include the facility site; however, the facility components would offer weak contrast due to existing urban development (namely residential in the foreground, otherwise commercial, and industrial land use at middleground distances). This would be a short-term visual experience for travelers on H-1, and the facility would remain visually subordinate to the broader developed landscape.

Similarly, although the telecommunication facility would be visible from all three Puʻu locations, the facility components would be seen in the context of the existing urban, highly modified environment. Any views of central Honolulu and Diamond head from Puʻu Makakilo specifically already include a highly developed landscape (including Grace Pacific Makakilo Quarry in the foreground), and the telecommunication facility is anticipated to create weak contrast. Most mauka views are not anticipated to be affected due to topographic and vegetation screening and location of the facility at a higher elevation than the southern coastline. The telecommunication facility is anticipated to be mostly screened from view by existing vegetation at the Kapolei Golf Club and along the Kapolei Golf Course Road. Because the telecommunication facility would introduce minimal to no visual contrast from identified scenic resources, visual impacts of long-term operation of the facility are anticipated to be negligible (Appendix C).

2.13.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on scenic and visual resources.

2.13.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on scenic and visual resources are anticipated. The following measures, which would be part of Project design, would be implemented to avoid and minimize potential impacts on scenic and visual resources during implementation of the Proposed Action.

- All infrastructure within the mechanical yard of the telecommunication facility, except the two light fixtures and storage tank, would be concealed by a surrounding metal, hurricane louver screening wall, which would be approximately 20 feet (6.1 m) tall.
- The telecommunication facility would be colored off-white to be consistent with existing UHWO buildings.

2.14 Socioeconomic Resources

2.14.1 Affected Environment

Administratively, the Project area is located in the ʻEwa Census County Division (CCD) of the city and county of Honolulu. The ʻEwa CCD had a 2021 population of approximately 360,000, encompassing about 35 percent of the total population in city and county of Honolulu, which was estimated at 1,016,508 in 2021 (U.S. Census Bureau 2025a, 2025b). From 2010 to 2021, the population of the

ʻEwa CCD grew from 320,373 to 360,178, which represented an average annual growth rate of approximately 1.1% (U.S. Census Bureau 2025a). This population growth outpaced the annual average growth rate of approximately 0.5 percent for the city and county of Honolulu during the same period (U.S. Census Bureau 2025b).

In 2013 (and amended in 2020), the CCH DPP developed the *ʻEwa Development Plan* for the ʻEwa region of Oʻahu, which is a smaller area than the ʻEwa CCD. The ʻEwa region encompasses the entirety of the Project area and the communities of ʻEwa Beach, Kapolei, and Makakilo, with boundaries extending from Kunia Road to Kahe Point and mauka towards Kaloʻi Gulch (DPP 2020). The closest communities to the Project area are Makakilo, Kapolei, and Kalaeloa, which are all within the ʻEwa region. In 2023, the estimated populations of Makakilo, Kapolei, and Kalaeloa and were 20,372, 23,033, and 3,229, respectively (U.S. Census Bureau 2023a, 2023b, 2023c). The ʼEwa Development Plan estimates that the population in the ʻEwa region will grow from 68,700 people in 2000 to over 164,000 people by 2035. While the development plan does not include population growth forecasts for Makakilo or Kalaeloa, over 8,000 new residents are forecasted for Kapolei by 2035 (DPP 2020).

2.14.2 Impacts of the Alternatives

2.14.2.1 Proposed Action

The Proposed Action is not expected to have an adverse impact on the existing populations in Makakilo, Kapolei, and Kalaeloa or the population in the immediate vicinity of the Project area. During construction, temporary employment opportunities would be created. However, as only a limited number of workers would be required to staff the Project during operations, the majority of the employment associated with the Proposed Action would be short-term, lasting for the duration of construction. It is estimated that up to nine full-time personnel would be employed during operation of the telecommunication facility. A maximum of three workers would be present onsite at one time and would rotate shifts to ensure operation of the facility 24 hours per day, 7 days per week. Occasional visits from various contractors for operation and maintenance of the Project would also be anticipated under the Proposed Action. Therefore, although some new employment may result under the Proposed Action, increases in employment would occur primarily during construction, and this increase is expected to be small and would have minimal impact on employment in the broader ʻEwa region.

The cost to construct the Project is estimated to be between approximately $55 and $57 million, which would generate state and local tax revenue from construction expenditures and income taxes on construction and operations wages. Construction and operations costs would be covered through private investment. The purpose of the Project, as described in Chapter 1, *Project Description and Alternatives*, is to improve the State's broadband infrastructure through increased telecommunications speed and improved reliability. Enhanced broadband infrastructure will support growth in the ʻEwa region and on the island of Oʻahu but is not expected to induce growth.

The Proposed Action is not anticipated to induce growth in the Project area but would instead support the growth that has occurred and that is forecasted for the communities in the Project area. The major benefit of the Proposed Action would be providing critical infrastructure of broadband for the State of Hawaiʻi for multiple purposes, including innovation, economic development, healthcare, education, public safety, research, public services, and entertainment (Department of

Business, Economic Development & Tourism 2020), particularly as the population of the ʻEwa community and the UHWO, as well as Oʻahu and Hawaiʻi generally, continue to grow. The Proposed Action would improve internet connections in the South Pacific and help protect the islands from internet disruptions by bringing much needed telecommunications competition and resilience to the region. Further, the Proposed Action would bring multiple additional cables to Hawaiʻi, increasing capacity (supply), thereby putting downward pressure on pricing. The proposed cables, cable landing site, fronthaul system, and telecommunication facility are separate from existing infrastructure, thereby increasing reliability of communications and resiliency of communication networks to and around the region.

2.14.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on socioeconomic resources. However, the No Action Alternative also would not have the beneficial effects on educational systems, communities, and businesses that the Proposed Action would provide.

2.14.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on socioeconomic resources are anticipated. No avoidance and minimization measures related to socioeconomic resources are proposed.

2.15 Terrestrial Biological Resources

2.15.1 Affected Environment

Biological surveys and desktop reviews were conducted in 2024 and 2025 to characterize the species and habitats that are present, or have the potential to occur, in the Project area. Separate terrestrial biology survey reports were prepared for the telecommunications facility site and the fronthaul route, including the cable landing site, and are included as Appendix D, *Biological Resources Survey Report – Telecommunication Facility*, and Appendix E, *Terrestrial Biological Survey Report*, of this EA, respectively. Results of biological surveys and desktop reviews are summarized under Section 2.15.1.1, *Flora*, and Section 2.15.1.2, *Fauna*.

2.15.1.1 Flora

No federally or state-listed threatened, endangered, proposed listed, or candidate plant species for listing were found during the botanical surveys. No designated or proposed critical habitat for threatened or endangered plant species occurs in the Project area. Three critical habitat parcels for seven endangered plant species (ʻakoko [*Euphorbia celastroides* var. *kaenana; Euphorbia skottsbergii* var. *skottsbergii*], ʻāwiwi [*Schenkia sebaeoides*], ʻohai [*Sesbania tomentosa*], ʻEwa hinahina [*Achyranthes splendens* var. *rotundata*], *V. o-wahuensis*, koʻokoʻolau [*Bidens amplectens*], and maʻoliʻoli [*Schiedea kealiae*]) occur within 1mile of the Barbers Point Beach Park, with the closest parcel being within 120 feet of the beach park. A description of plant communities identified within the Project area is provided in the following subsections, organized by Project component.

Cable Landing Site and Fronthaul Route

The cable landing site and fronthaul route overlap the Barbers Point Industrial Area and a highly developed road and highway corridors that pass through the towns of Kapolei and the Kalaeloa. Based on the type, distribution, and abundance of the plant species found, the vegetation types throughout the cable landing site and fronthaul are comprised of coastal sand dune, roadside scrub, and maintained lawn vegetation. Maintained vegetation was the most abundant vegetation type and was composed of mowed lawn or a variety of landscape and ornamental plants.

In total, 81 plant species were observed during the botanical survey (see Appendix E for list of all plant species observed in the cable landing site and fronthaul route survey area). Of the 81 species observed, 11 are native to the Hawaiian Islands and include hoary abutilon (*Abutilon incanum*), seaside heliotrope (*Heliotropium curassavicum*), beach morning glory (*Ipomoea pes-caprae*), naio (*Myoporum sandwicense*), hala (*Pandanus tectorius*), naupaka kahakai (*Scaevola taccada*), ʻĀkulikuli (*Sesuvium portulacastrum*), ʻAkiʻaki (*Sporobolus virginicus*), milo (*Thespesia populnea*), Pōhinahina (*Vitex rotundifolia*), and ʻUhaloa (*Waltheria indica L.).* None of the native plant species observed is federally or state-listed threatened, endangered, proposed listed, or candidate plant species for listing or known to be rare.

As described in Appendix E, thirteen endangered plant taxa were identified as potentially occurring in the Project vicinity based on data obtained from the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) data portal. However, because the Project area is a predominantly disturbed and well-developed highway corridor, suitable habitat for these endangered species was not observed during the reconnaissance survey. The manicured areas of the highway ROW are routinely mowed and weed whacked and the unmaintained areas are dominated by nonnative species. Barbers Point Beach Park is a recreational area subject to human foot traffic on a daily basis, particularly in the central area of the park next to the restrooms that are proposed for ground disturbance. Rodents and nonnative invertebrates that can damage endangered plants and their propagules are also present at the Project area. These unsuitable conditions, combined with the biology, status, and distribution of these endangered plant species, make it highly unlikely that these species would establish within the Project area. Therefore, Project activities are not likely to affect these endangered plant species.

Telecommunication Facility Site

The primary vegetation type at the telecommunication facility is active agricultural fields, which are intersected by multiple dirt roads and dominated by nonnative plants. Buffelgrass (*Cenchrus ciliaris*) grassland and narrow bands of koa haole scrub (*Leucaena leucocephala*) also occur within the area. Three native plant species that commonly occur throughout Hawaiʻi were observed at the telecommunication facility site, including kou (*Cordia subcordata*), ʻuhaloa, and hairy abutilon. None of the native plant species observed at the telecommunication facility site is federally or state-listed threatened, endangered, proposed listed, or candidate plant species for listing (Appendix D).

2.15.1.2 Fauna

No federally or state-listed threatened, endangered, proposed listed, or candidate wildlife species for listing were found during the biological surveys. The Project area for the cable landing site, fronthaul route, and telecommunications facility do not encompass any designated or proposed critical habitat for threatened or endangered wildlife species. A description of fauna observed or potentially occurring in the Project area is provided in the following subsections, organized by Project component.

Cable Landing Site and Fronthaul Route

Avian species observed during surveys of the cable landing site and the fronthaul route were nonnative to the Hawaiian Islands, with the exception of one indigenous bird, the Pacific golden plover, or Kōlea (*Pluvialis fulva)*. Additionally, the cattle egret (*Bubulcus ibis*), house finch (*Carpodacus mexicanus*), and red-crested cardinal (*Paroaria coronata*) were observed and are protected species under the Migratory Bird Treaty Act (MBTA). No rare native Hawaiian birds or bird species that are state or federally listed as threatened or endangered, or taxa that are candidates for listing, were observed in the Project area.

Four state and federally listed waterbird species—the Hawaiian duck (*Anas wyvilliana* [koloa maoli]), Hawaiian coot (*Fulica alai* [ʻalae keʻokeʻo]), Hawaiian stilt (*Himantopus mexicanus knudseni* [aeʻo]), and Hawaiian common gallinule (*Gallunila galeata sandvicensis* [ʻalae ʻula]), were identified as potentially occurring in the Project area through the IPaC report, but none one of these species was observed during the reconnaissance survey. The Project area is a predominantly highly disturbed, narrow, linear, highway corridor and the water features seen in the Project area are mostly culverts and highly disturbed ditches that do not contain optimal foraging and breeding habitat for these endangered waterbirds.

The listed seabird species that were identified as potentially occurring in the IPaC report were also not observed during the reconnaissance survey and are considered unlikely to be encountered in the Project area due to the lack of suitable habitat for nesting, their pelagic foraging behavior, and the absence of data to support their occurrence in the Project area. These species include the Newell's shearwater (*Puffinus auricularis newelli* [ʻaʻo]), Hawaiian petrel (*Pterodroma sandwichensis* [ʻuaʻu]), band-rumped storm-petrel (*Hydrobates castro* [ʻakēʻakē]), and short-tailed albatross (*Phoebastria albatrus)*.

The green sea turtle (*Chelonia mydas* [honu]) and the Hawksbill sea turtle (*Eretmochelys imbricata*) are identified to potentially occur in the Project area in the IPaC report. Even though these species were not observed on the sandy beach of the Barbers Point Beach Park during this reconnaissance survey, they are known to forage in all Hawaiian waters. (Also see Section 2.7, *Marine and Nearshore Biological Resources*.)

No mammal species were observed during the wildlife survey. However, the area is known to have small feral mammals such as cats, rats, and mongoose. The state's only native terrestrial mammal, the endangered Hawaiian hoary bat, or ʻōpeʻapeʻa (*Lasiurus semotus*), could roost or forage in the vicinity of the cable landing site and fronthaul route. Hawaiian hoary bats are tree-roosting bats and roost in various native and nonnative trees.

Telecommunication Facility Site

Similar to the cable landing site and fronthaul route biological survey, all avian species observed during surveys at the telecommunication facility site were nonnative to the Hawaiian Islands, with the exception of the Pacific golden plover. Six of the bird species observed are protected by the MBTA (Table 2, Appendix D). No Hawaiian short-eared owl, or pueo (*Asio flammeus sandwichensis*), were observed in the Project area during the general biological surveys or during the three pueo-specific surveys conducted in 2024 (see Appendix D). However, pueo have been reported in nearby areas immediately north and roughly 0.7 mile (1.1 km) to the northeast of the telecommunication facility site (Appendix D). Given their occurrence in the vicinity, the grassland habitat present, and because pueo use a variety of habitats, pueo could potentially traverse, hunt, roost, or nest in and around the telecommunication facility site. In addition, two seabirds—the endangered Hawaiian petrel and threatened Newell's shearwater—were not present during the survey but could fly over the Project area.

Multiple small Indian mongoose (*Herpestes auropunctatus*) and a small domestic dog were observed in the survey area. These nonnative species were the only terrestrial mammals detected during the surveys. The state's only native terrestrial mammal, the endangered Hawaiian hoary bat, could roost or forage in the survey area.

Only a few trees within the survey area (e.g., kou, koa haole, and kiawe) are over 15 feet tall and have the potential to function as roost trees for the Hawaiian hoary bat; these trees are primarily along the boundary of Farrington Highway and Kapolei Golf Course Road and along the Kaloʻi Gulch tributaries. However, detections at an acoustic recorder deployed roughly 0.3 mile (0.5 km) east of the telecommunication facility site as part of an island-wide study documented low bat activity in the vicinity. From June 2017 through October 2021, bats were detected on 14 out of the 1,341 nights sampled at this detector.

A total of 15 invertebrates were incidentally observed and recorded during survey efforts (Table 3, Appendix D). Only 2 of the 15 invertebrate species observed—globe skimmer (*Pantala flavescens*) and green darner (*Anax junis*)—are native to the Hawaiian Islands. In addition, damage from the invasive coconut rhinoceros beetle (*Oryctes rhinoceros*) which is now widespread on Oʻahu was observed on coconut palms adjacent to the survey area at Kapolei Golf Club.

Fauna observed during the biological surveys at the telecommunications facility site are listed and discussed in Section 4.2, *Wildlife*, of Appendix D.

2.15.2 Impacts of the Alternatives

2.15.2.1 Proposed Action

The Proposed Action would result in approximately 15.3 acres of surface disturbance for the development of the cable landing site, fronthaul system, and telecommunication facility.

Flora

While the vegetation types of the Project area are predominantly nonnative and not considered unique, the Proposed Action would require surface disturbance and clearing of vegetation, including potentially native plant species. Removal of any of the native plant species identified in the Project area is not anticipated to result in adverse impacts on local or regional populations as these native species are known to have widespread distribution on Oʻahu and throughout the state. The Project area does not contain suitable habitat for the endangered plant species discussed in Section 2.15.1.1, *Flora*, and no listed plant species were observed during surveys. Given the unsuitability of the Project area, combined with the biology, status, and distribution of endangered plant species in the vicinity, it is highly unlikely for endangered plants to establish within the Project area. Therefore, the Proposed Action is not anticipated to affect endangered plant species. The introduction and spread of invasive plant species could reduce habitat quality in the Project area and the vicinity;

however, with the implementation of the avoidance and minimization measures proposed in Section 2.15.3, *Avoidance and Minimization Measures*, the Proposed Action would not result in significant, adverse impacts on plants.

Fauna

Construction and operation of the Proposed Action may directly affect wildlife, potentially causing injury or mortality due to collisions with construction equipment, habitat removal and alteration, as well as noise and disturbance. Indirectly, construction of the Proposed Action may adversely affect wildlife through the introduction and spread of nonnative plant and animal species. The potential for direct mortality of wildlife due to collision with equipment or vehicles is anticipated to be low, as most wildlife tend to avoid construction activities. These impacts are expected to be localized with potential to primarily occur during the construction phase. No unique or high-quality wildlife habitats occur within the Project area, and the Proposed Action would not result in a substantial loss of wildlife habitat.

Construction of the Proposed Action would cause temporary noise and increased human activity in work areas, potentially disturbing wildlife. However, due to the relatively short duration of construction, wildlife is expected to return after minor, temporary displacement. No listed, protected, or candidate wildlife species were found in the Project area during the biological surveys. No designated or proposed critical habitat for threatened or endangered wildlife species occurs within the Project area. However, the Hawaiian hoary bat has potential to occasionally forage or roost in the Project area. Direct impacts on bats may occur if roost trees are disturbed. Only a few trees within the Project area (e.g., kou, koa haole, and kiawe) are over 15 feet tall and have the potential to function as bat roost trees; these trees are primarily along the boundary of Farrington Highway and Kapolei Golf Course Road and along the Kaloʻi Gulch tributaries. While the Proposed Action has a low likelihood of adversely affecting the Hawaiian hoary bat, avoidance and minimization measures outlined in Section 2.15.3 would be implemented to reduce the potential for adverse impacts on this species.

The native Hawaiian short-eared owl (pueo) was not observed during the surveys but may hunt, roost, or nest at the telecommunication facility site due to the existing vegetation type of the area. The Proposed Action could adversely affect pueo if they are nesting at the telecommunication site during construction. However, with implementation of avoidance and minimization measures in Section 2.15.3, the potential for adverse impacts on pueo would not be significant under the Proposed Action. Construction of the cable landing site and fronthaul system may temporarily displace predominantly nonnative individual birds that utilize the Project area, but long-term and population-level impacts are not expected. These bird species, if encountered during construction activities, are expected to find more suitable foraging habitat in nearby areas.

The Proposed Action is not anticipated to result in adverse impacts on waterbirds, including the Hawaiian duck, Hawaiian coot, Hawaiian stilt, and Hawaiian gallinule. Additionally, the Project area does not provide suitable nesting or foraging habitat for the listed seabirds; however, individuals may fly over the Project area and could be attracted to construction lights at night. Disorientation and fallout as a result of light attraction could occur to individual seabirds attracted to nighttime construction lighting and unshielded nighttime facility lighting. Juvenile birds are particularly vulnerable to light attraction. Grounded birds are also more vulnerable to mammalian predators or vehicle strikes. Although the chances of the Proposed Action adversely affecting listed waterbirds and seabirds are low, the avoidance and minimization measures listed in Section 2.15.3 would be implemented to reduce potential adverse impacts.

2.15.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on terrestrial biological resources.

2.15.3 Avoidance and Minimization Measures

Under the Proposed Action, significant impacts on terrestrial biological resources are not anticipated. The following measures, which would be part of Project design, would be implemented to avoid and minimize potential impacts on terrestrial biological resources during implementation of the Proposed Action.

The following measures would be implemented to minimize potential impacts on plants.

- All construction equipment and vehicles would arrive at the work site for the first time in clean condition and free of any soil or plants. Similarly, all construction equipment and vehicles would also be cleaned after use on the Project site.
- All materials imported to the Project site, including gravel, soil, rock, and sand, would be certified weed free. Invasive species found on stockpiled materials would be removed either chemically or mechanically.
- Only weed-free seed mixtures would be used for hydroseeding and hydromulching on the Project site.
- To the extent feasible, the Project would use native plants for revegetation or landscaping purposes. If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive may be substituted.
- Only plants grown on Oʻahu would be used for landscaping purposes. If locally grown plants are unavailable, then imported plants may be used, but they would be thoroughly inspected or quarantined if necessary to ensure that they are free of invasive pests, such as little fire ants (*Wasmannia auropunctata*), and invasive plant seeds and seedlings that could arrive inadvertently.
- The following measures would be implemented at the telecommunication facility site to minimize potential impacts on Hawaiian short-eared owl (pueo).
- Prior to clearing vegetation or ground-disturbing activities with heavy machinery, qualified biologists would conduct pre-construction pueo surveys in areas of suitable nesting habitat within 1 week of ground disturbance to confirm pueo are not nesting in the area. Generally, Hawaiʻi Division of Forestry and Wildlife (DOFAW) has recommended three evening vantage point surveys within 1 week before construction using the Pueo Project Survey Protocol (Price and Cotín 2018). DOFAW also recommends that vegetation clearing and grading should occur as soon as possible following pueo surveys and should be completed within 14 days of surveys.
- A wildlife education and observation program would be implemented for all construction and regular onsite staff to identify pueo and take appropriate steps if pueo or a pueo nest are observed.

- If a pueo is observed in the Project area at any time, all activities in the immediate vicinity would stop immediately. The location of the bird would be reported to a designated representative (including a UHWO representative), and a qualified biologist should check the area for the presence of a pueo nest.
- If a pueo nest or breeding displays are observed at any time (prior to construction, during construction, or during operation), DOFAW would be notified immediately to determine a buffer zone and next steps. Recommended buffers range from 50 to 656 feet around the nest. The buffer would be marked in the field by a qualified biologist. No work would occur in the buffer until pueo nesting is complete.

The following measures would be implemented to minimize potential impacts on listed seabirds.

- If operational onsite lighting is required, it would consist of fixtures that would be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- If a grounded seabird is found at the Project site, USFWS and DOFAW would be notified immediately. These agencies may recommend contacting a wildlife rehabilitation facility, such as Feather and Fur Animal Hospital at (808) 254-1548.
- The following measures would be implemented to minimize potential adverse impacts on listed waterbirds.
- Creating areas with standing water would be avoided.
- A wildlife education program would be implemented to inform construction workers on how to identify listed waterbirds and take appropriate steps if listed waterbirds are observed near construction work areas.
- If listed waterbirds are found in the Project area during active construction, all activities would cease within 100 feet of the birds. Work may continue after the listed waterbird leaves the area of its own accord.

The following measures would be implemented to minimize potential impacts on listed sea turtles.

- There would be no vehicle use on, or modification of the beach/dune environment during the sea turtle nesting or hatching season, or on beach where sea turtles are known to bask.
- The native dune vegetation would not be removed or destroyed.
- If basking sea turtle(s) are found in the Project area during active construction at the cable landing site, all mechanical or construction activities within 100 feet of the basking sea turtle would cease until the animal voluntarily leaves the area. All activities between the basking sea turtle and the ocean will also stop.
- Project-related debris, trash, or equipment from the beach or dune would be removed if not actively being used.
- The following measures would be implemented to minimize potential impacts on the Hawaiian hoary bat.
- To prevent entanglements, barbed wire would not be used for fencing.

- No trees taller than 15 feet (4.6 meters) would be trimmed or removed between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

2.16 Marine Water Quality

2.16.1 Affected Environment

The offshore waters in the Project area and up to the territorial limit of the State of Hawai‘i, including the proposed HDD corridor, HDD exit points, and subsea cables, are classified as Class A marine waters by HDOH – Clean Water Branch (CWB) (HDOH CWB 2025). *Class A waters*, as defined in HAR Section 11-54-3 (c)(2), are defined as those waters in which the objective is to protect recreational uses and aesthetic enjoyment, while also ensuring the protection and propagation of fish, shellfish, and wildlife. Class A waters are not intended to receive waters for any discharge that has not received the best degree of treatment or control compatible with the criteria established for this class. No new sewage discharges or new industrial discharges are permitted.

The State of Hawai’i established basic water quality criteria for open coastal waters, detailed in HAR Section 11-54-6, which includes specific criteria applicable to marine waters, including pH, dissolved oxygen, temperature, and salinity. The specific criteria for Class A open coastal waters are listed in HAR Section 11-54-6 and are summarized in Table 2-6. The water quality standards are based on a geometric mean for most parameters; therefore, three separate samples need to be collected to compare to the standard.

Table 2-6. Water Quality Standards for Open Coastal Waters (HAR Section 11-54-6)

	Water Quality Standard [a]		
Parameter	Geometric mean not to exceed value	Not to exceed value >10% of the time	Not to exceed value >2% of the time
Total Nitrogen (μg/L)	110.0	180.0	250.0
Nitrate and Nitrite Nitrogen (μg/L)	3.5	10.0	20.0
Ammonia Nitrogen (μg/L)	2.0	5.0	9.0
Total Phosphorous (μg/L)	16.0	30.0	45.0
Chlorophyll α (μg/L)	0.15	0.50	1.0
Turbidity (Nephelometric Turbidity Units)	0.20	0.50	1.00
Light Extinction Coefficient (k units) [b]	0.10	0.30	0.55
Temperature (°C)	Shall not vary more than 1 degree Celsius from ambient condition		
Dissolved Oxygen (%)	Not less than 75% saturation determined as a function of ambient water temperature and salinity		
pH	Shall not deviate more than 0.5 units from a value of 8.1, except at coastal locations where and when freshwater from stream, storm drain or groundwater discharge may depress the pH to a minimum level of 7.0		

Source: HAR Section 11-54-6.

[a] Only "dry" water quality standards are provided because the open coastal waters in the Project area are expected to receive less than 3 million gallons of freshwater discharge per day per shoreline mile.
[b] Light Extinction Coefficient is only required for discharges who have obtained a waiver pursuant to Section 301(h) of the Clean Water Act and are required by the Environmental Protection Agency to monitor it.

The HDOH CWB completed a water quality monitoring and assessment report, known as the Integrated Report (IR) in 2024 (HDOH 2024b). The report identifies state waters that are Clean Water Act (CWA) 303(d) impaired or threatened. According to the 2024 303(d) Final List of Impaired Waters in Hawai'i, the Barbers Point Beach Park monitoring site (HI593573) is lacking sufficient data. However, the Nimitz Beach site (HI1682233), located approximately 2 miles east of the Barbers Point Beach Park and the cable landing site, is in attainment for *Entercocci* and nonattainment for turbidity. All other parameters (e.g., total nitrogen, ammonia, etc.) have insufficient data to make a determination (HDOH 2024b).

2.16.2 Impacts of the Alternatives

2.16.2.1 Proposed Action

Construction and operation of the onshore cable landing site, HDD activities, and submarine cable laying have the potential to cause adverse impacts on marine water quality. However, measures would be implemented to avoid and minimize adverse impacts.

Cable Landing Site

Construction activities at the cable landing site would include soil disturbance, material stock piling, and use of fuels or other hazardous materials. Exposed sediments and fuels or other hazardous materials have the potential to be conveyed by localized runoff and overland flows into the nearby, adjacent, marine waters. At the cable landing site, earthmoving equipment would be used to grade a portion of the site for construction vehicle access and material laydown, as well as construction of the BMHs, OGBs, and HDD drill pit. Surface disturbance at the cable landing site would be limited to 0.96 acre, entirely within Barbers Point Beach Park. Following completion of construction, the site would be restored to pre-project contours and conditions. The likelihood of Project activities at the cable landing site affecting marine water quality is low because the disturbance area is relatively small (i.e., 0.96 acre) and measures would be incorporated to avoid and minimize adverse impacts. Cleared, unvegetated, and graded lands exposed to rain and localized runoff could potentially enter adjacent marine waters and result in increased turbidity. Additionally, marine water quality could be indirectly affected due to accidental release of toxic materials/chemicals during Project construction. Potentially hazardous materials that may be used during construction at the cable landing site include diesel fuel, gasoline, lubricant oils, hydraulic fluids, and other chemicals that may be required for the operation of construction vehicles and equipment. Indirect impacts would result from a spill or leak that occurs on land and that is transported through runoff during a storm event into the adjacent marine waters. An ESCP and SWPPP would be implemented during construction of the Proposed Action to avoid and minimize stormwater impacts. During development of the ESCP and SWPPP, the Applicants' construction contractor would confirm stormwater runoff requirements and, if necessary, implement stormwater control measures to minimize the potential for flood-related hazards during construction.

HDD Activities

The HDD process utilizes an inert, nontoxic mixture of water and bentonite clay. This mixture, known as *drilling mud*, is necessary to facilitate the drilling process. Its characteristics stabilize the borehole, suspend the cuttings so they can be pumped back to the drill site, lubricate the hole, and drive the drill head. Bentonite is a non-toxic, naturally occurring clay commonly used in farming practices; however, if large volumes of bentonite are discharged to waterways, the clay can act like a concentrated silt, impact water quality (e.g., turbidity, total suspended solids, and total dissolved solids), and cause environmental degradation by smothering benthic invertebrates, aquatic plants, and fish and their eggs.

During boring operations, it is possible that fractures in the underlying rock substrate may potentially result in the inadvertent release of bentonite clay into the environment. This event is described as an IDFR and typically occurs in highly fractured soils or if the bore path is shallow. To minimize adverse impacts on marine water quality, an IDFR Contingency Plan was prepared (Appendix A of this EA). This plan is intended to prevent such IDFRs or to respond should one occur. Under the Proposed Action, control methods would be implemented during HDD activities and installation of the landing pipes to minimize sediment dispersal. Seaward of the HDD exit points, the cable would be laid on the surface over the sandy seafloor. The level of disturbance to the areas of sediment on the seabed during HDD activities and landing pipe installation would be negligible compared to natural sediment movement in the nearshore environment.

At the completion of drilling, all drilling fluid and any solid materials displaced as a result of the HDD activities would be removed from the cable landing site and disposed of at an approved upland location.

Submarine Cable-Laying Activities

The submarine portion of the cables would be laid on the seabed, requiring no trenching or burying. Laying the submarine cables on the seafloor has the potential for increased turbidity and TSS due to disturbance of bottom sediments. These impacts would be temporary and localized to the cable footprint (maximum cable diameter of 1.41 inches [3.58 cm]) and the short time period that material is expected to be suspended in the oceans water column. The submarine cable does not contain materials that would be harmful to water quality; therefore, no long-term marine water quality impacts from the cable laying activities are expected to occur.

2.16.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on marine water quality.

2.16.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on marine water quality or exceedances of water quality standards for open coastal waters are anticipated. Grading activities associated with the Proposed Action at the onshore cable landing site would be conducted consistent with the CCH Grading Ordinance. In addition, the Applicants would obtain coverage under NPDES General Permit for stormwater discharge associated with construction activities. As part of the permit process, the

Applicants would prepare a site-specific ESCP and SWPPP to avoid and minimize erosion of soil and discharge of other pollutants into adjacent marine waters.

BMPs contained in the ESCP and SWPP would include some or more of the following measures.

- Watering or applying dust suppressants at active work areas and Project access roads, as needed.
- Installing dust screens or wind barriers around stationary construction sites.
- Installing silt fence or filter sock perimeter controls adjacent and downslope from disturbed areas at the construction areas for the cable landing site and telecommunication site.
- Cleaning nearby pavements and paved roads after construction.
- Covering open trucks carrying construction materials and debris.
- Limiting areas to be disturbed at any given time.

BMPs would be implemented prior to surface-disturbing activities and would be inspected and maintained throughout the construction period.

General BMPs for the HDD and F/O cable installation activities are described in the IDFR Contingency Plan (Appendix A). Additional detailed BMPs with regard to water quality will be developed during the CWA Section 402 permit process. The Proposed Action also requires a CWA Section 401 Water Quality Certification (inclusive of the USACE authorization). BMPs required by the CWA Section 401 Water Quality Certification will be adhered to during Project construction and operation.

The Proposed Action will also follow appropriate measures recommended by NMFS and/or USFWS with respect to protecting water quality. These may include ensuring Project-related materials and equipment that are placed in the water will be free of pollutants or contaminants. Inclusion of the IDFR Contingency Plan and compliance with federal and state water quality regulations, the Proposed Action will have less-than-significant impacts on marine water quality during construction and operation of the Proposed Action.

2.17 Onshore Water Resources and Hydrology

2.17.1 Affected Environment

2.17.1.1 Groundwater

Groundwater is found in *aquifers*, which are underground layers of permeable rock, sediment, or soil that allow water to move freely. The availability of groundwater resources is dependent upon recharge, or the replenishment of fresh groundwater, and ground- and surface water interactions. The State Commission on Water Resource Management (CWRM) established groundwater hydrologic units across the Hawaiian Islands (CWRM 2019). The proposed cable landing site, fronthaul route, and telecommunication facility site are located in the ʻEwa Caprock Aquifer Sector, which is comprised of three smaller aquifers, including the Malakole, Kapolei, and Puʻuloa. The ʻEwa Caprock Aquifer Sector has been designated as a separate groundwater management area and, unlike the sustainable yield of basal aquifer systems, the sustainable yield of the ʻEwa Caprock

Aquifer Sector is set by a chloride limit of 1,000 milligrams per liter. This aquifer has been declared a non-potable aquifer by CWRM and this brackish resource mainly supports irrigation and industrial uses (CWRM 2019).

A geotechnical investigation to support the HDD and cable landing design for the Project was performed on November 18, 2024. One land boring was drilled to a depth of 128.5 feet (39.2 m) below existing ground surface with a truck-mounted drill rig. The boring was located at Barbers Point Beach Park in the approximate center of where the proposed BMHs would be located. Soils encountered during the investigation include stiff to very stiff, brown clayey silt with traces of gravel (coralline) to a depth of about 2 feet (0.6 m); clayey silt was medium dense tan silty gravel (coralline) to a depth of about 3 feet (0.9 m); a thin layer of clayey silt to a depth of approximately 4.5 feet (1.4 m); and a medium dense light tannish white coral was encountered at approximately 10 feet (3.0 m). Sandy gravel, coral, coralline silty sand, and sandstone layers extended to the bottom of the core. Static water was encountered in the borehole at a depth of 2.3 feet (0.7 m); this level is expected to fluctuate with tidal variations. Depth to groundwater at USGS monitoring wells near the proposed telecommunication facility range from approximately 14.0 to 16.3 feet (4.3 to 5.0 m) (USGS 2025).

2.17.1.2 Surface Water

The Project area is in the Makakilo Gulch and Kaloʻi Gulch watersheds, which encompass approximately 22 square miles (56.6 square kilometers) in the southwest portion of Oʻahu (Parham et al. 2008). Located on the leeward coast, the hydrological conditions of the Makakilo Gulch and Kaloʻi Gulch watersheds are influenced by the regions' drier conditions and low rainfall totals (approximately 0 to 20 inches [0 to 50.8 cm] annually). As a result, these watersheds support fewer stream and wetland resources with the primary or named resources being non-perennial.

Aquatic resource delineations were completed for the Project area (see Appendix E and Appendix F, *Waters of the United States Delineation Report*). No wetland resources were identified, however 10 surface water features were identified and mapped in the survey area. These 10 surface water features include the western and eastern branches of Kaloʻi Gulch and eight drainage channels and/or ditches. The eastern and western branches of Kaloʻi Gulch and a single drainage ditch occur at the cable telecommunications facility. The branches of Kaloʻi Gulch in the survey area likely have episodic flow events in response to precipitation and do not appear to have continuous flow for extended periods of time. The drainage ditch connects to Kaloʻi Gulch and appears to carry flows year-round (Tetra Tech 2025). The remaining seven surface water features occur throughout the fronthaul route. Each of these are identified as drainage ditches, four of which are earthen with steep, vegetated banks. The remaining three surface water features are large concrete lined culverts. No surface water features were identified or mapped at the onshore cable landing site.

2.17.2 Impacts of the Alternatives

2.17.2.1 Proposed Action

Groundwater

The Proposed Action would add minimal areas of additional impervious surfaces. Groundwater recharge would continue through infiltration or precipitation. No groundwater pumping is proposed during construction or operation, and the Proposed Action's minimal use of water would not deplete or interfere with groundwater supply or recharge or impede sustainable groundwater use. Therefore, there would be no impact on groundwater supplies or recharge.

Surface Water

No surface water resources occur within the cable landing site or the proposed onshore portion of the HDD corridor. Although there are 10 surface water features mapped within the fronthaul route and the telecommunication facility site, the Proposed Action would not result in direct impacts on surface water resources or hydrology as the Project has been designed to avoid all potential surface water features. The fronthaul system would be constructed within public road ROWs between the cable landing site at Barbers Point Beach Park and the telecommunication facility and would be primarily installed using directional boring. However, depending on site-specific conditions, it is expected that some limited areas of trenching would be needed. Where the fronthaul system crosses surface waters, the cables would be bored beneath the drainage to avoid direct impacts on surface water resources. Surface disturbing activities and runoff from work areas could cause soil erosion and sedimentation. Potential impacts on water quality are related to sediment and sediment-bound pollutants that may be mobilized into drainage structures or other waterbodies. Additionally, hazardous materials (e.g., gasoline, oils, grease, and lubricants) from construction equipment could be released accidentally during construction. Accidental discharges to surface waters could adversely affect water quality or result in violation of water quality standards. Contaminants from construction vehicles and equipment and sediment from erosion could increase the pollutant load in runoff being transported to receiving waters. An ESCP and SWPPP would be implemented during construction of the Proposed Action to avoid and minimize stormwater impacts. During development of the ESCP and SWPPP, the construction contractor would confirm stormwater runoff requirements and, if necessary, implement stormwater control measures to minimize the potential for flood-related hazards during construction.

2.17.2.2 No Action

Under the No Action Alternative, the Project would not be constructed. Therefore, the No Action Alternative would have no impact on shore resources and hydrology.

2.17.3 Avoidance and Minimization Measures

Under the Proposed Action, no significant impacts on onshore water resources and hydrology are anticipated. A preliminary jurisdictional determination would be requested from USACE to determine the extent of Waters of the United States at proposed sewer and access crossings at the telecommunication facility site. All other surface water drainages within the onshore portion of the Project area would be bored beneath and therefore avoided during installation of the fronthaul system. The Applicants would obtain coverage under NPDES General Permit for stormwater discharge associated with construction activities. As part of the permit process, the Applicants would prepare a site-specific ESCP and SWPPP to avoid and minimize erosion of soil and discharge of other pollutants into onshore water resources.

BMPs contained in the ESCP and SWPP would include some or more of the following measures.

- Watering or applying dust suppressants at active work areas and Project access roads, as needed.

- Installing dust screens or wind barriers around stationary construction sites.
- Installing silt fence or filter sock perimeter controls adjacent and downslope from disturbed areas.
- Cleaning nearby pavements and paved roads after construction.
- Covering open trucks carrying construction materials and debris.
- Limiting areas to be disturbed at any given time.

BMPs would be implemented prior to surface-disturbing activities and would be inspected and maintained throughout the construction period. Therefore, potential adverse impacts on onshore water resources and hydrology during construction of the Proposed Action would be less than significant due to adherence to federal, state, and local regulations.

Chapter 3
Cumulative Impacts

Cumulative impacts are defined by HAR Section 11-200.1-2 as "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes the other actions." The other past, present, and reasonably foreseeable future actions that could add to or offset the impacts of the Proposed Action are discussed in this chapter.

Other actions contributing to cumulative impacts in the offshore portion of the Project area include the installation of future subsea cables, continued use of the existing Barbers Point single point mooring system, and ongoing vessel traffic and ocean recreation in the offshore Project area. Up to three additional subsea cables would utilize vacant landing pipes that would be constructed as part of the Project. Installation of up to three additional subsea cables would be expected to result in impacts similar to those described for the Proposed Action in Chapter 2, *Affected Environment and Environmental Impacts*; however, the potential for impacts would be reduced because future subsea cables would utilize existing landing pipes and other infrastructure that would be constructed as part of the Project. It is expected that future subsea cable installation for the three vacant landing pipes would use installation methods similar to the Proposed Action and would be surface laid, resulting in negligible to minor cumulative impacts on the benthic environment of the seafloor.

Use of the Barbers Point single point mooring system for crude oil transfer offshore Barbers Point would continue into the foreseeable future and involve the delivery of crude oil to an existing network of underwater pipelines that carry crude oil from the mooring to the Par Hawaii refinery onshore. Oil tankers deliver crude oil to the floating mooring, which is anchored in 100 feet of water, approximately 1.5 miles (2.4 km) offshore from Barbers Point. Ongoing use of the Barbers Point single point mooring system would contribute to vessel traffic generated by the Project and other marine uses during construction of the Proposed Action. The Proposed Action is not anticipated to contribute to vessel traffic during operation of the Project, with the exception of infrequent vessel trips that may be required for maintenance of subsea cables. The incremental impact of Project vessels when added to ongoing levels of vessel traffic in the offshore Project area would not result in significant cumulative impacts due to the low level of vessel traffic that would be added by the Proposed Action and temporary nature of vessel mooring to offload crude oil.

Past, present, and reasonably foreseeable future actions in the onshore portion of the Project area include the Hawaiian Islands Fiber Link (HIFL) project, future roadway improvements, existing and future land uses along public road ROW, and planned development at UHWO. The HIFL project is proposing to land two subsea cables at Barbers Point Beach Park and to install aerial fiber optic cable on existing overhead utilities between Barbers Point Beach Park and UHWO. The HIFL project would contribute to cumulative impacts on geology and soils, terrestrial biological resources, and recreational use at Barbers Point Beach Park due to ground disturbance for trenching; however, cumulative impacts are not expected to be significant due to the limited scope of planned trenching.

Other past, present, and reasonably foreseeable future actions in the Project area (including existing land uses in the Project area and planned future development at UHWO) and planned roadway improvement projects in the fronthaul corridor (i.e., for Kalaeloa Boulevard and Farrington Highway) would result in potential cumulative impacts on traffic, air quality and GHG emissions, noise, scenic and visual resources, geology and soils, infrastructure and utilities, and onshore water resources and hydrology. However, the public road ROW in the Project area is already heavily developed, and cumulative impacts are anticipated to be reduced through compliance with state and federal laws and regulations that are designed to protect natural resources and by implementation of Project-specific avoidance and minimization measures.

Planned roadway improvements and planned future development at UHWO are not anticipated to occur concurrently with the construction phase of the Proposed Action. After the Proposed Action is built, all the fronthaul infrastructure, except for manholes and vaults, would be located subsurface and would not contribute to cumulative impacts of future planned actions. The telecommunication facility would be the only aboveground structure associated with the Proposed Action that would contribute to cumulative impacts of future planned development at UHWO; however, any future development at UHWO would conform to long-range development plans, and cumulative impacts would not be significant.

Chapter 4
Relationship to Plans and Policies

4.1 Federal

4.1.1 Rivers and Harbors Act, Endangered Species Act, and Magnuson-Stevens Act

A permit from USACE under Section 10 of the Rivers and Harbors Act of 1899 (33 United States Code [U.S.C.] 401 et seq.) is required for the placement of dredged and/or fill material into Waters of the United States and work in, over, or under navigable Waters of the United States. The Project involves placement of subsea cables on the seafloor and conveyance of the cables through landing pipes that would be installed seaward of the mean high-water mark, which would constitute the placement of structures and/or work in navigable Waters of the United States. Therefore, a permit from the USACE Honolulu District Regulatory Branch must be obtained. The Applicants will submit a pre-construction notification for Nationwide Permit 57—Electric Utility Line and Telecommunications Activities for coverage under Section 10 of the Rivers and Harbors Act. Nationwide Permit 57 is a general permit that authorizes the construction, maintenance, repair, and removal of electric utility lines, telecommunication lines, and associated facilities, including fiber optic cables and HDD activities in Waters of the United States. Nationwide Permit general conditions and USACE Honolulu District regional conditions are applicable to all projects requiring a Nationwide Permit.

During review of the pre-construction notification, USACE will consult with NMFS to ensure compliance with Section 7 of ESA and the Magnuson-Stevens Act. To support consultation, the Applicants will prepare a BA and EFH Assessment that describes the action area, proposed installation methods, and the Applicant's commitments to BMPs that would avoid and minimize impacts on listed species, marine mammals, and EFH. The Applicants expect that applicable BMPs from the programmatic consultations[3] between USACE and NMFS would also be incorporated as Nationwide Permit 57 permit conditions. Adoption of the BMPs and conservation recommendations developed through consultation would ensure consistency of the Project with the Rivers and Harbors Act, ESA, and Magnuson-Stevens Act.

4.1.2 National Historic Preservation Act

The Applicant's will provide USACE information on any historic properties identified within the permit area for Nationwide Permit 57 as part of the pre-construction notification. If USACE determines that historic properties could be affected by the undertaking, USACE would initiate consultation with the State Historic Preservation Division under Section 106 of the National Historic Preservation Act. This consultation would run concurrently with the HRS Chapter 6E consultation that was initiated with SHPD on April 11, 2025, as described in Section 2.5, *Historic and Archaeological Resources*.

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[3] Magnuson-Stevens Fishery Conservation and Management Act, Programmatic Essential Fish Habitat Consultation (July 29, 2022); Biological Evaluation of the Effects of Implementing Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES; revised March 2, 2022).

4.1.3 Clean Water Act

The CWA of 1972 (33 U.S.C. §1251 et seq.) was established to regulate water quality standards and the discharge of pollutants into Waters of the United States. Projects that may result in discharge of dredged or fill material into Waters of the United States require a Water Quality Certification (WQC) per Section 401 of the CWA. The Department of Health issued a Blanket Section 401 WQC to USACE for Nationwide Permit 57 that became effective April 28, 2022. It is anticipated that the general conditions outlined in the Blanket Section 401 WQC would be incorporated as conditions of NWP 57. Additionally, the Applicants expect to obtain a Section 402 NPDES General Permit for discharges of storm water associated with construction activities because the Project is estimated to disturb more than one acre of total land area. Adherence to the permit conditions associated with the WQC and NPDES General Permit would ensure consistency of the Project with the CWA.

4.1.4 Migratory Bird Treaty Act

The MBTA of 1918 was established to facilitate the protection of migratory bird species and prohibits the take of any protected migratory species without prior authorization from the USFWS. Under the MBTA, *take* is defined as pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting of any migratory bird species or attempts to do so (50 Code of Federal Regulations 10.12). Field reconnaissance surveys of the Project area found that the occurrence of birds protected by the MBTA was low due to the corridor being predominantly characterized as a highly developed roadway corridor and take of migratory birds is not anticipated during construction or operation of the Project.

4.2 State of Hawaiʻi

4.2.1 Environmental Impact Statement Law, Chapter 343, Hawaiʻi Revised Statutes

The State of Hawaiʻi Environmental Impact Statement law, HRS Chapter 343, was developed "to establish a system of environmental review that would ensure that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations" (HRS 343-1). Pursuant to HRS 343-5(a), an EA has been prepared for the Project because it is an action that does the following.

1. **Proposes the use of state and county lands.** The Project proposes to acquire easements for installation of utility infrastructure on lands owned by the CCH and State of Hawaiʻi, including State submerged lands.
2. **Proposes use within land classified as a conservation district.** All marine portions of the Project are located within State waters and on State submerged lands that are classified as a conservation district.
3. **Proposes use within a shoreline area.** The Project's proposed cable landing site at Barbers Point Beach Park (Tax Map Key [1] 9-1-026:027) is located within the SMA, and the Project proposes subsurface infrastructure within the shoreline setback area.

DLNR OCCL is the approving agency for the EA. A 30-day public comment period is initiated with publication of the Draft EA, and responses to public comments will be documented in a Final EA.

4.2.2 State Land Use Law, Chapter 205, Hawaiʻi Revised Statutes

The State of Hawaiʻi Land Use Law (HRS Chapter 205) established the State Land Use Commission (LUC) and authorizes the LUC to designate all State lands into one of four Land Use Districts: Urban, Rural, Agricultural, or Conservation. Permitted uses within each district are listed under HRS Chapter 205 and the State LUC's Administrative Rules (HAR Title 15, Chapter 15, Subchapter 3). The Project crosses three State land use districts (Figure 1-1 and Table 1-2). The proposed cable landing site, most of the fronthaul route, and the proposed location for the telecommunication facility are within the State Urban District. Select portions of the fronthaul route intersect the State Agricultural District, and the portion of the Project located on submerged lands is within the State Conservation District.

The State Urban District generally includes lands characterized by city-like concentrations of people, structures, and services. On Oʻahu, the DPP administers the zoning code according to the ROH, Chapter 21. Uses planned for the Project are allowable within the Urban District and are consistent with the surrounding area. Development of the Project will meet standards contained in the CCH LUO and are subject to approval by DPP and the Honolulu City Council. See Section 4.2.3, *State Environmental Policy, Chapter 344, Hawaiʻi Revised Statutes*, for additional information.

Land uses within the State Conservation District require approval from the DLNR OCCL. Project components in the Conservation District include the landing pipes and subsea cables that would be installed between the shoreline and the seaward extent of the State's jurisdiction. The Project is an identified land use in the Resource Subzone pursuant to HAR 13-5-22 P-14 Telecommunications (D-1) *New telecommunications facility*. Pursuant to HAR 13-5-24 (c)(4), land uses identified by the letter D require a Conservation District Use Permit (CDUP) from the Board of Land and Natural Resources. With an approved CDUP and an associated management plan, the proposed use of the Conservation District would be consistent with State of Hawaiʻi Land Use Law.

The State Agricultural District was established to provide protection to lands with a high capacity for intensive cultivation. Permitted land uses within the State Agricultural District are a function of the productivity rating designation specific to the underlying land. The productivity of agricultural lands is rated by the University of Hawaiʻi Land Study Bureau (LSB) Detailed Land Classification. Agricultural soils have been classified as Category A, B, C, D, or E, with Category A representing the most productive soils and Category E the least productive soils. Parcels zoned Agricultural in the Project area are entirely within either public roadway ROW (i.e., portions of Farrington Highway) or the OR&L ROW. LSB does not provide a rating for State Agricultural District lands that the Project intersects. However, the Project is consistent with existing land uses in the Project area and would be permissible pursuant to HAR 15-15-25(b) within agricultural lands with productivity rating classes of C, D, and E.

4.2.3 State Environmental Policy, Chapter 344, Hawaiʻi Revised Statutes

The purpose of the State of Hawaiʻi Environmental Policy (HRS Chapter 344) 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 Hawaiʻi (HRS 344-1).

The following provides a discussion of policy guidelines set forth in HRS 344-4 that are applicable to the Project.

(4) Parks, recreation, and open space.

(A) Establish, preserve, and maintain scenic, historic, cultural, park, and recreation areas, including the shorelines, for public recreational, educational, and scientific uses.

The Project has been sited and designed so that it would not significantly affect scenic, historic, cultural, park, and recreational areas. Project components proposed at Barbers Point Beach Park would be installed subsurface with the exception of manholes and vaults that would be visible at ground level. Construction activities at the cable landing site in Barbers Point Beach Park would result in temporary disruptions to recreationists; however, the park would remain open during construction and park amenities would not be affected. Following completion of construction, disturbed areas would be restored to pre-construction or better conditions, with no long-term impact to shoreline or public recreational uses.

(B) Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities.

The Project has been designed to avoid impacts to the shoreline. The landing pipes would be installed subsurface utilizing directional drilling and would avoid the placement of artificial improvements or structures on the shoreline. Construction activities at the cable landing site would be short-term and temporary and public access to the shoreline would not be restricted during construction.

(5) Economic Development.

(A) Encourage industries in Hawaiʻi which would be in harmony with our environment.

The Project would increase and improve broadband access for residents of Hawaiʻi. Additionally, the Project would provide network redundancy and resiliency by building on the submarine cable network serving Hawaiʻi. High-speed internet access is critical for many industries, and the robustness of information networks, in terms of total bandwidth and redundancy, is important for supporting economic development. Furthermore, as detailed in the discussion of potential environmental impacts in Chapter 2, *Affected Environment and Environmental Impacts*, the Project has been designed to have minimal environmental impact and would, therefore, be in harmony with the environment.

4.2.4 Coastal Zone Management Act, Chapter 205A, Hawaiʻi Revised Statutes

The Hawaiʻi Coastal Zone Management (CZM) program, as outlined in HRS Section 205A, Part I, adheres to the requirements set forth by the federal Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. §§ 1451–1456). The purpose of the CZM program is to provide for the effective management, beneficial use, protection, and development of the coastal zone. The Hawaiʻi CZMA is administered by the State of Hawaiʻi Office of Planning and Sustainable Development with the objective of managing development within coastal areas to protect coastal resources. The CZM area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" under HRS Section 205A-1. Therefore, the Project must comply with the policies and objectives outlined in HRS Section 205A-2. The following sections discuss the Project's compliance with the objectives and policies of the CZMA.

4.2.4.1 Recreational Resources

Objective

Provide coastal recreational opportunities accessible to the public.

Policies

Improve coordination and funding of coastal recreational planning and management; and provide adequate, accessible, and diverse recreational opportunities in the CZMA area by:

- Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
- Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources would be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;
- Providing and managing adequate public access, consistent with conservation of natural resources to and along shorelines with recreational value;
- Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
- Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
- Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
- Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
- Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of Section 46-6.

The Project would not impact ongoing and continued public access and use of the shoreline or beach park where the cable landing site is proposed. The Project would utilize HDD for landing pipe installation, which would avoid direct impacts on the beach and shoreline. The HDD drill rig would be surrounded by noise fencing during construction to reduce noise levels at the beach park, and public access to the shoreline would not be restricted. Upon completion of construction all equipment would be removed and the site would be restored to original or better condition.

During subsea cable installation, access to the work area around the cable laying vessel would be controlled to maintain safe distances between the work area and other ocean uses. A public Local Notice to Mariners would be published prior to the start of construction to advise mariners to avoid the work area during subsea cable installation. Therefore, impacts on coastal recreational resources would be temporary and short-term. No long-term impacts on public access and use of coastal recreational resources are anticipated.

4.2.4.2 Historic Resources

Objective

Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the CZM area that are significant in Hawaiian and American history and culture.

Policies

- Identify and analyze significant archaeological resources;
- Maximize information retention through preservation of remains and artifacts or salvage operations; and
- Support state goals for protection, restoration, interpretation, and display of historic resources.

As discussed in Section 2.5, *Historic and Archaeological Resources*, an LRFI was completed in March 2025 to support the Project's historic preservation review process pursuant to HRS Chapter 6E. To assess potential impacts on cultural resources and practices, a CIA and Ka Pa'akai analysis was conducted for the Project and is included in this EA as Appendix B, *Cultural Impact Assessment*.

If human remains, burials, or other culturally significant materials are inadvertently discovered during construction, all earth-moving activities in the area would stop, the area would be cordoned off, and SHPD would be notified pursuant to HAR Section 13-280-3 and Section 13-300-40. An inadvertent discovery plan would also be developed in consultation with SHPD and cultural practitioners that participated in consultation for the CIA. The inadvertent discovery plan would define areas of highest potential cultural sensitivity that may warrant the implementation of cultural monitoring during construction and would establish communications protocols, immediate protective treatment measures, and cultural protocols in the event of an inadvertent discovery of human remains, burials, or other culturally significant materials.

Consultation with SHPD pursuant to HRS Chapter 6E was initiated on April 10, 2025, Results of consultation and any additional avoidance and minimization measures that are determined through consultation with SHPD will be documented in the Final EA.

4.2.4.3 Scenic and Open Space Resources

Objective

Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies

- Identify valued scenic resources in the coastal zone management area;
- Keep new developments compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
- Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
- Encourage those developments that are not coastal dependent to locate in inland areas.

Infrastructure for the cable landing site and fronthaul system would be installed subsurface and would not affect scenic resources. Use of HDD for the landing pipe installation would avoid alteration of any coastal landforms and public views toward and along the shoreline. The construction phase would involve the temporary presence of cable laying vessels and construction equipment visible to users of Barbers Point Beach Park, but this would not significantly impact views toward the ocean or along the shoreline. Upon completion of the installation, vessels and construction equipment would be removed, and only ground-level manholes and vault covers would be visible at the beach park. The completed Project would not diminish the quality of coastal scenic and open space resources.

4.2.4.4 Coastal Ecosystems

Objective

Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies

- Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
- Improve the technical basis for natural resource management;
- Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
- Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
- Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

The Project is not anticipated to have significant adverse impacts on coastal ecosystems. The landing pipes would be constructed with HDD, and subsea cables would be surface laid (without trenching or burial), which would minimize impacts on the nearshore and coastal environment. As described in Section 2.7, *Marine and Nearshore Biological Resources*, dive surveys were utilized to identify the most favorable (least impactful) locations to exit the landing pipes in the nearshore environment to reduce impacts on valued resources such as coral and seagrass. During installation of the Project, the Applicants would comply with all conditions of Nationwide Permit 57, including the conditions of the blanket WQC, to avoid and minimize impacts on marine biological resources and water quality during construction. See Section 2.7.3, Section 2.15.3, Section 2.16.3, and Section 2.17.3 for additional information on Applicant-proposed measures to avoid and minimize impacts on coastal ecosystems during construction of the Project. Long-term operation of the Project would not affect coastal ecosystems.

4.2.4.5 Economic Uses

Objective

Provide public or private facilities and improvements important to the state's economy in suitable locations.

Policies

- Concentrate coastal dependent development in appropriate areas;
- Locate, design, and construct coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
- Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
  - Use of presently designated locations is not feasible;
  - Adverse environmental effects are minimized; and
  - The development is important to the state’s economy.

The Project is a coastal dependent development that must be located near the shoreline to facilitate the landing of subsea telecommunication cables. As described throughout Chapter 2, *Affected Environment and Environmental Impacts*, the Project has been designed to minimize adverse social, visual, and environmental impacts in the coastal zone management area. The Project would provide critical broadband infrastructure to the State of Hawaiʻi and support the state’s economy as described in Section 4.2.5.1, *Section 226-10: Objectives and Policies for the Economy—Potential Growth and Innovative Activities* and Section 4.2.5.2, *Section 226-10.5: Objectives and Policies for the Economy—Information Industry*. The Project would also support the economic and other goals of the Hawaiʻi Broadband Initiative (Section 4.2.6, *Hawaiʻi Broadband Initiative, Hawaiʻi Broadband Strategic Plan, and Connect Kākou*) and the Hawaiʻi State Comprehensive Economic Development Strategy (Section 4.2.7, *Hawaiʻi Comprehensive Economic Development Strategy*).

4.2.4.6 Coastal Hazards

Objective

Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Policies

- Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
- Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;
- Verify that developments comply with requirements of the Federal Flood Insurance Program; and
- Prevent coastal flooding from inland projects.

As described in Section 2.2, *Climate Change and Sea Level Rise*, and Section 2.8, *Natural Hazards*, the Project infrastructure at the cable landing site has been designed to be resilient to coastal flooding and other coastal hazards, such as future sea level rise, over the expected life of the subsea cables. Because the Project is coastal dependent development that must be located near the shoreline to facilitate the landing of subsea telecommunication cables, complete avoidance of coastal hazards is not feasible. Project infrastructure would be installed underground at the cable landing site, and flood hazards would not affect Project components. The Project would not increase the potential for flooding or erosion. The proposed cable landing site is located within a tsunami evacuation zone. In the event of a tsunami warning during construction, construction activities would halt, and loose construction material and equipment would be removed from the site or secured until such time as the warning is lifted. All Project components at the cable landing site would be installed underground and would be resilient to tsunami or storm waves.

4.2.4.7 Managing Development

Objective

Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies

- Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;
- Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and
- Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

The environmental review being conducted pursuant to HRS Chapter 343 includes early consultation with agencies, elected officials, community members, and other stakeholders that may be affected by the Project and opportunity for public comment on the Draft EA. Comments received on the Draft EA will be addressed and included in the Final EA. Discretionary permits to be obtained for the Project, including the CDUP and SMA Major Permit, also provide opportunities for public input through public hearings. This process would help ensure that existing laws and public participation would be considered in the management of coastal resources.

4.2.4.8 Public Participation in Coastal Management

Objective

Stimulate public awareness, education, and participation in coastal management.

Policies

- Promote public involvement in coastal zone management processes;
- Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
- Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

The HRS Chapter 343 environmental review process provides opportunities for public participation during publication of the Draft EA. Public hearings would also be required prior to the issuance of discretionary permits. In addition to the required public engagements, the Applicants have pursued public involvement through community consultation for the CIA, as discussed in Section 7.3, *Consultation and Coordination*.

4.2.4.9 Beach Protection

Objective

Protect beaches for public use and recreation.

Policies

- Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;
- Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and
- Minimize the construction of public erosion-protection structures seaward of the shoreline.

Project components at the cable landing site would be installed within the shoreline setback area; however, all infrastructure at the cable landing site would be installed underground and would not affect public use of the shoreline or beach. The BMHs, OGBs, and fronthaul system consist entirely of underground infrastructure that would be located inland from the shoreline and would not interfere with natural shoreline processes. Landing pipes would be installed by HDD methods beneath the shoreline, ensuring no disruption to beach access, public recreational activities, or the general shoreline area at Barbers Point Beach Park. The project does not propose erosion-protection structures seaward of the shoreline.

4.2.4.10 Marine Resources

Objective

Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies

- Verify that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
- Assert and articulate the interests of the state as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
- Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
- Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

The Project is not anticipated to have significant adverse impacts on marine or coastal resources. The landing pipes would be constructed with directional drilling and subsea cables would be surface laid (without trenching or burial) which would minimize impacts on the nearshore and coastal environment. As described in Section 2.7, *Marine and Nearshore Biological Resources*, dive surveys were utilized to identify the most favorable (least impactful) locations to exit the landing pipes in the nearshore environment to reduce impacts on valued resources such as coral and seagrass. During installation of the Project, the Applicants would comply with all conditions of Nationwide Permit 57, including the conditions of the blanket WQC, to avoid and minimize impacts on marine biological resources and water quality during construction. See Section 2.7.3, Section 2.15.3, Section 2.16.3, and Section 2.17.3 for additional information on Applicant-proposed measures to avoid and minimize impacts on coastal ecosystems during construction of the Project. Long-term operation of the Project would not affect marine or coastal resources.

4.2.5 Hawaiʻi State Plan, Chapter 226, Hawaiʻi Revised Statutes

The Hawaiʻi State Plan establishes a statewide planning system that outlines state goals, objectives, and policies. Specific objectives and policies of the Hawaiʻi State Plan that pertain to the Project are discussed in the following subsections.

4.2.5.1 Section 226-10: Objectives and Policies for the Economy—Potential Growth and Innovative Activities

The Project would result in expanded access to telecommunications services that would support objectives and policies relating to the state's economy. The Project is intended to enhance the capacity, resiliency, and telecommunication connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan. Therefore, the Project would contribute to the future economic development of the state and increase the potential for economic opportunities in Hawaiʻi. Improved broadband capacity would further support the development of innovative, growth-oriented industry in Hawaiʻi.

4.2.5.2 Section 226-10.5: Objectives and Policies for the Economy—Information Industry

The Project supports the State's information industry objective, which recognizes that broadband communication capability and infrastructure is foundational for an innovative economy and further positions Hawaiʻi as a leader in broadband communications in the Pacific region. The Project would provide a service that would support both the private and public sectors and directly benefit Hawaiʻi's residents and visitors. The Project would also directly benefit the state through increased telecommunications speed and reliability due to the advanced broadband capacity and redundancy that the Project would provide.

4.2.5.3 Section 226-11: Objectives and Policies for the Physical Environment—Land Based Shoreline and Marine Resources

The Project involves both land- and water-based activities and is a coastal-dependent development. During siting and design of the Project, the Applicants considered the physical attributes of the area so that Project design specifications could be met while potential impacts resulting from the Project's development could be minimized and avoided. The Project would be compatible with surrounding land uses, activities, and natural resources due to the design of the Project components and the HDD method for installing the landing pipes, which would avoid impacts on the shoreline and minimize impacts on marine resources.

4.2.5.4 Section 226-12: Objectives and Policies for the Physical Environment—Scenic, Natural Beauty, and Historic Resources

During construction of the cable landing site and installation of subsea cables, there would be temporary impacts on ocean views due to the presence of construction equipment, a cable laying ship, and support vessels. The fronthaul system would be installed belowground within existing ROWs and would not result in impacts on scenic quality, natural beauty, or historic resources such as the OR&L Railway. Completion of the telecommunication facility would introduce new visual elements into the area, the most prominent of which would be the warehouse building, which is most visible around the perimeter of the site. However, the facility would not adversely affect the scenic resources identified in the ʻEwa Development Plan (DPP 2020). Refer to Section 2.13, *Scenic and Visual Resources*, and Appendix C, *Visual Impact Assessment*, for additional information relating to scenic and visual resources. Potential impacts on historic resources would be avoided and minimized through the Chapter 6E consultation with SHPD and implementation of the avoidance and minimization measures described in Section 2.5, *Historic and Archaeological Resources*.

4.2.5.5 Section 226-13: Objectives and Policies for the Physical Environment—Land, Air, and Water Quality

Minor, localized emissions would result from Project construction and operation of emergency generators at the telecommunication facility. BMPs would be implemented to minimize fugitive dust during construction, and compliance with all air quality standards would be maintained. Impacts on land and water resources would be avoided and minimized through implementation of a SWPPP and site-specific ESCP during construction. With the implementation of BMPs, land, air, and water quality in the Project area would be maintained during construction and operation of the Project.

4.2.5.6 Section 226-14: Objectives and Policies for Facility Systems—in General

The Project would be consistent with general statewide objectives and policies for facility systems and would increase the reliability and capacity of the state's telecommunication capabilities, resulting in long-term positive social and economic benefits.

4.2.5.7 Section 226-18.5: Objectives and Policies for Facility Systems — Telecommunications

The Project is intended to enhance the capacity, resiliency, and telecommunication connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan. The high operating bandwidth of the Project would support the development of innovative, growth-oriented industry in Hawaiʻi and directly benefit the state.

4.2.5.8 Section 226-107: Quality Education

The Project would enhance telecommunications capabilities, result in increased data transmission speeds and reliability, support the use of information technology in education, and enhance the exchange of information for educational purposes.

4.2.6 Hawaiʻi Broadband Initiative, Hawaiʻi Broadband Strategic Plan, and Connect Kākou

In 2011, the Hawaiʻi Broadband Initiative (HBI) was created with the goal of ubiquitous gigabit (one gigabit per second) connectivity throughout Hawaiʻi by 2018, and the ultimate purpose of ensuring that all of Hawaiʻi's citizens have access to highspeed broadband at affordable prices (DBEDT 2020). The HBI directed State officials and agencies to work together and with other levels of government, the University of Hawaiʻi , broadband providers, and other stakeholders to create and implement plans, policies, and programs to achieve the goals of the HBI. In 2012, the *Hawaiʻi Broadband Strategic Plan* was developed to provide information and a framework for the creation of policies and programs to address the challenges faced in meeting both state and national broadband goals (DBEDT 2020). The *Hawaiʻi Broadband Strategic Plan* includes goals to ensure robust broadband infrastructure to all Hawaiʻi residents, expand digital inclusion and adoption to achieve digital equity, enable Hawaiʻi to thrive through a digital economy, and strengthen community resilience through broadband. As designed, the Project would respond to the needs identified under the plan by contributing to the development of the state's broadband infrastructure.

Connect Kākou is a State of Hawaiʻi initiative led by the Office of the Governor aimed at ensuring reliable and affordable high-speed internet access for all residents, including digital literacy programs and infrastructure upgrades (Connect Kākou 2025). The Project would complement the *Connect Kākou* initiative by significantly enhancing future connections, connecting transpacific routes, improving reliability, reducing latency, and ensuring communities across the Pacific have equitable and reliable access to digital services for at least the next 25 years (Office of the Lieutenant Governor 2024).

4.2.7 Hawaiʻi Comprehensive Economic Development Strategy

The 2023 Hawaiʻi State Comprehensive Economic Development Strategy (CEDS) aims to foster economic growth and sustainability across the state (OPSD 2023). The CEDS identifies goals and objectives designed to create a more resilient and diversified economy and recognizes the importance of broadband infrastructure for economic growth and community development. In particular, the CEDS emphasizes infrastructure investment associated with improved broadband infrastructure across the state, efforts to ensure equitable access to high-speed internet, and economic opportunities from broadband connectivity to support business growth and educational opportunities (OPSD 2023). The Project would provide key broadband infrastructure and would support the CEDS goals to achieve a more stable, resilient, and diversified economy through enhanced broadband reliability, connectivity, and bandwidth.

4.3 City and County of Honolulu

4.3.1 Oʻahu General Plan

The *Oʻahu General Plan* (General Plan) was most recently amended in December 2021 and serves as the comprehensive planning document guiding the long-term development of the CCH. The General Plan outlines 11 subject areas that function as the framework for addressing public needs and government functions on Oʻahu. The following sections focus on the objectives and policies of the General Plan that are relevant to the Project.

4.3.1.1 Balanced Economy

Objective A

To promote diversified economic opportunities that enable all the people of Oʻahu to attain meaningful employment and a decent standard of living.

Objective G

To bring about orderly economic growth on Oʻahu.

- Policy 1: Concentrate economic activity and government services in the primary urban center and in the secondary urban center at Kapolei.

The Project aligns with Balanced Economy Objectives A and G because the Project would provide greater telecommunications capacity and connectivity on Oʻahu and within the secondary urban center of Kapolei.

4.3.1.2 The Natural Environment and Resources Stewardship

Objective A

To protect and preserve the natural environment.

- Policy 1: Protect the 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 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 8: Protect plants, birds, and other animals that are unique to the State of Hawaiʻi and Oʻahu and protect their habitats.

Objective B

To preserve and enhance natural landmarks and scenic views of Oʻahu for the benefit of both residents and visitors as well as future generations.

- Policy 1: Protect the island's significant natural resources: its mountains and craters; forests and watershed areas; wetlands, rivers, and streams; shorelines, fishponds, and bays; and reefs and offshore islands.
- Policy 2: Protect scenic views, especially those seen from highly developed and heavily traveled areas.
- Policy 3: Locate and design public facilities, infrastructure and utilities to minimize the obstruction of scenic views.

The Project is consistent with the Natural Environment and Resource Stewardship Objectives A and B, which aim to preserve and protect the natural environment. Impacts of the Project are analyzed in Chapter 2, *Affected Environment and Environmental Impacts,* and this analysis concluded that construction and operation of the Project would not result in significant impacts on natural or biological resources or scenic views.

4.3.1.3 Transportation and Utilities

Objective C

To provide residents with a choice of living environments that are reasonably close to employment, schools, recreation, and commercial centers, and that are adequately served by transportation networks and public utilities.

- Policy 1: Maintain and upgrade utility systems in order to avoid major breakdowns and service interruptions.

The Project supports the Transportation and Utilities Objective C by enhancing utility infrastructure to accommodate future telecommunication systems, addressing the increasing demands of consumers, improving the reliability of existing systems, and preventing service interruptions.

4.3.1.4 Physical Development and Urban Design

Objective A

To coordinate changes in the physical environment of Oʻahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they would be located.

- Policy 1: Provide infrastructure improvements to serve new growth areas, redevelopment areas, and areas with badly deteriorating infrastructure.

Objective D

To develop a secondary urban center in ʻEwa with its nucleus in the Kapolei area.

The Project is consistent with the Physical Development and Urban Design Objectives A and D as it would be located in the secondary urban center of Kapolei and would create additional capacity for telecommunication systems to serve the surrounding area. The Project has been designed in coordination with UHWO, utility owners, and CCH and would neither affect the urban design of the area nor hinder future development.

4.3.2 ʻEwa Development Plan

Oʻahu has eight regional planning areas, each with a development plan or sustainable community plan created by DPP. The development plans and sustainable community plans are second-tier planning documents through which CCH manages land use in addition to the General Plan. The purpose of these plans is to provide long-range guidance on land use planning and development to help achieve the objectives of the General Plan.

The Project is located in the ʻEwa regional planning area and, therefore, must comply with the objectives, guidelines, and policies set forth by the *ʻEwa Development Plan*. ʻEwa serves as a secondary urban center in Oʻahu, with its center being in Kapolei. Goals and policies of the *ʻEwa Development Plan* are expected to guide development through 2035. The following sections focus on the Project's compliance with relevant policies and guidelines from the *ʻEwa Development Plan*.

4.3.2.1 Community Growth Boundary

The ʻEwa Community Growth Boundary is designated to support urban development while protecting prime agricultural lands (DPP 2020). The Project is within the ʻEwa Community Growth Boundary and supports urban development and is, therefore, consistent with this policy.

4.3.2.2 Open Space Preservation and Development

General Policies

Use open space to:

- Protect scenic views and natural, cultural and historic resources; and
- Promote the accessibility of shoreline and mountain areas (as required by City Ordinance).

Guidelines – Shoreline Areas

- Identify and protect areas that are important to Native Hawaiian cultural practices.
- Provide, at a minimum, a 60-foot setback along the shoreline, and, where possible, expand the setback to 150 feet where justified, based on historic or adopted projections of shoreline erosion rates.
- Analyze the possible impact of sea level rise for new public and private projects in shoreline areas and incorporate, where appropriate and feasible, measures to reduce risks and increase resiliency to impacts of sea level rise.

Public access to the shoreline and park facilities would not be affected by the Project during construction. Construction and operation of the cable landing site and fronthaul system would not significantly affect scenic vistas and view planes. Upon completion of the installation, vessels and construction equipment would be removed, and only ground-level manholes and vault covers would be visible at the beach park and along the fronthaul route, leaving no permanent impact on vistas or view planes. Construction and operation of the telecommunication facility would introduce visual contrast and have visual effects from locations where the new facility would be visible and noticeable. Views of the telecommunication facility from the west are anticipated to be mostly screened by existing vegetation at the Kapolei Golf Club and along the Kapolei Golf Course Road. Because the telecommunication facility would introduce minimal to no visual contrast from identified scenic resources, visual impacts of long-term operation of the facility would be consistent with the *ʻEwa Development Plan*. See Section 2.13, *Scenic and Visual Resources*, for additional details.

The cable landing site would be located partially within the 60-foot setback from the shoreline. Therefore, a shoreline setback variance (SSV) would need to be obtained, which is discussed further in Section 4.3.5, *Shoreline Setback Variance*. The cable landing site would be susceptible to sea level rise and erosion; however, the BMHs and conduit components have been sited as far inland on the parcel as technically feasible and to entirely avoid the projected 1.1-foot (0.3-m) sea level rise scenario. Additionally, the infrastructure at the cable landing site would be monitored for sea level rise throughout the life of the Project to identify whether the location of components needs to be moved or readjusted as a result of coastal flooding and erosion hazards from high waves and storms. Therefore, the Project is expected to be resilient to sea level rise during the expected life of the subsea cables (25+ years).

4.3.2.3 Historic and Cultural Resources

General Policies

- Preserve significant historic features from the plantation era and earlier periods.
- Vary the treatment of sites according to their characteristics and potential value.
- Use in situ preservation and appropriate protection measures for historic, cultural, or archaeological sites with high preservation value because of their good condition or unique features, as recommended by the State Historic Preservation Officer. In such cases, the site should be either restored or remain intact out of respect for its inherent value.
- Retain significant vistas wherever possible.

Impacts of Development on Historic and Cultural Resources

- Public Views—Design and site all structures, where feasible, to reflect the need to maintain and enhance available views of significant landmarks and vistas. Whenever possible, relocate or place underground overhead utility lines and poles that significantly obstruct public views, under criteria specified in state law.

OR&L Historic Railway

- Adjacent Uses—Set back new development a minimum of 50 feet on either side of the OR&L right-of-way, unless it is either directly related to the operation of the railroad, or reconstruction of an historic use, or is consistent with the use of the right-of-way for open space and shared pedestrian path/bikeway purposes in stretches where railroad operation is not feasible, or is otherwise specified in existing land use approvals.

The Project would be consistent with the *ʻEwa Development Plan's* policies for historic and cultural resources. Direct impacts on previously identified historic properties and newly identified potential historic properties in the Project area would be avoided through Project design to the extent feasible. The fronthaul system primarily would be installed using directional boring. However, depending on site-specific conditions, it is expected that some limited areas of trenching would be needed. The Applicants propose to avoid impacts on the OR&L ROW by installing conduit beneath the railroad bed using directional boring. The Applicants also propose to bore beneath other potential historic properties that intersect the fronthaul system, such as post-Contact bridges, canals and storm drains, culverts and ditches. Because the fronthaul system would be installed subsurface with only manholes and vault covers visible at the ground surface, there would be no impact on the visual setting of built historic properties. The landing pipes would be installed by HDD, with the bore commencing at a point on land, continuing beneath the beach and surf zones, and exiting at a point on the seafloor. The bore depth for the landing pipes at the shoreline would be approximately 31 feet (9.5 m) and exit on the seafloor at water depths ranging from approximately 49 feet (15 m) to 71 feet (22 m). Therefore, the HDD installation of the landing pipes would be at a depth below where encountering archaeological resources is expected and would be unlikely to have the potential to adversely affect archaeological resources.

To mitigate for potential impacts of an inadvertent discovery of archaeological resources, burials, or other culturally significant materials, an inadvertent discovery plan would be developed in consultation with SHPD and cultural practitioners that participated in consultation for the CIA. The inadvertent discovery plan would define areas of highest potential cultural sensitivity that may warrant the implementation of cultural monitoring during construction and would establish communications protocols, immediate protective treatment measures, and cultural protocols in the event of an inadvertent discovery of human remains, burials, or other culturally significant materials. Refer to Section 2.3, *Cultural Resources and Practices*, and Section 2.5, *Historic and Archaeological Resources*, for additional information and a full list of avoidance and minimization measures that would be implemented as part of the Project.

4.3.2.4 Natural Resources

General Policies

- Protect valuable habitat for waterbirds and other endangered animals and plants.
- Protect endangered fish and invertebrates in sinkholes.
- Require surveys for proposed new development areas to identify endangered species habitat, and require appropriate mitigations for adverse impacts on endangered species due to new development.
- Reduce light pollution's adverse impact on wildlife and human health and its unnecessary consumption of energy by using, where sensible, fully shielded lighting fixtures using lower wattage.

As discussed in Section 2.7, *Marine and Nearshore Biological Resources*, and Section 2.15, *Terrestrial Biological Resources*, biological surveys were conducted during which no protected status plant or wildlife species were encountered. However, a desktop review determined that there are protected marine and terrestrial wildlife species with potential to occur in the Project area. With the implementation of avoidance and minimization measures in Sections 2.7 and 2.15, Project activities are not expected to have significant adverse impacts on protected species.

4.3.3 City and County of Honolulu Zoning

The Project would be considered a utility installation as defined in the LUO (Chapter 21 of the ROH, revised January 30, 2025; DPP 2025a). The LUO categorizes utility installations as Type A or Type B depending on the potential impact on adjacent lands associated with the proposed utility installation. Because the Project is anticipated to result in only minor, short-term impacts on adjacent lands, the Project would be a Type A utility installation. Ordinance 25-2, signed into law on January 3, 2025, replaces, revises, and updates the regulations in the LUO, including the Master Use Table, use development standards, and use definitions. Ordinance 25-2 included new categories for utility installations that become effective in October 2025. The LUO as amended by Ordinance 25-2 will replace the Type A and Type B utility categories with *Small* and *Large*, respectively, while also adding a new *Medium* utility category. The definition of each category follows.

- **Small—**Utility infrastructure that primarily provides onsite utility services to a single residential, commercial, or industrial site, or a neighborhood at a facility with no new staff or crew and has minimal impacts on surrounding areas. The term includes geothermal, wind, and solar energy generation with supporting storage, control, and electrical equipment, stormwater retention or detention; aeration and septic systems; drainage systems; and water supply wells and water tanks. The term also includes non-generation energy installations with minor impacts on adjacent land uses, such as 46 kilovolt or lower voltage electrical substations, vaults, distribution equipment, and accessory telecommunication antennas to support these installations, minor residential gas infrastructure, and other similar uses.
- **Medium—**Utility infrastructure that primarily provides onsite utility services to a single commercial or industrial site, or to a neighborhood. The term includes non-generation energy installations with potential impact on adjacent land uses, by virtue of appearance, noise, size, traffic generation, or other operational characteristics, including 138 kilovolt transmission substations, and base yards. The term also includes solar energy generation facilities that are not considered small utilities; wind energy generation facilities; energy storage, control, and electrical equipment; stormwater retention or detention; private water and wastewater pump stations or lift stations; drainage systems; or private water towers.
- **Large—**Utility infrastructure that primarily provides regional offsite services to multiple neighborhoods. The term includes energy generation facilities, supporting storage, and any generation capacity over 5 megawatts, and utility scale wind energy generation facilities with a rated capacity of 100 kilowatts or more.

As outlined in Section 1.1.1, *Project Location and Land Ownership*, and Section 1.1.2, *Project Area Land Use and Surrounding Land Uses*, CCH LUO zoning for the cable landing site parcel is General Preservation (P-2). The fronthaul system would intersect several LUO zoning districts, including General Preservation (P-2), Intensive Industrial (I-2), General Agricultural (A-2), Agricultural Restricted (A-1), Business Mixed Use Community (BMX-3), and Apartment Medium Density (A-2); however, the fronthaul route follows existing developed public road ROW. The cable landing site and fronthaul system qualify as a Type A utility installation under the current LUO and as a Small utility installation under the LUO as amended by Ordinance 25-2. Under the current LUO and the LUO as amended by Ordinance 25-2, the cable landing site and fronthaul system are permitted uses in all zoning districts.

The siting area for the telecommunication facility on TMK (1)-9-1-016:179 includes areas zoned Apartment Medium-Density (A-2) and Residential (R-5) (see Figure 1-3). However, DPP is proposing to rezone TMK (1)-9-1-016:179 to Apartment Mixed Use Medium-Density (AMX-2) as part of the *East Kapolei Neighborhood Transit-Oriented Development Special District Plan* (DPP 2025b). The Applicants expect that the telecommunication facility would be a Type A utility installation under the current LUO, or a Small or Medium utility installation under the LUO as amended by Ordinance 25-2, which would be effective October 2025. Type A utility installations or Small utility installations are permitted uses under both the current LUO and the LUO as amended by Ordinance 25-2. Medium utility installations under the LUO as amended by Ordinance 25-2 require a Minor Conditional Use Permit in all current and DPP-proposed zoning districts for TMK (1)-9-1-016:179.

4.3.4 Special Management Area

The SMA is the area that extends inland from the shoreline, established by the Honolulu City Council, to preserve, protect, and restore the natural resources of the coastal zone. The entirety of the proposed cable landing site is located within the SMA (Figure 1-2). In accordance with ROH Section 25, a permit is required for development within the SMA. Additionally, because the current valuation of the Project is greater than $500,000, an SMA Major Permit application would need to be obtained prior to the start of construction. The objectives, policies and guidelines of ROH 25-3.1 are the same as those contained in HRS Section 205A-2 and 205A-26(1). The Project would be consistent with the Hawaiʻi CZM program, as discussed in Section 4.2.4, *Coastal Zone Management Act, Chapter 205A, Hawaiʻi Revised Statutes*, and with the General Plan as discussed in Section 4.3.1, *Oʻahu General Plan*. The Project would also not have any substantial adverse environmental or ecological effects as disclosed in Chapter 6, *Findings and Determination,* consistent with the findings that must be reached to approve an SMA Major Permit. ROH Section 25-6.1 also requires conditions for exterior lighting and landscaping for all development within the SMA. However, as currently proposed, the Project does not involve night-time work activities, new permanent light fixtures, or landscaping within the SMA. Following construction activities, the Project site would be restored to pre-construction conditions, or better. As a result, there are no impacts related to exterior lighting or landscaping within the SMA.

4.3.5 Shoreline Setback Variance

Shoreline setbacks were developed by CCH to serve the following purposes.

1. Reduce exposure to coastal hazards and increase the resilience of the community.
2. Protect and preserve the natural shoreline, coastal zone environments, and associated ecosystems, especially sandy beaches, coastal dunes, wetlands, and reefs.
3. Protect and preserve public pedestrian access laterally along the shoreline and to the sea.
4. Maintain, protect, and preserve open space and coastal scenic resources.
5. Prohibit shoreline hardening unless necessary for coastal restoration or where it would result in clear public benefit.

ROH Chapter 26 outlines the guidelines for establishing the shoreline setback line, the prohibited actions within the shoreline setback area, and the criteria for obtaining a SSV. Pursuant to ROH Section 26-1.4, the shoreline setback is "Sixty feet on zoning lots where historical erosion data has not been collected for the Hawaiʻi shoreline study, or its successor, where the historical erosion data show coastal accretion, or where the historical erosion data show an annual coastal erosion rate of zero." No historical erosion data are available for the cable landing site according to review of the *Hawaiʻi Shoreline Study Web Map* (Coastal Research Collaborative 2021).

An SSV would need to be obtained prior to the start of construction of the landing pipes, which would be installed below the shoreline setback area. Per ROH Chapter 26, the director may grant a SSV if the proposed activity meets one of three standards, including the "shoreline-dependent facility standard," the "public interest standard," and the "hardship standard." The Project meets the criteria of the "shoreline dependent facility," which is defined as follows (ROH Chapter 26).

> Shoreline-dependent facility standard. A shoreline setback variance may be granted for a structure or activity that is necessary for or ancillary to a shoreline-dependent facility or improvement, including but not limited to public infrastructure, drainage facilities, and boating, maritime, or water sport recreational facilities; provided that the proposal is the practicable alternative that best conforms to the purpose of the shoreline setback rules.

The Project would be considered a shoreline-dependent facility because the landing pipes and subsea cables must pass through the shoreline setback area to connect to the fronthaul system and telecommunication facility.

4.4 Approvals and Permits

Table 4-1 provides an overview of the federal, state, and local permits and approvals that are necessary prior to construction of the Project.

Table 4-1. Federal, State, and Local Permits Required for the Project

Permit/Approval	Responsible Agency
Federal	
Cable Landing License	Federal Communications Commission
Nationwide Permit 57 under Section 10 of the Rivers and Harbors Act	USACE
Magnuson-Stevens Fishery Conservation and Management Act Consultation for EFH	USACE/NMFS
ESA Section 7 Consultation	USACE/NMFS
National Historic Preservation Act Section 106 Consultation	USACE/SHPD
State of Hawaiʻi	
Conservation District Use Permit	DLNR
Environmental Assessment (HRS 343)	DLNR – OCCL
Right of Entry Permit/Grant of Submerged Land Easement	DLNR – BLNR
Shoreline Certification	DLNR – Land Division
Blanket CWA Section 401 Water Quality Certification	HDOH CWB
NPDES Permit(s)	HDOH CWB
Use and Occupancy Agreements (Farrington Highway and OR&L ROW)	HDOT Highways Division
Permit to Perform Work Upon State Highways	HDOT Highways Division

Permit/Approval	Responsible Agency
Permit to Discharge into the State Highways Drainage System	HDOT Highways Division
Blanket Coastal Zone Management Consistency Certification	USACE/Hawaiʻi Office of Planning and Sustainable Development
Noise Permit	HDOH Indoor and Radiological Health Branch
Noise Variance	HDOH Indoor and Radiological Health Branch
City and County of Honolulu	
Building Permit	DPP
Conditional Use Permit – Minor	DPP
Grading, Grubbing, Stockpiling, and Trenching Permits	DPP
Right-of-Entry within Park (Barbers Point Beach Park)	Department of Parks and Recreation
Shoreline Setback Variance	DPP
Special Management Area Major Permit	Honolulu City Council
Utility Easements	Department of Budget and Fiscal Services

BLNR = Board of Land and Natural Resources; CWB = Clean Water Branch; DLNR = Department of Land and Natural Resources; DPP = Department of Planning and Permitting; EFH = Essential Fish Habitat; HDOH = Hawaiʻi Department of Health; ESA = Endangered Species Act; HDOT = Hawaiʻi Department of Transportation; NMFS = National Marine Fisheries Service; NPDES = National Pollutant Discharge Elimination System; OCCL = Office of Conservation and Coastal Lands; OR&L = Oʻahu Railway & Land Company; ROW = right-of-way; SHPD = State Historic Preservation Division; USACE = U.S. Army Corps of Engineers.

Chapter 5
Other Impacts

5.1 Unavoidable Adverse Impacts

Construction of the Project would result in ground/seafloor disturbance and involve the operation of construction equipment that would result in unavoidable, short-term, localized adverse impacts on air quality, geology and soils, terrestrial and marine biological resources, noise, scenic and visual resources, and water quality. The avoidance and minimization measures described in Chapter 2, *Affected Environment and Environmental Impacts*, would be implemented during construction to reduce the potential for adverse effects. Because construction-related impacts would be temporary and minimized through implementation of avoidance and minimization measures, unavoidable adverse impacts are not anticipated to be significant. Long-term operation of the telecommunication facility would introduce a new structure that would be visually prominent from locations around the perimeter of the site and from Farrington Highway but would be increasingly muted and less noticeable at greater viewing distances. The telecommunication facility would introduce minimal to no visual contrast from scenic resources identified in the *‘Ewa Development Plan*.

5.2 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments are decisions affecting nonrenewable resources or commitments that cannot be reversed. The term *irreversible* describes the loss of future options and applies to the impacts of using nonrenewable resources or resources that are renewable only over a long period of time. The Project’s use of raw materials and fuel during construction represent irreversible commitments of resources. Construction and operation of the Project would require the commitment of nonrenewable resources; however, these impacts would not be significant and would be outweighed by the beneficial long-term impacts of enhanced telecommunication service within the state.

Irretrievable commitments of resources refers to the long-term or permanent loss of a resource, such as destruction of a cultural resource, loss of soil productivity, or extinction of a species. The irretrievable commitments of resources would be avoided through project design; the implementation of avoidance and minimization measures described in Chapter 2, *Affected Environment and Environmental Impacts*; and through adherence to all conditions associated with required approvals and permits (see Section 4.4, *Approvals and Permits*).

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Chapter 6
Findings and Determination

6.1 Determination

Based on the analysis presented in this EA, the Proposed Action is not anticipated to result in significant impacts. Therefore, it is anticipated that the DLNR OCCL would issue a Finding of No Significant Impact. This determination is based upon an evaluation of the significance criteria set forth in HAR Section 11-200.1-13 and in the discussion in Section 6.2, *Significance Criteria*.

6.2 Significance Criteria

HAR Section 11-200.1-13 outlines the criteria for considering the significance of potential environmental effects. These significance criteria and their relationship to the Proposed Action are as follows.

1. ***Irrevocably commit a natural, cultural, or historic resource.***

   As discussed in Section 5.1, *Unavoidable Adverse Impacts* and Section 5.2, *Irreversible and Irretrievable Commitment of Resources*, the Proposed Action would not result in an irrevocable commitment to loss or destruction of any natural, cultural, or historic resources. Construction of the Project would result in ground and seafloor disturbance and involve the operation of construction equipment that would result in unavoidable, short-term, localized adverse impacts on air quality, geology and soils, terrestrial and marine biological resources, noise, scenic and visual resources, and water quality. The avoidance and minimization measures described in Chapter 2, *Affected Environment and Environmental Impacts*, would be implemented during construction to reduce the potential for adverse impacts. Because construction-related impacts would be temporary and minimized through implementation of avoidance and minimization measures, unavoidable adverse impacts are not anticipated to be significant. Most Project infrastructure would be installed below ground level and would not be noticeable or have long-term effects on natural, cultural, or historic resources during operations. Construction of the telecommunication facility would result in a new above-ground structure on undeveloped land at UHWO. The parcel identified for siting the telecommunication facility is not identified as critical habitat for protected species and would not result in the irrevocable commitment of a cultural or historic resource.

2. ***Curtail the range of beneficial uses of the environment.***

   The Proposed Action would not curtail the range of beneficial uses of the environment. Most Project infrastructure for the fronthaul system would be installed below ground surface within public road ROW that is already developed. Construction of subsurface infrastructure at Barbers Point Beach Park could temporarily disturb recreational uses at the beach park; however, access to the beach park would not be restricted during construction and shoreline access would be maintained throughout the duration of Project activities. Nearshore construction activities for the landing pipes and subsea cable installation could temporarily disrupt other ocean uses in the immediate area of the work zone during construction. However, this impact would be temporary and would not curtail the range of beneficial uses of the marine or nearshore environment during long-term operation of the Project. The telecommunication facility has been sited adjacent to Farrington Highway at a location that is consistent with long-term development plans for UHWO and would not limit the range of beneficial uses on the remainder of the parcel where the telecommunication facility is proposed.

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

   As described in Section 4.2, *Relationship to Plans and Policies, State of Hawai'i*, the Proposed Action would be consistent with the State of Hawai'i Environmental Impact Statement law (HRS Chapter 343); the State of Hawai'i Environmental Policy (HRS Chapter 344); the State of Hawai'i Land Use Law (HRS Chapter 205); the State of Hawai'i CZM program (HRS Section 205A, Part I); the Hawai'i State Plan (HRS Chapter 226); the Hawai'i Broadband Strategic Plan; and the Hawai'i State Comprehensive Economic Development Strategy. Therefore the Proposed Action would not conflict with the State's long-term environmental policies or goals.

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

   The Proposed Action would have beneficial effects on the economic and social welfare of community and state due to the improved telecommunication infrastructure that the Proposed Action would provide. The provision of critical broadband infrastructure for the State of Hawai'i would have multiple benefits for innovation, economic development, healthcare, education, public safety, research, public services, and entertainment and would increase broadband capacity to support forecast population growth. As described in Section 2.3, *Cultural Resources and Practices*, the Proposed Action would not adversely affect or restrict cultural practices within the Honouliuli ahupua'a, where the Project is proposed.

5. ***Have a substantial adverse effect on public health.***

   Potential impacts of the Proposed Action on public health related to noise, air quality, and water quality would be minor, temporary, and localized. Avoidance and minimization measures identified in Chapter 2, *Affected Environment and Environmental Impacts,* and compliance with federal, state and local regulations and permit conditions would further reduce the potential for impacts on public health. Construction and operation of the Project would have no direct impact on existing health care facilities and emergency services and is not expected to place substantial additional demands on health care or emergency services in the area.

6. ***Involve adverse secondary impacts, such as population changes or effects on public facilities.***

   The Proposed Action would not have adverse secondary impacts and would not induce growth or cause other population changes but would instead support the population growth that has already occurred and that is forecast for the state by improving the capacity and reliability of telecommunication infrastructure. The Project would not place increased demand on public facilities and would provide enhanced broadband capacity to the state.

7. ***Involve a substantial degradation of environmental quality.***

   The Proposed Action would not involve a substantial degradation of environmental quality. As discussed in Chapter 2, *Affected Environment and Environmental Impacts*, the Project would result in temporary and minor impacts during construction that would be less than significant. Avoidance and minimization measures would be implemented to reduce impacts, as applicable. Most Project infrastructure would be installed below ground level and would not be noticeable or have long-term effects during operations. The telecommunication facility would be sited at a location consistent with long-term development plans for UHWO.

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

   As described in Chapter 3, *Cumulative Impacts*, the cumulative impact of other past, present, and reasonably foreseeable future actions in combination with the Proposed Action is not anticipated to be significant. Other actions contributing to cumulative impacts in the offshore portion of the Project area include the installation of future subsea cables, continued use of the existing Barbers Point single point mooring system, and ongoing vessel traffic and ocean recreation in the offshore Project area. Other actions contributing to cumulative impacts in the onshore portion of the Project area include the HIFL project that would land two cables and utilize existing aerial infrastructure in the public road ROW, future roadway improvements, existing and future land uses along public road ROW, and planned development at UHWO. Other actions in the Project area could have similar effects to the Proposed Action on air quality, geology and soils, terrestrial and marine biological resources, noise, scenic and visual resources, and water quality. However, the Project area is already heavily developed, and cumulative impacts are anticipated to be reduced through compliance with state and federal laws and regulations that are designed to protect natural resources and by commitment to project-specific avoidance and minimization measures during permitting of other planned actions. The Proposed Action does not involve a commitment for larger actions beyond what is already included in the Proposed Action.

9. ***Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.***

   Rare, threatened, or endangered species or their habitats are not anticipated to be substantially affected by the Proposed Action. Construction activities related to the Project have the potential to result in short-term minor adverse impacts on marine and nearshore biological resources where protected species may occur. Implementation of avoidance and minimization measures would reduce any potential impacts on marine and nearshore protected species present during construction (see Section 2.7.3, *Avoidance and Minimization Measures*). The Proposed Action would not result in the permanent alteration of habitats, including designated critical habitat in the Project area. The Project is not anticipated to reduce the quality or quantity of EFH for the Pelagic Species, Bottomfish and Seamount Groundfish, Crustacean, or Coral Reef Ecosystems Fishery Management Plan MUS groups.

   Given the unsuitability of the Project area, combined with the biology, status, and distribution of endangered plant species in the vicinity, it is highly unlikely for endangered plants to establish within the Project area. Therefore, the Project is not anticipated to affect endangered plant species. Significant impacts on terrestrial biological resources, including protected wildlife species, are not anticipated to result from implementation of the Proposed Action. Avoidance and minimization measures (see Section 2.15.3, *Avoidance and Minimization Measures*) would be implemented to reduce the potential for impacts on terrestrial biological resources, including rare, threatened, or endangered species.

10. ***Have a substantial adverse effect on air and water quality or ambient noise levels.***

    The Proposed Action would not result in substantial impacts on air quality, water quality, or ambient noise. Construction activities, including the use of heavy equipment and vehicles, can release air pollutants, while land clearing and excavation may produce fugitive dust. The potential for elevated air pollutants and fugitive dust levels would primarily occur during construction and would be reduced by implementation of avoidance and minimization measures, such as maintaining vehicles and equipment in proper working order, complying with state and federal vehicle and emission standards, and preparing and implementing fugitive dust control measures. Onshore construction activities have the potential to cause sediments and other pollutants to be transported by stormwater runoff into adjacent surface waters. However, the likelihood of these activities affecting marine water quality is low due to the small disturbance area and measures that would be incorporated to prevent and minimize adverse impacts, such as preparing and implementing an ESCP and SWPPP for the Project. The use of grading, boring, HDD, and cable laying equipment during construction would cause a temporary increase in noise in the vicinity of work areas. However, this increased noise level would be short-term and localized, and a noise barrier would be installed around the stationary HDD drill rig to reduce construction noise at the cable landing site (see Section 2.9.3, *Avoidance and Minimization Measures*). Operational noise sources at the telecommunication facility were modeled to inform the siting of the telecommunication facility such that there would not be a noise exceedance at the property line during operations; thus, noise impacts during operation would not be significant.

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 have a substantial adverse impact on or be likely to suffer damage by being located in an environmentally sensitive area. The cable landing site at Barbers Point Beach Park is within a tsunami evacuation zone, while portions of the fronthaul route from the intersection of ʻŌlaʻi Street and Kalaeloa Boulevard north past the intersection of Kalaeloa Boulevard and Malakole Street are within an extreme tsunami evacuation zone. The remainder of the Project area is within the tsunami safe zone. Except for a portion of the cable landing site, none of the onshore Project area is within a flood zone. The conduit and associated components at the cable landing site would be installed below ground and are designed to be resilient to flooding.

Given the potential for Project infrastructure to be affected by coastal hazards, components at the cable landing site have been designed to site the BMHs and vaults as far inland on the parcel as reasonably practicable and would entirely avoid the projected 1.1-foot (0.3-m) sea level rise scenario. The project components are designed to be resilient to flooding and coastal erosion, as they are specifically built for this environment. The cable landing site would be monitored throughout the life of the Project during regular maintenance to identify impacts of coastal flooding and erosion, which are anticipated to increase with sea level rise, and mitigation would be implemented as needed to stabilize underground facilities. The landing pipes and subsea cables are not susceptible to sea level rise and would not be affected.

The telecommunication facility would be constructed in accordance with current building code requirements and be surrounded by a metal hurricane louver screening wall. No impacts on the Project from hurricanes, tropical storms, earthquakes, or seismicity are anticipated.

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 significantly affect scenic vistas and view planes identified in County or State plans or studies. The construction phase would involve the temporary presence of vessels and equipment visible to users of Barbers Point Beach Park, but this would not significantly affect views of the ocean. Upon completion of cable installation, vessels and construction equipment would be removed. Views of the telecommunication facility from the west are anticipated to be mostly screened by existing vegetation at the Kapolei Golf Club and along the Kapolei Golf Course Road. Because the telecommunication facility would introduce minimal to no visual contrast from identified scenic resources, visual impacts of long-term operation of the facility would not be significant (see Section 2.13, *Scenic and Visual Resources*, and Appendix C, *Visual Impact Assessment*).

13. ***Requires substantial energy consumption or emit substantial greenhouse gases.***

The Proposed Action is not expected to require substantial energy consumption or emit substantial GHGs. Construction activities would temporarily increase energy use, including fueling construction equipment, vehicles and vessels used during construction.

Operation of the telecommunication facility would also result in increased energy consumption; however, these increases would be typical of energy consumption for this type of facility. The siting area for the proposed telecommunication facility was strategically selected for its proximity to existing electrical infrastructure, including the nearby Kaloʻi Substation, which has spare capacity. The proposed telecommunication facility is expected to require a newly installed line from the substation across Farrington Highway. Preliminary discussions with HECO indicated this would likely be a 12.47 kilovolt medium-voltage distribution system. All required electrical transformation and switching equipment for grid connection would be fully contained within the telecommunication facility's designated lease area. Power would be supplied to the telecommunication from the new 12.47 kilovolt line and stepped down onsite via transformers to 480 volts for facility operations.

The telecommunication facility's electrical demand is projected to range from approximately 1 megawatt at initial operation to up to 3.5 megawatts at full build-out. To support this demand, the Applicants have submitted a pre-service request to HECO to initiate a power feasibility study. Concurrently, an interconnection request has also been submitted. The Applicants will work in close coordination with HECO to develop a technically sound interconnection solution and are fully committed to meeting all technical, regulatory, and contractual requirements outlined in the final service agreement.

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Chapter 7
Consultation and Coordination

During development of the Draft EA, the Applicants initiated early consultation for the Project through (1) distribution of an early consultation letter in January 2025, (2) facilitation of pre-application meetings with permitting authorities, and (3) community consultation initiated through presentation to the neighborhood board and through consultation for the cultural impact assessment. Consultation and coordination undertaken for the Project to date is described in more detail in Sections 7.1 through 7.3.

7.1 Early Consultation

A total of 45 early consultation letters were distributed to federal, state, and local agencies, elected officials, and other stakeholders on January 22, 2025, to solicit input on the Project. The distribution list for the early consultation letter included the CCH agency responsible for implementing the Oʻahu General Plan, permitting agencies with jurisdiction or expertise over a specific aspect of the Project, elected officials, and other interested parties, such as local utilities or businesses, who may be affected by the Project. Early consultation is part of the scoping process for the Draft EA, and comments received on the early consultation letters were used to inform the scope of the Draft EA. Table 7-1 lists the agencies and other parties to whom early consultation letters were sent. A total of 20 responses to the early consultation letter were received as indicated by a "✓" in Table 7-1. Table 7-2 provides excerpts of substantive comments received during early consultation and the Applicant's responses.

Table 7-1. Early Consultation Distribution List and Comments Received

Distribution List	Comments Received
Federal Agencies	
U.S. Army Corps of Engineers, Honolulu District	✓
U.S. Coast Guard, Sector Honolulu	
U.S. Department of Transportation, Federal Highway Division	
U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office	✓
NOAA Fisheries, Pacific Islands Regional Office	✓
State of Hawaiʻi Agencies	
Department of Agriculture	
Department of Business, Economic Development and Tourism	
Department of Hawaiian Home Lands	✓
Department of Health	
Clean Water Branch	
Environmental Management Division	
Indoor and Radiological Health Branch	
Department of Land and Natural Resources	
Bureau of Conveyances	

Distribution List	Comments Received
Division of Aquatic Resources	
Division of Boating and Ocean Recreation	✓
Division of Forestry and Wildlife	
Land Division	✓
Office of Conservation and Coastal Lands	✓
State Historic Preservation Division	
Engineering Division	✓
Department of Transportation, Highways Division	
Office of Hawaiian Affairs	
Office of Planning and Sustainable Development	✓
City and County of Honolulu Agencies	
Department of Budget and Fiscal Services	
Department of Facility Maintenance	
Department of Parks and Recreation	
Department of Planning & Permitting	✓
Department of Transportation Services	✓
Honolulu Board of Water Supply	✓
Honolulu Fire Department	✓
Honolulu Police Department	✓
Elected Officials	
State Senate Representative Brian Schatz	
State Senate Representative Mazie Hirono	
State Senate Representative Mike Gabbard	
State House Representative Jill Tokuda	
State House Representative David Alcos III	✓
Council Member Andria Tupola, Ph.D., Honolulu City Council, District 1	
Other Interested Parties	
Gasco, Inc. (Hawaii Gas)	✓
Germaine's Lūʻau	
Hawaiian Electric Co., Inc	✓*
Hawaiian Telcom	✓*
Island Energy Services	✓*
Makakilo-Kapolei-Honokai Hale Neighborhood Board No. 34	
PAR Hawaii Refining, LLC	
Spectrum	✓
University of Hawaiʻi	

*Response contained information that may be deemed confidential and/or privileged. Comments received during early consultation and responses to these comments are not included in Table 7-2.

Table 7-2. Early Consultation Comment Excerpts and Applicant Responses

Interested Party	Early Consultation Comment Excerpt	Applicants Response
Federal Agencies		
U.S. Army Corps of Engineers, Honolulu District	We are in receipt of your request for comments on the Oahu Subsea Cable Telecommunications Project - Barbers Point Landing. Your project has been assigned the following number: POH-2025-00034, and your project manager will be Ms. Kirsten Lara. I have cc'd her on this email in the event you need to contact her. She will reach out directly if additional information or clarification is required.	Thank you for your response. We acknowledge the project number that has been assigned and appreciate the U.S. Army Corps of Engineers Honolulu District's involvement on the Project.
U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office	The Pacific Island Fish and Wildlife Office (PIFWO) is transitioning to the use of the Information for Planning and Consultation (IPaC) online portal, https://ipac.ecosphere.fws.gov/, for federal action agencies and non-federal agencies or individuals to obtain official species lists, including threatened and endangered species and designated critical habitat in your project area. Using IPaC expedites the process for species list distribution and takes minimal time. Therefore, the IPaC list would fulfill your request for a species list. For recommended avoidance and minimization measures, you can visit the following webpage https://www.fws.gov/office/pacific-islands-fish-and-wildlife/library. Please find step by step instructions attached to use IPaC for future projects, and feel free to share with additional project partners. Additionally, you can also electronically submit requests and correspondence to PIFWOadmin@fws.gov.	Thank you for your response. We acknowledge your comments regarding the use of the Information for Planning and Consultation (IPaC) online portal for this Project. Desktop analyses of terrestrial biological resources conducted for this EA have included review of species lists generated from the U.S. Fish and Wildlife Service IPaC portal.
NOAA Fisheries, Pacific Islands Regional Office	Thank you for the opportunity to provide early input on the environmental compliance for this project. NMFS HCD will be a partner in early coordination with you and the Army Corps of Engineers (USACE) for the essential fish habitat (EFH) consultation and may provide comment, if desired, on the Environmental Assessment your office will generate for the proposed action. An EFH consultation with NMFS pursuant to the Magnuson-Stevens Fishery Conservation and Management Act is required	Thank you for your early input on requirements for Essential Fish Habitat (EFH) consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act. The Applicants will prepare an EFH Assessment in accordance with your guidance to support consultation with the National Marine Fisheries Service (NMFS) on the Pre-Construction Notification (PCN) for Nationwide Permit 57. In a letter to NMFS dated April 10, 2025, U.S. Army Corps of Engineers designated ICF as a non-federal

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	when a federal action agency is involved in a project that will adversely affect EFH (i.e., the federal agency is directly conducting, funding, or permitting work) (MSA; Section 305(b)(2) as described by 50 CFR 600.920). The EFH consultation process entails the federal agency contacting NMFS and providing an EFH Assessment (EFHA), which contains, at minimum, key required information: • a description of the proposed action • a determination from the federal agency as to how the action will affect EFH • an assessment of those adverse effects • proposed ways to mitigate for the adverse effects, if applicable EFH around Hawaiʻi is designated as the marine water column from the surface to a depth of 3,281 feet (ft) (1,000 meters [m]) from the shoreline to the outer boundary of the EEZ (200 nautical miles), and the seafloor from the shoreline out to a depth of 2,296 ft (700 m) around each of the Hawaiian Islands. As such, the water column and bottom of the Pacific Ocean around Oʻahu are designated as EFH, and support various life stages for the management unit species (MUS) identified under the Western Pacific Regional Fishery Management Council's Pelagic and Hawaiʻi Archipelago Fishery Ecosystem Plans. The MUS and life stages found in these waters include eggs, larvae, juveniles, and adults of Bottomfish, Crustacean, and Pelagic MUS. Specific types of habitat considered as EFH include: coral reef, patch reefs, hard substrate, artificial substrate, seagrass beds, soft substrate, lagoon, estuarine, surge zone, deep-slope terraces and pelagic/open ocean. An adverse effect to EFH is anything that reduces the quality and or quality of EFH. It may include direct, indirect, and site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of an action. A mitigation plan should include efforts to avoid, minimize, or otherwise offset adverse effects to EFH. Once submitted, NMFS will your EFHA and may	representative to conduct Endangered Species Act Section 7 and EFH consultation. We look forward to coordinating with NMFS on these consultations after the PCN has been submitted.

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	provide conservation recommendations to avoid, minimize, or offset the potential adverse effects to EFH. If the provided EFHA is missing information needed to assess the impacts action, the EFH consultation may be delayed. Some information that needs to be known about your proposed action is discussed below. Detailed action description Please describe your action completely. We need to know what is being installed, where it is being installed, how it is being installed, what equipment will be used, and the schedule for installation. A list of best management practices (BMPs) that will be implemented during the project is an essential part of your action description. Please also tell us if this cable project is connecting to a larger, already established cable project. If so, which one? You indicate your cable is laying cable in the state waters. Who is laying the cable in federal waters? Make sure you describe the cable that will be laid and how the portion that is not in the conduit will be secured to the ocean bottom.	The EA has been developed to support state and local permitting and, therefore, the Proposed Action description is focused on those aspects of the Project that occur in State waters, seaward of Barbers Point Beach Park to 3 nautical miles (nm) (5.6 kilometers [km]). The Project description for the USACE PCN and Action Area for the NMFS Biological Assessment and EFH Assessment will encompass the full extent of USACE's and NMFS' jurisdiction to the limit of the State of Hawai'i Exclusive Economic Zone (EEZ). The Project description for the PCN and NMFS consultation documents will include a description of all activities occurring within the limit of the EEZ (200 nm [370 km]), and will include a description of installation methods, a list of best management practices, and a proposed schedule for activities. Notably, there are no installation methods proposed in federal waters that are not also proposed in State waters, and conclusions on Project effects would be consistent across federal and State jurisdictions (all subsea cables would be surface laid and would not be secured to the seafloor).
	Marine resource surveys A potential factor that can delay consultations is the need for marine benthic surveys of the action area. Knowledge of the marine resources in and adjacent to the project footprint will be required in order to complete a full assessment of the effects of the planned actions on EFH. Nearshore areas in the Pacific	Initial dive surveys to assess the structural and biotic composition of the six proposed HDD exit points and seaward conditions for subsea cable installation were completed in October 2024. These surveys photographically documented the biotic and abiotic

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	Islands Region often have areas of high coral cover or seagrass. For EFH consultations, we will need a description of the resources that are present in the area that may be impacted by the action. This will be especially important if the cable will go through nearshore areas that have coral reefs or seagrass beds. Previous surveys may suffice if they provide enough information on the specific resources in the action area. We recommend that marine resource surveys include quantities of corals in the action area by species and size. We also recommend identifying the corals in the area divided by size classes in 10 cm intervals to inform minimization efforts, such a coral translocation plan, and any necessary compensatory mitigation for corals that are unavoidably lost.	surface types within a 20-foot by 20-foot (6 meter by 6 meter)_area of the seafloor around each of the proposed horizontally directional drilling (HDD) exit points with real-time micro-adjustments made to select an area that would minimize impacts on reef coral and/or seagrass. Images were then analyzed to assess the percent cover of biotic and abiotic surface types. Corals were identified to the lowest taxonomic level possible, the longest diameter of each colony was measured, and colonies were binned into size classes of 10 cm intervals. Scenic photographs to document the habitat at each site were also obtained.
	Minimization efforts – coral translocation Avoiding damage to corals and seagrass is the best first option for projects in the marine environment. If that is not possible, minimizing losses of EFH can be achieved through a plan to relocate and/or transplant all corals above 10 cm that will be unavoidably lost. We also recommend consider the following conditions: 1. The receiving location(s) must not have foreseeable and avoidable adverse effects (i.e., adverse effects from any anticipated projects by any proponent). 2. The receiving location(s) must have similar physicochemical conditions (e.g., temperature, salinity, light penetration, nutrient concentrations, and turbidity). 3. A coral relocation plan that includes post-relocation success criteria and evaluation methodology is provided to and approved by NMFS and implemented by the proponent. *4.* If coral relocation is impractical, then offsets are proposed and implemented by the proponent. *Compensatory Mitigation*	The October 2024 dive surveys found that five of the six HDD exit points had the same overall physical structure consisting of a nearly flat fossil reef surface that terminated in a steep sloping face and then extended to a distinct junction with a sand plain. Surveys found that the density of coral at these sites was generally low—ranging from 0 to 6 percent cover—and no living corals were observed at three of the six sites. One site (where reef flat and slope was not observed) consisted of a flat sandy area covered by seagrass and an invasive alga (mudweed). Additional surveys were conducted in March 2025 to determine if further micro-adjustment of the HDD exit points could further minimize impacts on coral and seagrass. Results of these surveys are under review, and results will be reported in the EFH Assessment and Final EA. The Applicants acknowledge that NMFS may provide additional conservation recommendations to avoid, minimize, or offset the potential adverse effects on EFH as an outcome of EFH consultation for the PCN authorization.

<table>
<tr><th>Interested Party</th><th>Early Consultation Comment Excerpt</th><th>Applicants Response</th></tr>
<tr><td></td><td>If there will be a net loss off EFH due to the action, NMFS encourages you to consider developing of an offset plan in order to make up for the loss of marine resources due to the action. Offset plans are individually tailored to the resource, location, and activity. An example is outplanting corals from a nursery to make up for damaged corals or improving the quality of EFH in the action area through removal of invasive species, improved water quality, of removal of marine debris. NMFS is ready and willing to provide technical assistance in the development of an offset plan, if needed.

While planning specific projects, we also recommend:
• Early coordination with local partners and natural resource management agencies
• Reusing existing conduits and directional drilling to reduce unavoidable loss of EFH

Early coordination with our office is always encouraged. We are available for meetings to discuss your project or to review any draft consultation documents.</td><td></td></tr>
<tr><td colspan="3">State of Hawaii Agencies</td></tr>
<tr><td>Department of Hawaiian Home Lands</td><td>The Department of Hawaiian Home Lands (DHHL) acknowledges receiving the request for comments on the above-cited project. The DHHL owns a portion of lands within the Kalaeloa (former Naval Facility) area; however do not anticipate any impacts to our lands or beneficiaries from the project. DHHL recommends consultation with Hawaiian Homestead community associations located within the moku of Kalaeloa-Kapolei, and other native Hawaiian organizations to better assess potential impacts to cultural and natural resources, and other rights of Native Hawaiians.</td><td>Thank you for confirming that DHHL does not anticipate any impact on its lands or beneficiaries from the Project. During consultation for the Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis, a total of 40 individuals were contacted, including representatives of government agencies, advisory councils, local community organizations, and individuals with generational ties to Honouliuli ahupuaʻa. Ten individuals responded to the consultation letter, the majority of whom either had no comment on or no objections to the Project. Six individuals shared additional information and insights into Honouliuli ahupuaʻa that were incorporated into the background research section of the CIA and Ka Paʻakai Analysis and informed the description of potential impacts and recommendations on the feasible actions that could be</td></tr>
</table>

Interested Party	Early Consultation Comment Excerpt	Applicants Response
		taken to reasonably protect Native Hawaiian rights (see Appendix B, *Cultural Impact Assessment*). Consultation is ongoing, and updates on the status of consultation will be included in the Final EA.
Department of Land and Natural Resources		
Division of Boating and Ocean Recreation	We have no objections.	Thank you for your response. We acknowledge your comment that the Division of Boating and Ocean Recreation has no objections to the Project.
Land Division	Any work and/or use of State land makai of the title boundary and/or certified shoreline shall require a disposition from the Board of Land and Natural Resources.	Comment acknowledged. The Applicants intend to submit an application to the Land Division for a submerged land easement concurrent with processing the Conservative District Use Application (CDUA).
Office of Conservation and Coastal Lands	The OCCL regulates land uses in the State Land Use Conservation District through the issuance of Conservation District Use Permits and Site Plan Approvals to help conserve, protect, and preserve important natural and cultural resources. The State's jurisdictional waters extend ~3 miles seaward and is located within the State Land Use Conservation District, Resource Subzone. Based on the information you have provided; it appears that the proposed subsea cable project appears to be an identified land use in the Resource Subzone pursuant to Hawai'i Administrative Rules (HAR), §13-5-22 P-14 TELECOMMUNICATIONS (D-1) *New telecommunications facility. A management plan approved simultaneously with the permit, is also required.* This requires the filing of a Conservation District Use Application (CDUA). Applications can be found on our website at https://dlnr.hawaii.gov/occl/application-process/. To allow, modify, or deny a permit would be at the discretion of the Board of Land and Natural Resources (BLNR). The applicant is responsible for compliance with HRS 6E and should provide evidence of SHPD concurrency with the submittal of the application or submit a HRS 6E form with the application.	Thank you for your response. The Applicants will submit a CDUA to the Office of Conservation and Coastal Lands (OCCL) for use of state lands within the Conservation District pursuant to Hawai'i Administrative Rules Section 13-5-22 P-14 TELECOMMUNICATIONS (D-1). As recommended by OCCL, the Draft EA for compliance with HRS Chapter 343 has been submitted to OCCL prior to the CDUA to allow additional time for processing the EA. The Applicants initiated the HRS Chapter 6E consultation with State Historic Preservation Division (SHPD) on April 10, 2025, and included OCCL's Administrator (Michael Cain) as a point of contact to receive official communications from SHPD on the referenced consultation. We acknowledge your comments regarding the CDUA requirement of the landowner's signature, as well as coordination with the Department of Land and Natural Resources (DLNR) Land Division for information regarding potential land disposition that may be required for the use and occupancy of state land. The Applicants held a pre-application meeting with the

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	Pursuant to HRS §27-45 Broadband-related permits; automatic approval. (b) *The state shall approve, approve with modification, or disapprove use applications for broadband facilities within the Conservation District within one hundred forty-five days of submission of a complete application and full payment of any applicable fee.* With regards to HRS Chapter 343 compliance, the OCCL suggests that the ICF complete an environmental assessment prior to the submittal of the CDUA application. The 145-day deadline for telecommunications projects may not be enough time to concurrently process a draft environmental assessment. Processing a CDUA requires the landowner's signature, the State of Hawai'i. Please contact the Department of Land and Natural Resources (DLNR) Land Division at (800) 587-0400 or at dlnr.land@hawaii.gov. Obtaining the landowner's signature prior to submitting the CDUA to OCCL will expedite the process. The applicant should also contact DLNR Land Division for any information regarding potential land disposition that may be required for the use and occupancy of state land. See contact information above. You may want to contact the Division of Aquatic Resources (DAR) and the Division of Boating and Ocean Recreation (DOBOR) regarding comments or additional authorizations that may be needed for the proposed project.	DLNR Land Division on August 29, 2024, to discuss the shoreline certification and submerged land easement needed for the Project. The Applicants will continue to coordinate with the DLNR Land Division to obtain the landowner's signature concurrently with submitting the CDUA. The Applicants included the Division of Aquatic Resources and the Division of Boating and Ocean Recreation on the distribution of the early consultation letter. The Division of Aquatic Resources had no comment, and the Division of Boating and Ocean Recreation responded that it has no objections to the Project.
Engineering Division	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 for researching the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are	Thank you for your comment. An analysis of potential flood hazards identified on Flood Insurance Rate Maps for the Project area has been included in Section 2.8, *Natural Hazards*, and a map of identified flood zones is included on Figure 2-5 of this EA. Portions of the proposed cable landing site are located within Flood Zone AE, which is within the 100-year floodplain. No permanent aboveground structures would be built at the cable landing site, and proposed subsurface infrastructure (e.g., beach manholes [BMH] and ocean

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	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) (fhat.hawaii.gov) 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.	ground beds [OGB]) are engineered to be resilient to flooding. A portion of the proposed landing pipes would be installed beneath the ground surface within Flood Zone VE, which is designated as a special flood hazard or high-risk area within the 100-year floodplain. However, because the landing pipes would be installed below ground and are designed to house subsea cables that are engineered to be installed in the marine environment, the landing pipes (and subsea cables within) would not be affected by flooding. Additionally, the Proposed Action would not alter existing drainage patterns within Flood Zones AE and VE. The remainder of the Project is located in Zone D. The National Flood Insurance Program does not impose any regulations concerning development within Zone D.
Office of Planning and Sustainable Development	The Office of Planning and Sustainable Development (OPSD) has reviewed the submitted material, and has the following comments to offer. <u>Coastal Zone Management Act (CZMA) federal consistency</u>. We note that the review material states that this project is subject to a U.S. Army Corps of Engineers (USACE) Nationwide Permit (NWP) 57 and Rivers and Harbors Act (RHA) Section 10 Permit. Please note that a federal permit for the proposed project may trigger the requirements of a CZMA federal consistency review. OPSD is the lead state agency with the authority to conduct CZMA federal consistency determinations. Please contact our office on the appliable rules and regulations on CZMA federal consistency. <u>Hawaiʻi Coastal Zone Management (CZM) Program.</u> The CZM area is defined as “all lands of the State and the area extending seaward from the shoreline to the limit of the State’s police power and management authority, including the U.S. territorial sea” under HRS § 205A-1. Pursuant to HRS § 205A-4, in	Thank you for your comments. Please see the following responses. The Applicants expect that the Project will comply with the requirements of the Coastal Zone Management Consistency Concurrence for Nationwide Permit (NWP) 57 issued by the State of Hawaiʻi Department of Business, Economic Development and Tourism, Office of Planning during the Nationwide Permit reissuance process in 2021. However, if the U.S. Army Corps of Engineers (USACE) determines that individual consistency certification is warranted, the Applicants will coordinate with USACE and the Office of Planning and Sustainable Development to ensure that Coastal Zone Management Act federal consistency is obtained. The Project is consistent with the Hawaiʻi Coastal Zone Management (CZM) law (Hawaiʻi Revised Statutes [HRS] Chapter 205A). A discussion of how the Project conforms to each of the CZM objectives and policies as set forth in HRS Section 205A-2 is provided in Section

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	implementing the objectives of the CZM program, agencies shall consider ecological, cultural, historic, esthetic, recreational, scenic, open space values, coastal hazards, and economic development. As the project will require federal, state and county agency approvals, the Draft EA should include an assessment as to how the proposed project conforms to each of the CZM objectives and supporting policies set forth in HRS § 205A-2, as amended. Disclosure of impacts to CZM objectives and supporting policies, as it relates to HRS Chapter 343 requirements, will aid our office in determining impacts to the resources of the coastal zone, and evaluate the feasibility of potential mitigation measures.	4.2.4, *Coastal Zone Management Act, Chapter 205A, Hawaiʻi Revised Statutes*, of the EA
	<u>Special Management Area (SMA) Use Permitting.</u> The review material acknowledges the proposed use within the shoreline area. Please consult the City and County of Honolulu, Department of Planning and Permitting, on this matter for the requirements of a SMA use permit, and a shoreline setback variance for the proposed project.	The Applicants coordinated with the City and County of Honolulu (CCH) Department of Planning and Permitting (DPP) during early consultation (see Section 7.2, *Permit Pre-Application Meetings*) and obtained a formal determination from CCH DPP that a Special Management Area (SMA) Major Permit would be required in November 2024 (DPP Tracking Number 2024/ELOG-2108). The Applicants expect that a shoreline setback variance will also be required for the Project. See Section 4.3.4, *Special Management Area*, and Section 4.3.5, *Shoreline Setback Variance*, of the EA for additional information on how the SMA and shoreline setback apply to the Project.
	<u>Water Quality, Erosion Mitigation, and the Impacts to the Nearshore Environment.</u> Pursuant to Hawaiʻi Administrative Rules (HAR) § 11-200.1-18(d)(7) – identification and analysis of impacts and alternatives considered; to ensure that nearshore coastal resources of the Leeward Shore of Oʻahu remains protected, the Draft EA should include, but are not limited to, project site characteristics in relation to flooding, identifying erosion prone areas, or vulnerability of the nearshore environment to degradation of water quality. The Draft EA should include mitigation measures for the protection of the	The EA includes an analysis of nearshore coastal resources and water quality in Section 2.7, *Marine and Nearshore Biological Resources*, and Section 2.17, *Marine Water Quality*. Analyses related to potential flooding and erosion impacts are provided in EA Section 2.2, *Climate Change and Sea Level Rise*; Section 2.4, *Geology and Soils*; Section 2.8, *Natural Hazards*; Section 2.16, *Marine Water Quality*; and Section 2.17, *Onshore Water Resources and Hydrology*. Avoidance and minimization measures that would be implemented as part of Project design to protect the

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	nearshore coastal ecosystem and the maintenance of water quality, pursuant to HAR § 11-200.1-18(d)(8).	nearshore coastal ecosystem and water quality are provided in each of these EA sections.
	Hawaii's Comprehensive Economic Development Strategy (CEDS). The CEDS identifies internet connectivity and digital equity as important elements for enabling a skilled workforce to maintain a stable and diversified economy. OPSD supports this project as key infrastructure to achieve that goal.	Thank you for your support of the Project's goals and objectives. Section 4.2.7 of the EA, *Hawai'i Comprehensive Economic Development Strategy*, recognizes the importance of the Project in the context of supporting goals of the Comprehensive Economic Development Strategy to enable a skilled workforce and maintaining a stable and diversified economy.
City and County of Honolulu Agencies		
Department of Planning and Permitting	We offer the following comments based on the information presented in your submittal:	Thank you for your comments. Please see the following responses to your comments.
	Permit Requirements: Table 1, Oahu Subsea Cable Telecommunication Project Components for the Cable Landing must be revised to include the Department of Parks and Recreation of the City and County of Honolulu. The list of Required Permits and Approvals must be corrected to indicate that the Special Management Area (SMA) Major Permit is approved by the City Council and not the Department of Planning and Permitting (DPP). However, the DPP is the approving authority for the Shoreline Setback Variance and any Zoning Permits.	Permit Requirements: The clarifications provided in your comments have been incorporated into Section 4.4, *Approvals and Permits*, of the EA
	Revised Ordinances of Honolulu (ROH) Chapter 25 , the SMA Ordinance: The DEA should include an analysis of the Project's consistency with each of the SMA policies presented in Revised Ordinances of Honolulu (ROH) Section 25-3.1, as well as the mandatory findings contained in ROH Section 25-4.1.	ROH Chapter 25, SMA: Please refer to EA Section 4.3.4, *Special Management Area*, for an analysis of the Project's consistency with the SMA policies and mandatory findings contained in Revised Ordinances of Honolulu Chapter 25.
	Some specific issue areas requiring analyses are as follows:	
	Coastal Hazards - As an important infrastructure facility located on a coastal property, the DEA should address possible coastal hazards which could expose the facility in the future, including sea level rise, wave action, flooding erosion, tsunamis, and storm surge. The DEA should include a discussion of how long term mitigative and or adaptive measures, if any, must be considered	Coastal Hazards: EA Section 2.2, *Climate and Sea Level Rise*, and Section 2.8, *Natural Hazards*, provide analyses of possible coastal hazards, including sea level rise, flooding, erosion, and tsunamis. Additionally, Section 4.2.4, *Coastal Zone Management Act, Chapter 205A, Hawaii Revised Statutes*, Section 4.3.4, *Special*

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	and evaluated. This analysis should evaluate the site's existing topographic, geologic, and shoreline environment, and how the proposed Project avoids impacts associated with such coastal hazards. Describe how the Project will be designed for resiliency to six feet of sea level rise. The DEA should evaluate potential impacts, and incorporate appropriate mitigation measures to avoid or minimize potential impacts where appropriate.	*Management Area*, and Section 4.3.5, *Shoreline Setback Variance*, include discussions of how the Project would be consistent with policies guiding development in areas susceptible to coastal hazards. The analysis contained in the EA considers the 1.1-foot (0.3-meter [m]), 2.0-foot (0.6-m), and 3.2-foot (1.0-m) future sea level rise scenarios for the cable landing site and the immediate vicinity as modeled by the Pacific Ocean Observing System (PacIOOS 2018). The sea level rise scenarios used in the analysis are consistent with the SMA Major Permit application requirement to include delineated areas that would be inundated by 3.2 feet of sea level rise on Project plans. The Pacific Ocean Observing System and State of Hawaiʻi Sea Level Rise Viewer do not include sea level rise exposure modeling to 6 feet (1.8 m) of sea level rise and, therefore, this scenario has not been included on Figure 2-1. Given the potential for Project infrastructure to be affected by coastal hazards, components at the cable landing site have been designed to locate the beach manholes (BMH) and vaults as far inland as technically feasible and to entirely avoid the projected 1.1-foot (0.3-m) sea level rise scenario. The 1.1-foot (0.3-m) sea level rise scenario corresponds to the projected sea level rise in 2050 which would also correspond to the estimated 25-year life of the subsea cables. The cable landing site would be monitored throughout the life of the Project to identify coastal flooding and erosion hazards from high waves and storms, which are anticipated to increase with sea level rise. If the components become threatened by erosion or sea level rise, actions to mitigate these conditions may be implemented as described in Section 2.2.3, *Avoidance and Minimization Measures*. Because Project infrastructure would be installed underground, and no permanent aboveground structures would be built within flood zones or tsunami evacuation zones, flood and tsunami hazards are not expected to affect Project components.

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	Near-shore and Sensitive Species - The DEA should identify the potential for presence of threatened, endangered, or protected flora and fauna, and their critical habitat within the Project area. We recommend consulting the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation database to obtain a list of species that are known to occur, or may potentially occur, in the Project vicinity. Known, mapped wetlands and streams can be viewed on the USFWS National Wetlands Inventory Wetlands Mapper. The State Department of Land and Natural Resources, Department of Aquatic Resources, and Department of Forestry and Wildlife, should be consulted regarding the potential presence of State-listed sensitive species or critical habitat. Include a discussion on the potential for the spread of invasive species, such as little fire ants, coconut rhinoceros beetles, or the fungus that causes rapid ohia death. The DEA must evaluate potential impacts of each of these issues, and incorporate standard agency-required mitigation measures as well as any Project-specific mitigation measures required to avoid or minimize potential impacts.	Nearshore and Sensitive Species: The terrestrial biological reports for the telecommunication facility (Appendix D) and fronthaul system (Appendix E) identify the potential for presence of threatened, endangered, or protected flora and fauna, and their critical habitat in the Project area based on field reconnaissance and information obtained through the U.S. Fish and Wildlife Service's IPaC database. The presence of wetlands and waters of the United States were also assessed within the project area as reported in EA Appendix E and Appendix F. Draft EA Section 2.15, *Terrestrial Biological Resources*, Section 2.15.3 includes avoidance and minimization measures to minimize potential impacts on native flora and fauna, including federal and state protected species. This includes measures to minimize the spread of invasive plants and pests (including little fire ants). ʻŌhiʻa lehua trees were not observed in the project area and, for that reason, specific minimization measures to prevent the spread of the fungus that causes rapid ʻōhiʻa death are not proposed.
	Archaeological, Cultural, and Historic Resources - The DEA must identify the soil types present throughout the Project area and provide background information regarding the known historic resources and unknown historic resources, including the disinterment and reinternment of iwi kupuna (Native Hawaiian burials), which were encountered during the original development of the shoreline park and nearby industrial park. Include a discussion on the cultural sites and practices in this area which may have previously been addressed and remain relevant to the proposed Project. The DEA must also discuss the potential for encountering unknown historic properties during ground-disturbing activities required for Project implementation. The DEA must evaluate potential impacts of each of these issues, and incorporate standard agency-required mitigation measures	Archaeological, Cultural, and Historic Resources: To assess potential impacts on cultural resources and practices, a Cultural Impact Assessment (CIA) and Ka Pa'akai analysis was conducted for the Project and is included in this EA as Appendix B. The CIA and Ka Pa'akai analysis identifies soil types in the Project area (see Appendix B, Figures 8 through 10), presents archival and background research on traditional and post-contact history and previous archaeology, summarizes the consultation process and input received during consultation with local community organizations and individuals with ties to Honouliuli ahupuaʻa, and presents recommendations for feasible actions that could be taken to reasonably protect Native Hawaiian rights. The Applicants considered

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	as well as any Project-specific mitigation measures required to avoid or minimize potential impacts. We also recommend the DEA include an analysis of the continued potential impact of the Project to Native Hawaiian access and cultural practices (Ka Paakai analysis). The DEA must address potential impacts and incorporate standard agency-required mitigation measures to avoid or minimize such potential impacts.	these recommendations in developing the avoidance and minimization measures that are included for cultural resources and practices (Section 2.3.3) and for historic and archaeological resources (Section 2.5.3). Consultation with SHPD was initiated on April 11, 2025, and any additional measures that result from either the Hawaii Revised Statutes Chapter 6E consultation with the State Historic Preservation Division, or through further consultation with cultural descendants of Honouliuli ahupuaʻa, will be incorporated into the Final EA.
Department of Transportation Services	Thank you for the opportunity to provide written comments regarding the Chapter 343, Hawai'i Revised Statutes Early Consultation Request for O'ahu Subsea Cable Telecommunications Project, Island of O'ahu, Tax Map Keys (TMKs): (1) 9-1-027 (por.); (1) 9-1-016:179 (por.); Olai Street Right-of-Way (ROW); Kalaeloa Boulevard ROW; Kamokila Boulevard ROW; Farrington Highway ROW. We have the following comments.	Thank you for your comments. Your comments have been incorporated into the analysis contained in EA Section 2.12, *Roadways and Transportation*. Please see the following summary and responses to your comments.
	The Project shall not modify existing bicycle and pedestrian facilities, including those along Kalaeloa Boulevard.	Construction of the Project would not permanently modify existing bike lanes or sidewalks, including those along Kalaeloa Boulevard. During construction, warning and directional signage would be implemented to direct pedestrian and bicycle traffic around the work area and ensure safe passage of pedestrians and bicyclists.
	The O'ahu Regional Transportation Plan 2045 includes a proposed project (No. 0-21-07) for Kalaeoa Boulevard reconstruction and widening between Lauwiliwili Street and Olai Street. The Project shall consider the future improvements and avoid any changes that may impact the future project.	The Applicants are aware of the planned Kalaeloa Boulevard reconstruction and widening project (No. 0-21-07) and will work with the Department of Transportation Services (DTS) to mitigate potential future impacts, where possible. Engineering design plans will be reviewed by DTS during permitting to reduce potential conflicts.
	The Draft Environmental Assessment (DEA) shall discuss any short-term traffic impacts the project may have on the City and	Refer to EA Section 2.12, *Roadways and Transportation*, for an analysis of impacts on City and County of Honolulu (CCH) roadways. Short-term impacts on

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	County of Honolulu roadways and include measures to mitigate the impacts.	roadways could include speed reductions and/or partial lane closures in work zones and minor increases in truck or vehicular traffic to transport equipment, materials, and/or construction workers. Site-specific traffic control plans would be implemented during construction. Impacts on traffic would be temporary and localized to the area under construction. See Section 2.12.3, *Avoidance and Minimization Measures*, for a complete listing of measures that would be implemented to reduce potential impacts.
	Transportation Impact Assessment (TIA). In regards to the proposed telecommunications facility associated with the Project, the applicant should perform a TIA to examine the vehicle, pedestrian, bicycle, and public transit safety, stress, and comfort levels at the nearby intersections and driveways with corresponding improvements to mitigate these impacts by applying Complete Streets principles. The applicant shall discuss the future year growth rate, trip distribution, mode split, and route assignment assumptions used in the TIA The applicant shall submit all native files (e.g., Synchro, Excel, etc.) for the raw multi-modal counts (in the format specified at https://geocounts.com/api/format/ and the example file at_https://bit.ly/DTScountsample) and accompanying analyses to the DTS Regional Planning Branch (RPB) at dtsplanningdiv@honolulu.gov. Please refer to the DTS TIA Guide for multimodal assessment tools and recommended analyses. The TIA Guide can be found at http://www4.honolulu.gov/docushare/dswebNiew/Collection-7723.	Section 2.12, *Roadways and Transportation*, provides a desktop analysis of the Project's impacts on traffic, pedestrian and bicycle facilities, and public transit in the Project area and its immediate vicinity. A Transportation Impact Assessment (TIA) has not been conducted for the following reasons: • A TIA is typically required if a project generates 50 or more trips during AM or PM peak hours. Estimated trips during operation of the proposed telecommunication facility for the Project fall well below this threshold at 10 trips per day, mostly outside peak hours. • The proposed telecommunication facility would not require new roadway modifications. • The proposed telecommunication facility would not introduce operational traffic changes that would require modifications beyond what is already planned by the CCH and Hawaii Department of Transportation for Farrington Highway.
	Parking. A discussion regarding off-street parking and site generated parking demand shall be included in the TIA.	The proposed telecommunication facility would accommodate 10 parking spaces onsite. The Project would not generate parking demand beyond what is

Interested Party	Early Consultation Comment Excerpt	Applicants Response
		required for operational staff and deliveries to the telecommunication facility.
	Street Usage Permit. A Street usage permit from the DTS should be obtained for any construction-related work that may require the temporary closure of any traffic lane, sidewalk, bicycle lane, or pedestrian mall on a City Street.	Comment noted. A street usage permit would be obtained from CCH DTS if construction requires closure or blockage of a sidewalk or bike lane.
	Neighborhood Impacts. The area representatives, neighborhood board, as well as the area guests, businesses, emergency personnel (fire, ambulance, and police), O'ahu Transit Services, Inc. (TheBus and TheHandi-Van), etc., should be kept apprised of the details and status throughout the Project and the impacts that the project may have on the adjoining local street area network.	Throughout construction activities, the status of the Project and any impacts on the adjoining local street area network would be communicated with area representatives, including neighborhood boards, business, emergency response personnel, and Oʻahu Transit Services (see Section 2.12.3, *Avoidance and Minimization Measures*).
	Bus Stops. The Project site is in the immediate vicinity of bus stops. Please coordinate roadway improvements with DTS - Transportation Mobility Division (TMD). Contact DTS-TMD at TheBusStop@honolulu.gov	Comment noted. Project plans would be coordinated with and submitted to the CCH DTS to minimize impacts on public transit services, including bus stops.
	Disability and Communication Access Board (DCAB). Project plans (vehicular and pedestrian circulation, sidewalks, parking and pedestrian pathways, vehicular ingress/egress, etc.) should be reviewed and approved by DCAB to ensure full compliance with Americans with Disabilities Act requirements.	Comment noted. Project plans would be coordinated with and submitted to the Disability and Communication Access Board, as applicable.
Honolulu Board of Water Supply	The Board of Water Supply (BWS) has water mains traversing through the entirety of the Ola`i Street, Kalaeloa Boulevard, Kapolei Parkway, Kamokila Boulevard, and Farrington Highway right-of-ways. The BWS is also starting construction of the Kalaeloa Seawater Desalination Facility Off-Site Improvements project at the intersection of 0la`i Street and Kalaeloa Boulevard and expect to complete construction at the end of 2027. These water mains should be made accessible for repairs and maintenance during all phases of the project. Any structures and infrastructure should be adequately set back from the water main easements to prevent damage in the event of main breaks, repair, and maintenance.	Thank you for your comment. The Applicant has completed the as-built request and the as-built drawings for Board of Water Supply (BWS) water mains have been considered in the engineering design. In addition, the engineering consultant reviewed the location of water manholes during a site visit to ground-truth the location of water mains along the fronthaul route. Engineering drawings have been submitted to the CCH for review and CCH will be routing the plans to BWS as part of the engineering plan review process. Access for repair and

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	To request BWS as-built drawings, please contact the Support Branch of our Capital Projects Division at (808) 748-5740. The construction drawings should be submitted for our approval, and the construction schedule should be coordinated to minimize impact to the water system. The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.	maintenance of BWS water mains would be maintained throughout Project construction and operation.
Honolulu Fire Department	In response to your letter received on January 24, 2025, regarding the abovementioned subject, the Honolulu Fire Department (HFD) reviewed the submitted information and requires that the following be complied with: 1. Fire apparatus access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 meters) from fire apparatus access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; 2021 Edition, Sections 18.2.3.2.2). A fire apparatus access road shall extend to within 50 feet (15 meters) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; 2021 Edition, Section 18.2.3.2.1.). 2. Fire apparatus access roads shall be in accordance with NFPA 1; 2021 Edition, Section 18.2.3. 3. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to all premises upon which facilities, buildings, or portions of buildings are hereafter constructed or moved into the jurisdiction. The approved water supply shall be in accordance with NFPA 1; 2021 Edition, Sections 18.3 and 18.4.	Comment acknowledged. The Project will comply with the National Fire Protection Association standards identified in the comments and civil drawings will be provided for Honolulu Fire Department review concurrently with processing the building permit for the telecommunication facility.

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	4. Civil drawings submitted to your department shall be routed to the HFD for review and approval. The requirements above are required by the HFD. This project may have additional requirements to be met as determined by other agencies.	
Honolulu Police Department	This is in response to your correspondence dated January 17, 2025, requesting comments on the proposed Oʻahu Subsea Cable Telecommunications Project. Based on the information provided, the Honolulu Police Department does not have any concerns at this time.	Thank you for confirming that the Honolulu Police Department does not currently have any current concerns regarding the Project.
Elected Officials		
State House Representative, David Alcos III	I want to extend my gratitude for reaching out to my office regarding the Submarine Cable Telecommunications Project at Barbers Point Beach Park. I appreciate your efforts in enhancing communication across the state of Hawaii. As this project progresses, I kindly ask that you keep me informed about any developments. Additionally, I would like to inquire if your organization participates in any community projects or events that could support nonprofit organizations in our area. In our community, we are focused on various initiatives, including cleanups, educational programs, and infrastructure development, all aimed at strengthening our community. Your support in these efforts would be invaluable. Thank you once again for your commitment to our community and for your role in improving our telecommunications infrastructure. I look forward to hearing from you soon. If there is anything that I can do to help support through this, please do not hesitate to reach out.	Thank you for your feedback and for voicing an interest in partnering on community projects. We will evaluate avenues to contribute and look forward to future communication.
Other Interested Parties[1]		
Gasco, Inc. (Hawaii Gas)	In response to your letter dated January 17, 2025, please be advised that Hawaii Gas maintains an underground 16" transmission line and a 4" distribution line in the project vicinity. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area. Thank you for the opportunity to comment on the Environmental Assessment	Thank you for your response. EA Section 2.6, *Infrastructure and Utilities*, acknowledges the presence of Gasco, Inc. (Hawaii Gas) infrastructure in the vicinity of the Project. Utility clearances for the Site Development Division Master Application are currently

Interested Party	Early Consultation Comment Excerpt	Applicants Response
	for Chapter 343, Hawaii Revised Statutes Early Consultation Request for Oahu Subsea Cable Telecommunications project.	underway, and the proposed fronthaul route has been approved by Gasco, Inc.
Spectrum	The locations of existing routes and crossings are shown on the provided plans. The exact locations, and routing of all CATV facilities must be verified in the field due to construction variances. The location of the proposed project may have an effect on Spectrum's existing CATV plant in your work area. However, if the work or repairs being performed requires special machinery, with a specific height requirement, the contractor performing the work, will be required to notify our office prior to performing any work. Spectrum may need to reattach or move our plant system, if we have to relocate our existing plant system, charges may apply. Currently, Spectrum utilizes Hawaiian Electric aerial infrastructures, Hawaiian Telcom and Spectrum's underground infrastructures to provide our CATV services in the area that passes near your project location. Before any digging, toning may be required. Call "One Call Center" at (866)423-7287 to set up toning. This information has been provided to help minimize delays and prevent damage to existing CATV structures within the project area.	Thank you for your response. EA Section 2.6, *Infrastructure and Utilities*, acknowledges the presence of Spectrum and Hawaiian Electric infrastructure in the Project area. Utility clearances for the Site Development Division Master Application are currently underway, and to date the proposed fronthaul route has been approved by Spectrum.

[1]Excludes confidential communications from HECO, Hawaiian Telcom and Island Energy Services

7.2 Permit Pre-Application Meetings

Pre-application meetings held with permitting agencies to date are summarized in Table 7-2.

Table 7-3. Pre-Application Meetings Held with Permitting Agencies

Agency	Date	Purpose of the Meeting
Federal Agencies		
U.S. Army Corps of Engineers	June 27, 2024, and March 4, 2025	Pre-application meeting for Nationwide Permit 57.
NOAA Fisheries	April 21, 2025	Pre-application meeting for essential fish habitat assessment and consultation.
State of Hawaiʻi Agencies		
DLNR Office of Conservation and Coastal Lands	July 10, 2024	Pre-application meeting for Conservation District Use Permit.
DLNR Land Division	August 29, 2024	Pre-application meeting for shoreline certification and submerged land easement.
Hawaiʻi Department of Transportation	October 10, 2024	Pre-Application meeting for design and Use and Occupancy Agreement
City and County of Honolulu		
Department of Budget and Fiscal Services	January 22, 2025	Pre-application meeting to discuss process for obtaining utility easements.
Department of Parks and Recreation	March 3, 2025	Pre-application meeting to further discuss process and requirements of the easement for facilities
Department of Planning and Permitting	May 29, 2024	Pre-application meeting for Special Management Area Permit.

DLNR = Department of Land and Natural Resources; NOAA = National Oceanic and Atmospheric Administration.

7.3 Community Consultation

7.3.1 Consultation for Cultural Impact Assessment

To initiate consultation for the CIA and Ka Paʻakai Analysis (Appendix B), letters and project area maps were sent to a total of 40 contacts that included government agencies, advisory councils, local community organizations, and individuals with generational ties to Honouliuli ahupuaʻa (see Table 4 in Appendix B). The initial letters were distributed on December 3, 2024, and follow-up reminders were sent to all letter recipients on December 16, 2025. In addition, an invitation to participate in consultation for the CIA and Ka Paʻakai Analysis was posted to the Public Notice Board for *Ka Wai Ola* for the month of January 2025. Ten individuals responded to the consultation letter, the majority of whom either had no comment on or no objections to the project. Six individuals shared additional information and insights into Honouliuli ahupuaʻa that was incorporated into the background research section of the CIA and informed the description of potential impacts and recommendations on feasible actions that could be taken to reasonably protect Native Hawaiian rights (see Section 2.3, *Cultural Resources and Practices*). Consultation is ongoing, and updates on the status of consultation will be included in the Final EA.

7.3.2 Neighborhood Board Meeting Presentation

The Applicants included the Chair of Neighborhood Board No. 34 (Makakilo-Kapolei-Honokai Hale) on the distribution list for the early consultation letter distributed in January 2025 and made a presentation to the neighborhood board at the regular meeting on April 23, 2025. In accordance with the application requirements for the SMA Major Permit, written notification of the neighborhood board presentation was distributed to property owners adjacent to the SMA permit area on April 10, 2025.

Chapter 8
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Appendix A
Inadvertent Drilling Fluid Release Contingency Plan

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Project Overview

The Project includes installing multiple steel casings (landing pipes) from points on land to points in the Pacific Ocean that will house the planned subsea fiber optic cables. The landing pipes would be installed by a construction method known as horizontal directional drilling (HDD). HDD allows for a bore machine to be positioned on land, bore down under the beach and surf zone, and exit at a predetermined point in the ocean. The HDD would occupy the bore entry site, drilling steel casings into the ground at an angle of approximately 12 degrees. Once the HDD reaches the desired depth, the direction would level out as the drilling continues to push the landing pipe horizontally through the ground. When the landing pipe reaches the appropriate distance offshore, the drill head would be guided to the ocean bottom at approximately 49 feet (15 m) to 71 feet (22 m) of water depth. After the borehole is completed, the bore assembly consisting of the drill bit and electronics would be removed by divers or the bore pipe would be withdrawn back to the bore site to remove the assembly before reinstalling the landing pipe into the completed borehole. This operation would be repeated for each of the landing pipes. The Project would include the installation of up to six such landing pipes that would be approximately 7 inches (17.8 centimeters [cm]) in diameter and approximately 4,400 to 5,100 feet (1,341 m to 1,555 m) from the shoreline.

Prior to the commencement of the HDD, geotechnical investigations would take place to help identify the types and densities of materials that will be encountered during the HDD process.

The HDD process utilizes an inert, nontoxic mixture of water and bentonite clay. This mixture, known as *drilling mud*, is necessary to facilitate the drilling process. Its characteristics stabilize the borehole, suspend the cuttings so they can be pumped back to the drill site, lubricate the hole, and drive the drill head. Bentonite is a non-toxic, naturally occurring clay commonly used in farming practices; however, if large volumes of bentonite are discharged to waterways, the clay can act like a concentrated silt and cause environmental degradation by smothering benthic invertebrates, aquatic plants, and fish and their eggs.

During boring operations, it is possible that fractures in the underlying rock substrate may potentially result in the inadvertent release of bentonite clay into the environment. This event is described as an Inadvertent Drilling Fluid Release (IDFR) and typically occurs in highly fractured soils or if the bore path is shallow. This plan is intended to prevent such IDFRs or to respond should one occur.

Plan Objectives

The objectives of the IDFR contingency plan are to do the following.

- Minimize the potential for IDFRs.
- Provide the timely detection of any IDFRs that could enter or otherwise compromise or affect any sensitive cultural, environmental, or biological resources, surface facilities, or features.
- Facilitate notification of all appropriate agencies immediately and ensure documentation of any incident.
- Facilitate proper response, containment, and clean-up in the event an IDFR occurs.

Responsibilities

The Contractor's responsibilities for the management of the work include the following.

- Monitor hydraulic pressures during the performance of the work.
- Minimize potential for an IDFR.
- Detect any IDFRs at ground or water surface.
- Contain any IDFRs.
- Clean up any IDFRs.
- Document any IDFR.
- Notify the permitting agencies and stakeholders of any IDFR.

Preconstruction Inadvertent Drilling Fluid Release Prevention

Experienced Crew

IDFR prevention begins well before the mobilization of the drilling equipment to the Project site. To this end, the Contractor will employ skilled, competent workers who are familiar with HDD construction, have performed many crossings of multiple complexities, and are well versed in monitoring for IDFRs and the warning signs that are often a precursor to an IDFR.

Drilling Profile Design

The profile of the drill path will be designed to gain depth as soon as possible and will then maintain a minimum depth of cover below ground or seabed level of greater than 30-feet (9.1 m), though the Contractor is likely to go deeper. Depths beyond 30-feet (9.1 m) reduce the risk of an IDFR reaching ground or water surface.

Casing Pipe at Entry

Prior to construction, a geotechnical investigation will be completed. The resulting report will provide the Contractor the information needed to determine if they need to install a steel casing at the entry points to ensure the borehole stays open and the drilling fluids have a clear path back to the bore site. This casing pipe is usually temporary and is removed after the bored landing pipes are installed. However, there are situations in which it is desirable to leave the surface casing in place.

Drilling Fluid Selection

The drilling fluids will dominantly consist of water and a high yield bentonite clay. It is not anticipated that any other additives will be necessary to safely accomplish this crossing, however if it is determined that some would be beneficial, Material Safety Data Sheets (MSDS) will be submitted prior to their use.

The basic drilling fluid properties of concern include the following.

- Viscosity
- Fluid density
- Sand (solids) content
- Mud weight

Lost Circulation Material (LCM) may be used in case of an IDFR or loss of circulation. LCM products are used to bridge fractured ground and fissures, allowing a foundation for bentonite to form a waterproof filter cake against fracture zones and stop fluid flowing into the frac out zone. Once lodged in the problem voids, LCM will swell up to 200 times its original size, thus bridging the frac out and allowing it to be sealed off with bentonite. LCM can also be spotted into caving zones to prevent collapse. MSDS for LCM will be submitted if needed.

Drilling Exit Point

The exit points of the HDDs have been selected to minimize the length of the landing pipes while also avoiding sensitive biological resources. Further, the ends of the landing pipes need to be in a position where the cable ship can approach to install the subsea fiber optic cable. As the HDD drill bit nears the exit point, the drillers will switch from the use of the bentonite clay to fresh water. This practice will reduce the potential for the silty drilling fluid to be released into the ocean and reduce turbidity upon exit.

Construction IDFR Monitoring

The Contractor will be vigilant during the construction process to reduce the possibility of an IDFR.

Project Site Monitoring

Monitoring the project site provides the primary HDD good practice necessary to minimize the potential of an IDFR. The frequency of monitoring may be increased or decreased depending on the conditions of the work and phase of the work (i.e., increased monitoring during the period of lost circulation or reduced monitoring when HDD activities have been demonstrated to consistently produce anticipated results).

Drilling Fluid Pressure Monitoring

The drilling company will maintain drilling fluid monitoring equipment on site (and crew members who are proficient in their use) to evaluate fluid properties and adjust fluid quality as necessary during drilling operations. Adjustments of the basic drilling fluid properties may be desired in certain circumstances to match actual soil types to achieve a more stable borehole, improve cuttings return, and/or to reduce the IDFR potential during difficult drilling circumstances.

Pump pressures will be monitored continuously with the use of a pressure gauge located on the driller's console. This pressure is commonly referred to as *standpipe pressure* and reflects the pressure through the mud pump(s), surface plumbing, drill pipe, and across the jet nozzle(s) in the bit. These pressures will be logged for each joint drilled, in the drillers log. The amount of standpipe pressure generated is generally determined by how much pressure is required to hydraulically erode the formation using a jetting bottom hole assembly or that is required to turn the rotor section of a mud motor.

Standpipe pressure may increase and decrease depending on the strength of the formation being drilled at any given time, but it is anticipated that mud pressures for the Project would range from 500–700 pounds per square inch (psi).

In addition, the drilling company will employ the use of an annular pressure tool to monitor the annular pressure of the fluid returns while drilling the borehole to mitigate over pressurizing weaker formations, reducing the chances for a frac-out from occurring. Annular pressures of 50–125 psi may be anticipated for this bore, with annular pressures expected to increase gradually as the length of the drill increases.

Drilling Fluid Returns Monitoring

Good HDD practices dictate monitoring fluid returns during the progression of work. In many cases, the loss of or sudden changes in fluid returns provide an early indication that down-hole conditions may be susceptible to the occurrence of an IDFR. Fluid returns are monitored on a continuous, or near continuous, basis.

Plugging of the borehole annulus or the presence of a major formation fracture can lead to partial or full loss of drilling fluid circulation. It is possible to monitor fluid loss by watching for significant differences or sudden changes between the fluid rate being pumped downhole and the rate of returns flowing into the surface containment pits. The presence of back pressure in the drill pipe when unscrewing from the down-hole work string is also a warning of a plugged annulus, which could increase the possibility of an IDFR.

In accordance with this plan, the drilling company will monitor the drilling fluid pump rate, the solids control tank level, and visually observe the rate of drilling fluid returns to the containment pits and back pressures. As drilling progresses, the driller will be kept appraised of whether back pressure is present or if high volumes of drilling fluid are being lost downhole, taking into consideration ground conditions and the volume of fluid needed to fill the new hole being drilled. Should the driller feel that fluid circulation is slowing or is about to stop, or back pressure in the string is present, the driller will immediately implement the following procedures.

1. Temporarily cease drilling operations and shut off the mud pumps.
2. Dispatch observers to inspect the area between the entry point and the bit, along the bore alignment, for evidence of drilling fluid on the surface or in the water.
3. If no drilling fluids are seen on the ground surface or in the water, the mud pumps will be started and volumes gradually increased as the drill pipe is pulled back, rotating the drill string to wipe the borehole annulus and encourage flow.

Depending on the success of this procedure, the properties of the drilling fluid may be altered to aid in restoring circulation. Observers will continuously monitor the area for IDFRs as long as the mud pumps remain on.

If circulation is re-established, drilling will proceed as usual, and monitoring for IDFRs will become more routine as long as circulation is maintained. If circulation is not re-established, monitoring will continue while the pumps are operating.

Often times, in the course of drilling the borehole, circulation may be temporarily lost as the bit is advanced through more permeable sections of the formation and fluid pressures are at a maximum. Under these circumstances, the loss of fluid circulation alone may be temporary. As the pilot bit advances beyond the zone of lost circulation, fluid pressure may return back to normal and circulation within the borehole re-established.

It is expected that at some point, circulation on each bore will be lost and not recoverable due to the length of the bore string. In such cases, monitoring will continue as the drilling proceeds to the end point.

Seabed Exit of Horizontal Directional Drill

At a suitable distance prior to the exit point (as defined by the seabed geology), the use of standard drilling mud will be curtailed. The borehole will be completed to the punch-out point using either fresh water or a biodegradable, nonsolid, biopolymer fluid, such as Xanthan Gum to minimum release of bentonite onto the seabed. Xanthan Gum is an industry standard drilling fluid for cases in which solids-free systems are a requirement. Xanthan gum is considered non-hazardous and suitable for use in environmentally sensitive locations and applications.

Inadvertent Drilling Fluid Release Response

Land-Based Release

If IDFRs are observed on the ground surface, at a location other than the bore containment pits, the following procedures will be implemented.

1. Cease drilling operations.
2. Notify all required parties.
3. Document the event with photographs.
4. Contain the drilling fluid with sand or gravel bags, straw bales and/or wattles, or a premade containment vessel made of steel so the fluid cannot migrate from the fracture location.
5. If possible, excavate a small sump pit at the fracture location and provide a means of containment of the fluid while it is returned to either the drilling site for cleaning and re-use or to an approved pump site (e.g., vac trucks, pumps, or both).
6. Clean up the affected area using a vacuum unit, brooms, shovels, etc., once release is contained. Clean-up will include removal of all visible drilling fluid located in accessible areas. Removal methods will vary based on the volume of the release and the site-specific conditions. Removal equipment may include vacuum trucks, loader and track hoe buckets, small pumps, shovels, and buckets. After removal of the released drilling fluid, the release area will be returned as close to the original condition as possible.
7. Document the cleaned-up area with photographs.

8. Adjust drilling fluid properties to inhibit flow through the fracture and wipe the hole by tripping out the drill pipe to wipe the borehole annulus.
9. Determine the suitability of placing LCM in the hole.
10. After tripping the drill string back, allow the formation to rest for a suitable period and continue drilling, while monitoring the frac-out location and transferring fluids, as necessary.
11. Forward ream the borehole up to the frac-out location to relieve annular pressures, as necessary.
12. Continue drilling with minimum fluid.
13. Consider drilling a vertical relief well over the borehole in order to relieve borehole pressures and encourage flow to a known source where it can be managed.

It should be noted that often times, drill cuttings generated as a result of the drilling process will naturally bridge, and subsequently seal, fractures or voids in the formation as drilling progresses, thus providing another means to re-establish lost circulation.

Waterbody Release

1. If an IDFR is observed offshore, the following procedures will be implemented.
2. Cease drilling operations.
3. Notify all required parties.
4. Document the event with date and time stamped photographs.
5. Remove releases by vacuum truck, if possible. In cases of inadvertent releases to open water, it is usually impractical to contain the release due to the fact that the release does not necessarily occur on the bore path, and the action of waves and ocean swell quickly disperse the IDFR. Removal by vacuum truck may be attempted at the shoreline if reachable from shore and deemed appropriate.
6. Sample turbidity levels, as appropriate. Water sampling equipment will be available for use by site inspectors to evaluate turbidity levels.
7. Once dissipated, again document the event with date and time stamped photographs.
8. Adjust drilling fluid properties to inhibit flow through the fracture and wipe the hole by tripping out drill pipe to wipe the borehole annulus.
9. Determine the suitability of placing LCM in the hole.
10. After tripping the drill string back, allow the formation to rest for a suitable period, continue drilling while monitoring the frac-out location and transferring fluids, as necessary.
11. Forward ream the borehole up to the frac-out location to relieve annular pressures, as necessary.
12. Continue drilling with minimum fluid, increasing drilling fluid gradually whilst continuously monitoring for any further IDFRs.

It should be noted that often times drill cuttings generated as a result of the drilling process will naturally bridge, and subsequently seal, fractures or voids in the formation as drilling progresses, thus providing another means to re-establish lost circulation.

The decision to proceed with the drilling operation will be made mutually between the drilling site supervisor and the on-site Client Representative after practical methods to seal off the location of the discharge have been attempted.

Inadvertent Drilling Fluid Release Control Equipment

In accordance with good HDD practices, the following frac-out containment and clean-up equipment should be present on or near the Project site for an IDFR.

- Heavy-weight sealed plastic bags filled with sand or gravel.
- Splash board: three layers of heavy plastic.
- Several 5-gallon plastic buckets.
- One wide heavy-duty push broom.
- Flat blade shovels.
- Silt fence, T-posts, and/or straw bales.
- Straw logs (wattles): at least two 10-foot rolls.
- Portable trash pumps with a minimum of 500 feet (152.4 m) of discharge hose.
- Preconstruction seawater sample as baseline for any testing following an offshore IDFR.
- Seawater sampling kits.
- Offshore dive vessel available on call in case of an offshore IDFR.
- A minimum of one vacuum unit on site and access to a vacuum truck within 1 hour of the job site.

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Appendix B
Cultural Impact Assessment

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Pacific Legacy

Historic Preservation

CULTURAL RESOURCES CONSULTANTS

Hawaiʻi Office:
Kailua, Oʻahu

California Offices:
Bay Area
Sierra/Central Valley
Business Office

DRAFT

CULTURAL IMPACT ASSESSMENT FOR THE PROPOSED OʻAHU SUBSEA CABLE TELECOMMUNICATIONS PROJECT, HONOULIULI AHUPUAʻA, ʻEWA MOKU, ISLAND OF OʻAHU

[TMK: (1) 9-1-016:179 (POR.); (1) 9-1-016:222; (1) 9-1-026:027 (POR.); OLAI STREET ROW; KALAELOA BOULEVARD ROW; KAMOKILA BOULEVARD ROW; FARRINGTON HIGHWAY ROW]

Pacific Legacy: Exploring the past, informing the present, enriching the future.

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DRAFT

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March 2025

ABSTRACT

At the request of ICF International, Pacific Legacy, Inc. has prepared this Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis for the proposed Oʻahu Subsea Cable Telecommunications Project, Honouliuli Ahupuaʻa, ʻEwa Moku, Island of Oʻahu [TMKs: (1) 9-1-016:179 (por.); (1) 9-1-016:222 (por.); (1) 9-1-026:027 (por.); Olai St ROW; Kalaeloa Blvd ROW; Kamokila Blvd ROW; Farrington Hwy ROW]. The proposed Oʻahu Subsea Cable Telecommunications Project includes subsea fiber optic cable installation in state marine waters and state submerged lands, a cable landing site at Barbers Point Beach Park, and an underground conduit system to be installed in public road rights-of-way between the cable landing site and a telecommunication facility to be located at the University of Hawaiʻi – West Oʻahu Campus. To complete this report, Pacific Legacy conducted archival research and consultation with cultural practitioners, cultural descendants of Honouliuli, and organizational and state agency representatives.

The results of background research identified several significant places in proximity to the project area, including Puhilele, Kalaeloa, the Barbers Point Lighthouse, Kaupeʻa, Kānehili, Puʻu o Kapolei, Puʻu Pālailai, and Puʻu Makakilo. Barbers Point Beach Park lies within the uplifted coral reef of the ʻEwa Plain, which is characterized by its abundance of limestone pit features. These pits have been found to contain significant cultural and paleontological deposits, as well as burials. Archival research did not identify any Land Commission Awards (LCAs) within or near the project area. Post-Contact land uses were largely focused on commercial ranching, agriculture, and transportation. This included activities associated with Honouliuli Ranch, the Ewa Plantation Company, and the Oahu Railway and Land Company (OR&L). The ʻEwa Plain was a key site for military development during WWII, and the residential and industrial boom that followed the war led to the development of Makakilo, Kapolei, and Campbell Industrial Park. In 1976, West Oʻahu College opened in Kapolei, and in 1989 became the University of Hawaiʻi – West Oʻahu.

Pacific Legacy completed a Literature Review and Field Inspection (LRFI) for the proposed Oʻahu Subsea Cable Telecommunications Project in 2025. During the field inspection, a portion of the previously identified OR&L Railroad right-of-way (SIHP 50-80-12-07387/50-80-12-09714) and a portion of a crushed limestone gravel road (SIHP 50-80-12-08933) were identified in the project area, along with 15 additional potential historic properties and two isolated metal blade implements. All of the potential historic properties identified within the project area are likely related to post-Contact land use, including agriculture, transportation, and water management.

Consultation for previous projects in Honouliuli identified a range of cultural resources, practices, and beliefs in the *ahupuaʻa*, including rich marine fisheries, salt pans, coastal freshwater sources, and *limu*. The area around Makakilo was known to contain rich soils for cultivation and a wide number of native or Polynesian-introduced plant and animal species. Makakilo also held great spiritual significance. Otherworldy or supernatural events have been observed in Honouliuli, especially around the Kaupeʻa Plain. Other important features identified included pre-Contact trails, coral and rock coves, limestone pits, and burials. Consultation specific to this project identified the potential for iwi kūpuna to be present in the project area; the potential presence of access trails or resource gathering sites in or near the project area; valued offshore cultural resources including those identified during the desktop review (the *Arthur* and the *Liliu*) and marine resources including fisheries, *limu*, and coral; the possible presence of limestone pit features, which may contain cultural deposits, environmental data, and/or burials; and other resources and places

which are located further away from the project area but still hold significant value, including Ordy Pond and the permanent settlements and expansive irrigated kalo floodplains near Puʻuloa.

Potential impacts to resources and traditional and customary Native Hawaiian rights included the potential for the project to encounter *iwi kūpuna*; potential impacts to nearshore resources like coral and *limu* from development activities like water diversion, pollution, and/or runoff; potential impacts to submerged cultural resources (e.g., the *Arthur* and the *Liliu*); and potential impacts to the portion of the OR&L Railroad right-of-way that intersects with the project area.

Recommended feasible actions to be taken to reasonably protect Native Hawaiian rights include (1) cultural monitoring during all ground disturbing activities; (2) ensuring legal and respectful protocols are in place in the event that *iwi kūpuna* are encountered during project activities; (3) additional survey to identify pre-Contact historic properties in the project area; (4) employing mitigation strategies to ensure the project avoids impacts to marine ecosystems; (5) ongoing consultation and collaboration with community members throughout the project; and (6) consultation with SHPD and the Hawaiian Railway Society to mitigate any potential impacts to the OR&L Railroad right-of-way.

This CIA and Ka Paʻakai Analysis is currently in draft form. Therefore, the identified traditional cultural resources, practices, and beliefs; potential impacts from the project; and recommended feasible actions contained herein should be taken as a preliminary assessment. Additional consultation is currently underway and will be incorporated into a final CIA and Ka Paʻakai Analysis report, which will be prepared for inclusion in the Final Environmental Assessment for the proposed Oʻahu Subsea Cable Telecommunications Project.

ACKNOWLEDGEMENTS

Pacific Legacy would like to acknowledge the *kūpuna*, cultural practitioners, community members, and other knowledge holders who have shared their time and *manaʻo* with us to better understand and protect the valued cultural resources and traditional practices of Honouliuli Ahupuaʻa. We recognize that even the most well-intentioned efforts to mitigate the impacts of development projects on resources, practices, and Native Hawaiian rights often places an added burden on individuals who are frequently sought for their expertise. We are grateful for their continued willingness to share with us, and we hope that we have honored their time and commitments here. We apologize for any errors in names, content, or presentation. We are especially grateful to Mana Cáceres, John Bond, Ross Cordy, Shad Kane, Steve Vendt, and Kaʻāhiki Solis for providing information and referrals, which greatly improved the quality of our report.

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Note: In this report, the spellings and the use of diacritical marks (glottal stops and macrons) follow conventions issued by Pukui and Elbert (1986) and Pukui et al. (1974) with limited exceptions – spellings and diacritical marks are used as the original sources used them in quotations, titles, and proprietary names.

Cover Image: View of the project area at Barbers Point Beach Park, taken from the southeast corner of the project area (view to northwest).

1.0 INTRODUCTION

At the request of ICF International, Pacific Legacy, Inc. conducted a Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis for the proposed Oʻahu Subsea Cable Telecommunications Project, Honouliuli Ahupuaʻa, ʻEwa Moku, Island of Oʻahu [TMKs: (1) 9-1-016:179 (por.); (1) 9-1-016:222 (por.); (1) 9-1-026:027 (por.); Olai Street ROW; Kalaeloa Boulevard ROW; Kamokila Boulevard ROW; Farrington Highway ROW] (Figure 1 through Figure 5).

1.1 PURPOSE AND LEGAL CONTEXT

The CIA is a requirement of Act 50 (Haw. 2000), which amended Chapter 343 of the Hawaiʻi Revised Statutes (HRS) to require that environmental assessments (EA) or environmental impact statements (EIS) consider potential effects on Native Hawaiian cultural practices, and amends the definition of "significant effect" to include adverse effects on cultural practices. It explicitly acknowledges that Articles IX and XII of the Hawaiʻi State Constitution requires government agencies to "promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups" (OEQC 1997). These articles empower the state to conserve and develop objects and places of historic or cultural interest (Article IX, Section 7), and confers the power to preserve and develop the cultural, creative, and traditional arts of its various ethnic groups (Article IX, Section 9). In addition, Article XII, Section 7 of the State Constitution reaffirms the State's obligations to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights."

The Office of Environmental Quality Control (OEQC)'s Guidelines for Assessing Cultural Impacts, which were adopted by the State of Hawaiʻi Environmental Council in 1997, provide a structure for CIA methodology and reporting. They specify that the scope of the assessment should in most cases extend beyond the boundaries of the project area in order to account for cultural practices which may not necessarily take place within the project area but may still be impacted by development activities. In general, the *ahupuaʻa* is recommended as the appropriate scale of assessment, though in some cases, potential impacts of project activities may extend beyond the boundaries of a single *ahupuaʻa* and the scope should be widened accordingly (e.g., projects that pose potential impacts to watersheds or offshore resources). The OEQC offers the following guidance for the historical period and cultural resources subject to assessment:

> The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.
>
> The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, including submerged cultural resources, which support cultural practices and beliefs. (OEQC 1997:1)

They also stress that the presence of development, including urban infrastructure, does not preclude the existence of ongoing cultural practices, beliefs, and culturally important resources. The following protocol is recommended by the Environmental Council for preparing Cultural Impact Assessments:

> (1) Identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupuaʻa;
> (2) Identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;
> (3) Receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;
> (4) Conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;
> (5) Identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
> (6) Assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified. (OEQC 1997)

A series of decisions by the Supreme Court of Hawaiʻi have further reaffirmed and clarified protections for native Hawaiian customary and traditional gathering rights.

Kalipi v. Hawaiian Trust Co., Ltd., 66 Haw. 1, 656 P.2d 745 (Haw. 1982) asserted that the right to enter "undeveloped lands to gather, without unnecessarily disturbing the surrounding environment, natural products necessary for certain traditional native Hawaiian practices" did not extend to individuals who do not actually reside within the land division in which they seek to exercise such rights. However, it also asserted that "any argument for the extinguishing of traditional rights based simply upon the possible inconsistency of purported native rights within our modern system of land tenure must fail" based on the constitutional obligations of the court to preserve and enforce traditional rights under Article XII of the Hawaiʻi State Constitution. This is the first case in which the Hawaiʻi Supreme Court recognized the modern legal bases of traditional customary rights.

In *Pele Defense Fund v. Paty*, 73 Haw. 578, 837 P.2d 1247 (Haw. 1992), members of the Pele Defense Fund asserted native Hawaiian gathering rights in an *ahupuaʻa* other than the ones in which they reside. Although this assertion is similar to that made by Kalipi in 1982, in this instance the court ruled in favor of the Pele Defense Fund's gathering rights. They argued that where Kalipi's assertion was based entirely on land ownership, the Pele Defense Fund's assertion was based on access and gathering patterns that have been held traditionally by native Hawaiians in the Puna region. Therefore, the court determined that "native Hawaiian rights protected by article XII § 7 may extend beyond the ahupuaʻa in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner."

Public Access Shoreline v. Cty. Planning Comm, 79 Haw. 425, 903 P.2d 1246 (Haw. 1995), commonly known as PASH, held that the Hawaiʻi Planning Commission is obligated to "preserve and protect" native Hawaiian rights to the extent feasible when issuing Special Management Area (SMA) Permits. The case clarified that native Hawaiian gathering rights extended to land that is less than fully developed, stating: "Although access is only *guaranteed* in connection with undeveloped lands, and article XII, section 7 does not *require* the preservation of such lands, the State does not have the unfettered discretion to regulate the rights of ahupuaʻa tenants out of existence." It further stated that although the reasonable exercise of native Hawaiian usage is entitled to protection under article XII, section 7, "the balance of interests and harms clearly favors a right of exclusion for private property owners as against persons pursuing *non-traditional* practices or exercising otherwise valid customary rights in an *unreasonable* manner."

Ka Paʻakai O Ka ʻAina v. Land Use Comm'n, 94 Haw. 31, 7 P.3d 1068 (Haw. 2000) found that the Land Use Commission (LUC) failed to fulfill its obligation to preserve and protect traditional and customary rights of native Hawaiians when it made the decision to reclassify nearly 1,010 acres of land in Kaʻūpūlehu Ahupuaʻa from conservation to urban use. The court found that the LUC improperly delegated these responsibilities to the developer:

> The power and responsibility to determine the effects on customary and traditional native Hawaiian practices and the means to protect such practices may not validly be delegated by the LUC to a private petitioner who, unlike a public body, is not subject to public accountability. Allowing a petitioner to make such after-the-fact determinations may leave practitioners of customary and traditional uses unprotected from possible arbitrary and self-serving actions on the petitioner's part. After all, once a project begins, the pre-project cultural resources and practices become a thing of the past. (Haw. 2000)

The court remanded the case to the LUC on a limited basis to enter specific findings of fact and conclusions of the law regarding:

> 1.) The identity and scope of "valued cultural, historical, or natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
> 2.) The extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and
> 3.) The feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist. (Haw. 2000)

Notably, in requiring these three specifications for findings of fact and conclusions, the court provided an analytical framework to help guide the state and its agencies in considering land use decisions and to "help ensure the enforcement of traditional and customary native Hawaiian rights while reasonably accommodating competing private development interests." This analytical framework has become commonly known as the "Ka Paʻakai Analysis."

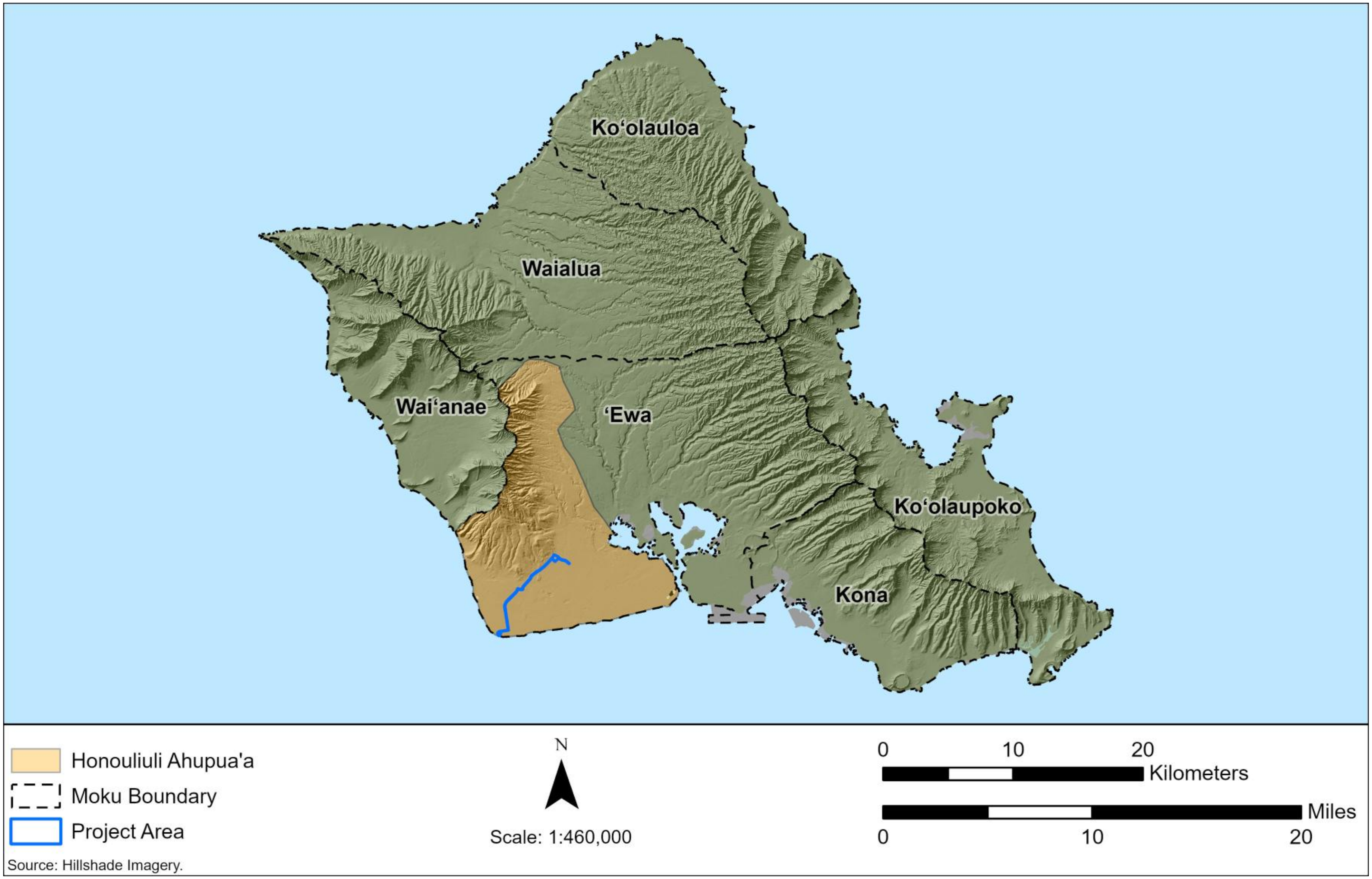


Figure 1. Location of the O‘ahu Subsea Cable Telecommunications Project Area within Honouliuli Ahupua‘a, with surrounding moku labeled.

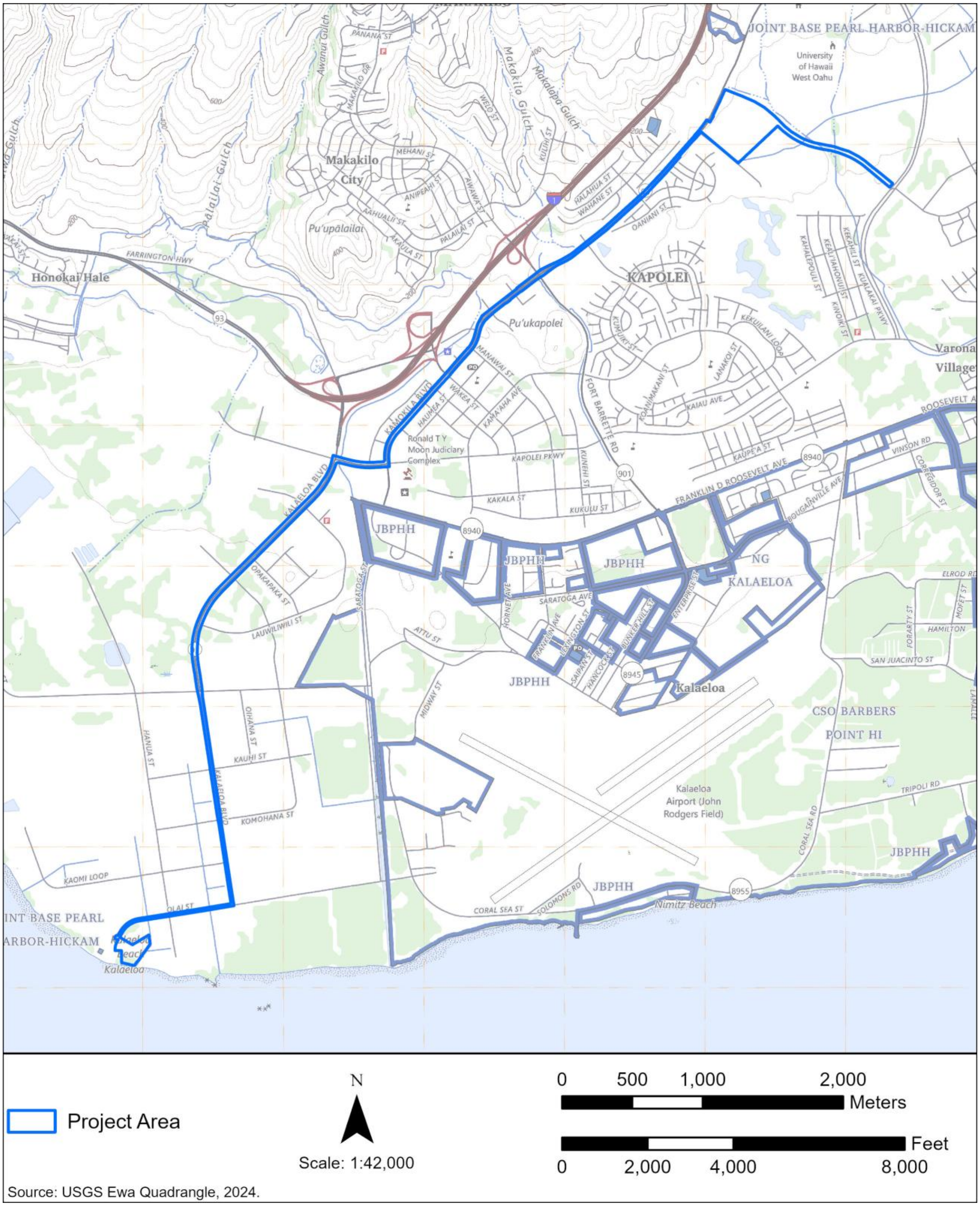


Figure 2. Location of the O'ahu Subsea Cable Temecommunications Project Area on the USGS Ewa Quadrangle map (2024).

Figure 3. Location of the Oʻahu Subsea Cable Telecommunications Project Area on an aerial image (base map: Esri 2024).

Figure 4. Location of the southwestern portion of the Oʻahu Subsea Cable Telecommunications Project Area with TMK boundaries (base map: Esri 2024).

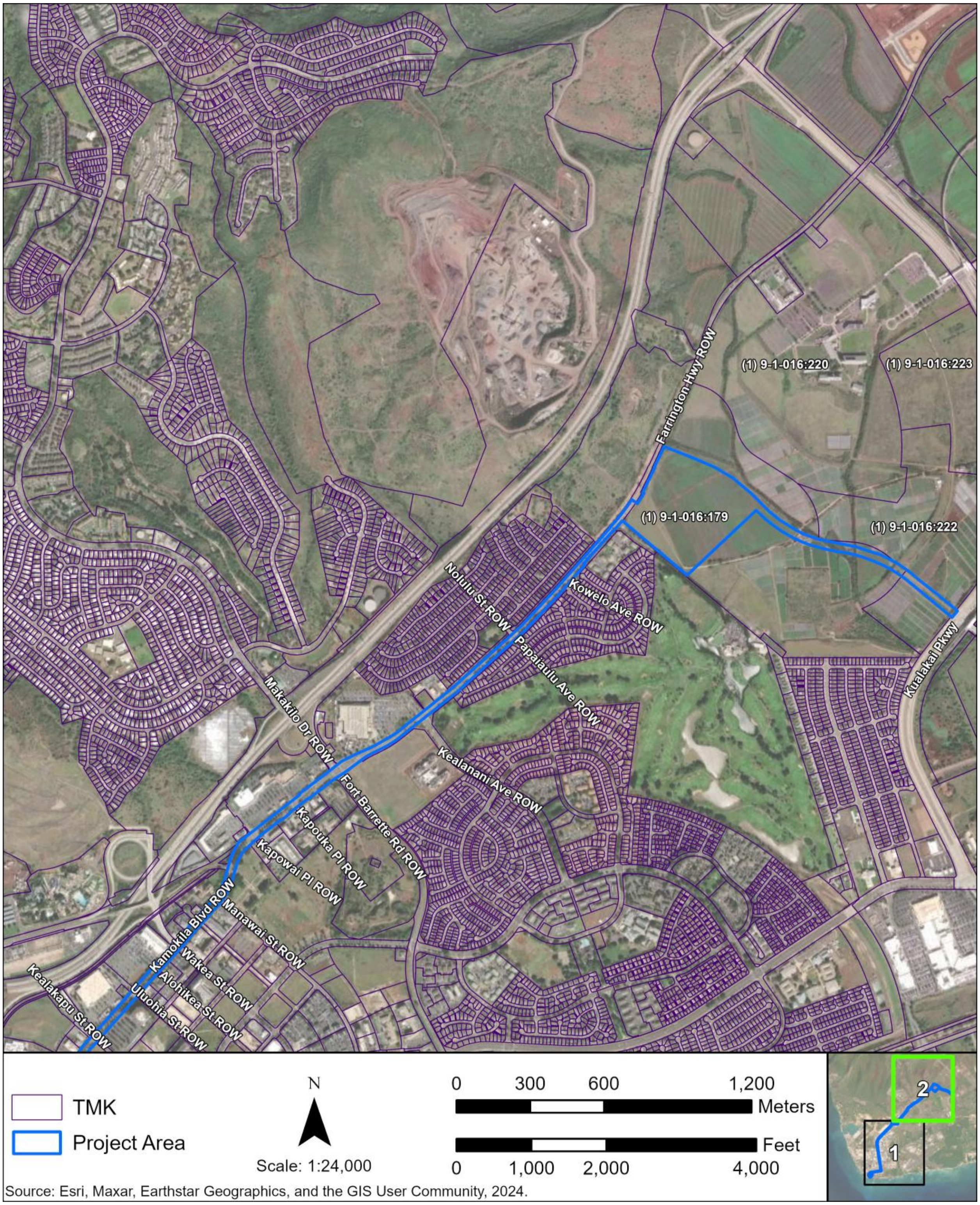


Figure 5. Location of the northeastern portion of the Oʻahu Subsea Cable Telecommunications Project Area with TMK boundaries (base map: Esri 2024).

1.2 STUDY AREA, BACKGROUND, AND ENVIRONMENT

In keeping with the OEQC's Guidelines for Assessing Cultural Impacts, and in consideration of the Hawai'i Supreme Court rulings on the aforementioned court cases, the study area for this CIA and Ka Pa'akai Analysis includes the entire *ahupua'a* (land division) of Honouliuli. This report includes descriptions of the environment, traditional accounts, and post-Contact records concerning the activities conducted throughout Honouliuli Ahupua'a, with particular attention given to the vicinity of the O'ahu Subsea Cable Telecommunications Project Area (see Figure 1).

The O'ahu Subsea Cable Telecommunications Project includes subsea fiber optic cable installation in state marine waters and state submerged lands, a cable landing site at Barbers Point Beach Park, and an underground conduit system to be installed in public road rights-of-way between the cable landing site and a telecommunication facility to be located at the University of Hawai'i – West O'ahu Campus. The overall purpose of the project is to provide affordable, reliable, and diverse internet connectivity between Hawai'i, the continental United States, other Pacific Islands, Australia, and Japan.

Onshore components of the project include a cable landing site at Barbers Point Beach Park where four beach manholes, three vaults, four ocean ground beds, and the onshore extent of six landing pipes would be installed. An underground conduit system for fiber optic and power cables would be constructed within public road rights-of-way between the cable landing site and the telecommunication facility. The marine portion of the project includes the offshore extent of six landing pipes that would be directionally drilled between the shoreline and an exit point on submerged lands, and three subsea fiber optic cables that would be installed in state marine waters seaward of the cable landing site. Subsea cables would be surface laid directly on the ocean floor without burial to the end of the landing pipe, and then pulled through the landing pipe to the beach manhole. No trenching or plowing would be involved with cable installation. Three subsea cables would be permitted and installed as part of the proposed project and up to three additional subsea cables would be installed by cable suppliers at a later date (Figure 6 and Figure 7).

Soils in the vicinity of the proposed location of the beach manholes at Barbers Point Beach Park consist of coral outcrop and beach sands (Figure 8). The coral outcrop is composed of Pleistocene limestone outcrop formed from coral reefs when sea levels were upwards of 7.5 m (24.6 ft) above current sea levels (Macdonald et al. 1983:420–421). Following a drop in sea level and uplifting of O'ahu Island, the exposed coral reef was eroded into a karst topography characterized by limestone pits and subsurface caverns (Ziegler 2002:96). The pits are typically "bell-shaped" in cross-section because of rainwater erosion that was more corrosive in the pit interiors due to a slower evaporation rate and mixing with ground water (Ziegler 2002:97).

As the fiber optic cable traverses *mauka* towards the proposed telecommunication facility, it will pass through a patchwork of soils that largely fall within the Ewa series, including Ewa silty clay loam and Ewa silty stony clay loam (Figure 8 through Figure 10). The proposed telecommunication facility lies within Ewa silty clay loam. According to Foote et al. (1972):

> This [Ewa] series consists of well-drained soils in basins and on alluvial fans on the islands of Maui and Oahu. These soils developed in alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from near sea level to 150 feet. The annual rainfall amounts to 10 to 30 inches. Most of it occurs between November and April.

> The mean annual soil temperature is 73° F. Ewa soils are geographically associated with Honouliuli, Mamala, Molokai, Pulehu, and Waiakoa soils.
>
> These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of fingergrass, kiawe, koa haole, klu, and uhaloa. (Foote et al. 1972:29)

Small portions of the project area along the cable line also pass through the Waialua silty clay series, Honouliuli clay, Kawaihapai stony clay loam, and Molokai silty clay loam.

Vegetation in the project area consists largely of non-native species. Previous work in the Barbers Point area has identified *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), sisal (*Agave sisalana*), *ʻopiuma* (*Pithecellobium dulce*), Chinese violet (*Asystasia gangetica*), Zulu giant (*Stapelia gigantea*), Guinea grass (*Megathyrsus maximus*), sourgrass (*Digitaria insularis*), and three native species, *ʻilima* (*Sida fallax*), hoary abutilon (*Abutilon incanum*), and *kaunaʻoa pehu* (*Cassytha filiformis*) (Tetra Tech 2020).

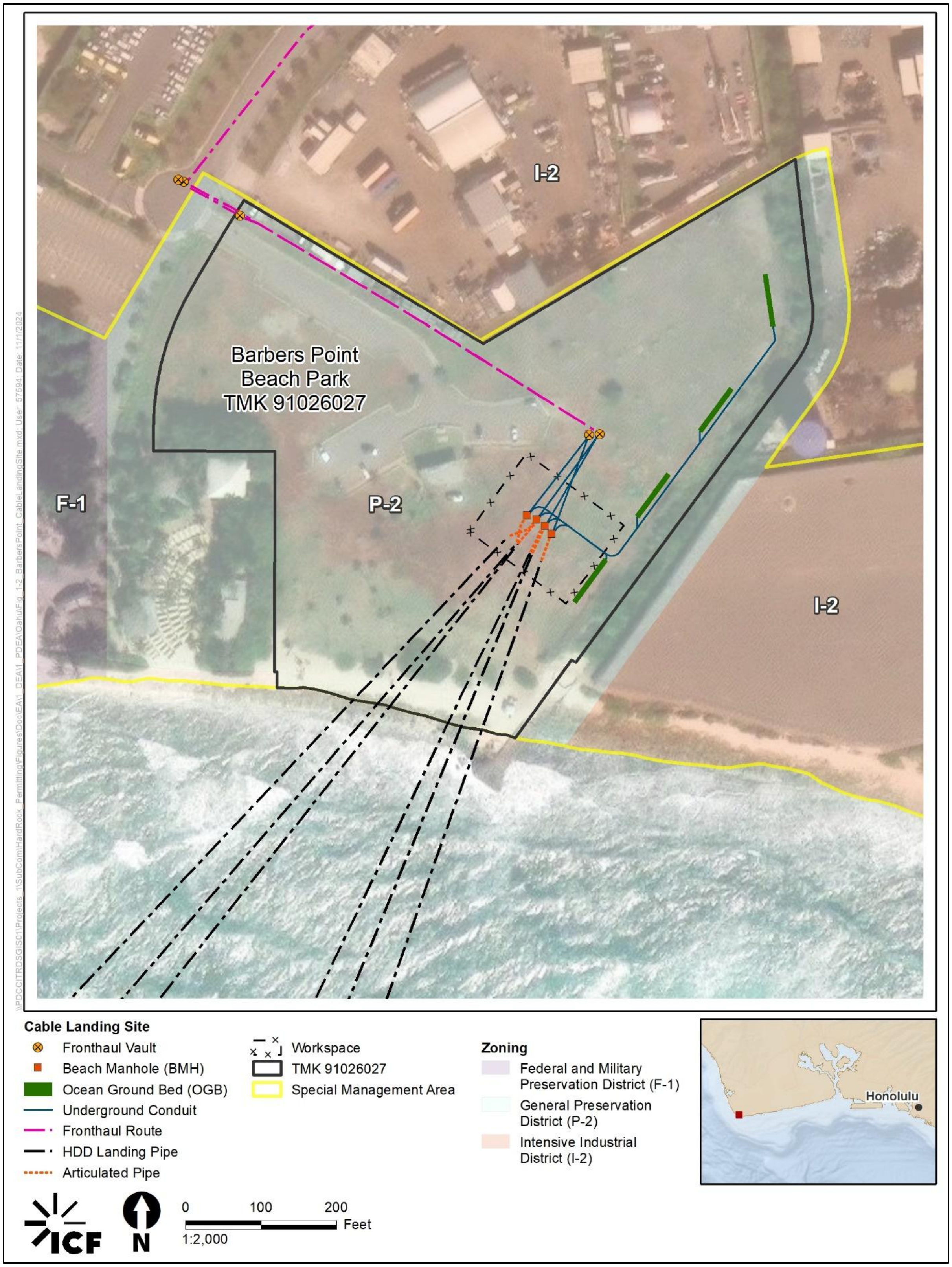


Figure 6. Site plans for the proposed Barbers Point Cable Landing Site for the Oʻahu Subsea Cable Telecommunications Project (courtesy of ICF International, 2024).

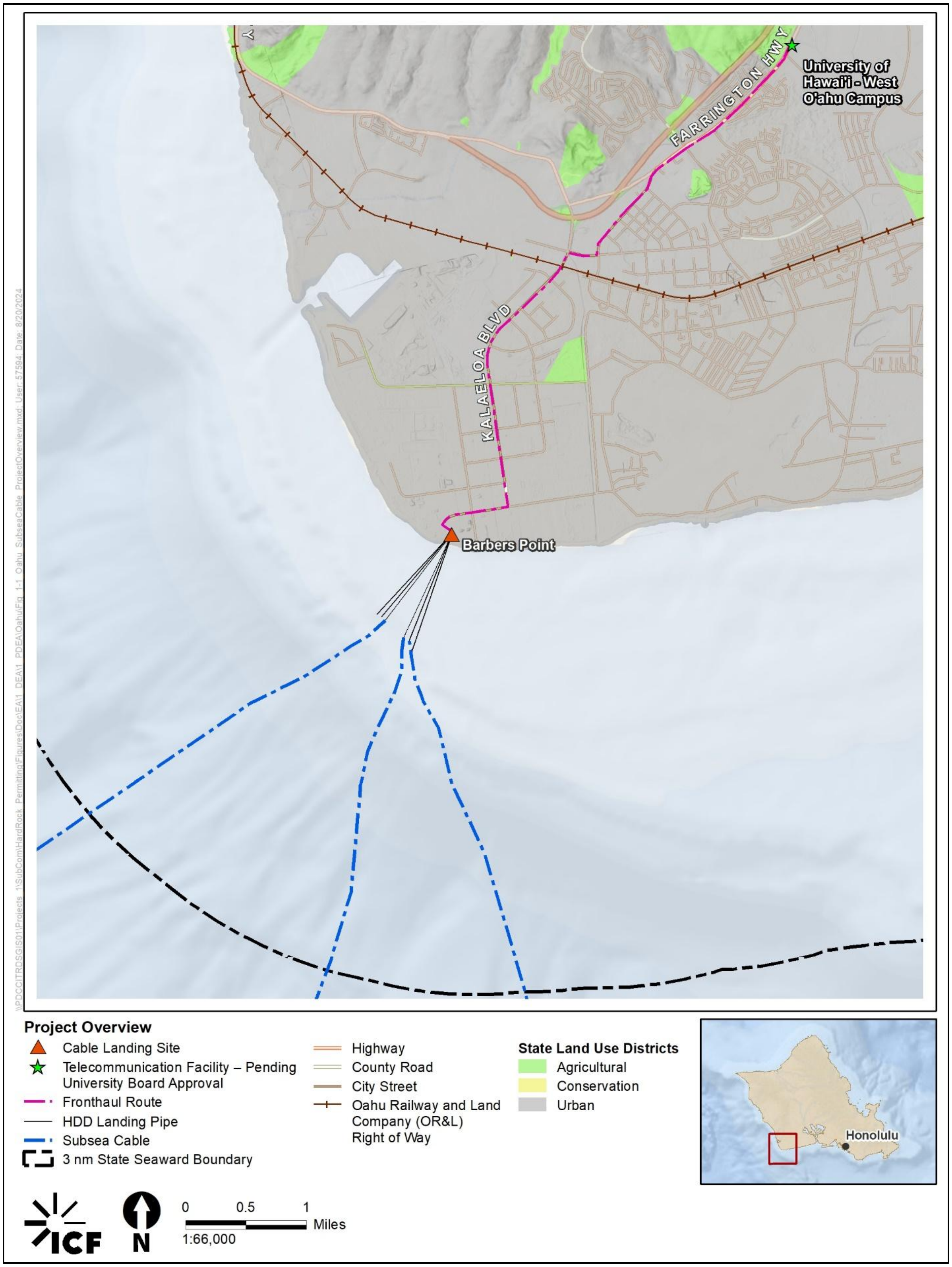


Figure 7. Site plans for the proposed Oʻahu Subsea Cable Telecommunications Project (courtesy of ICF International, 2024) (base map: Esri 2024).

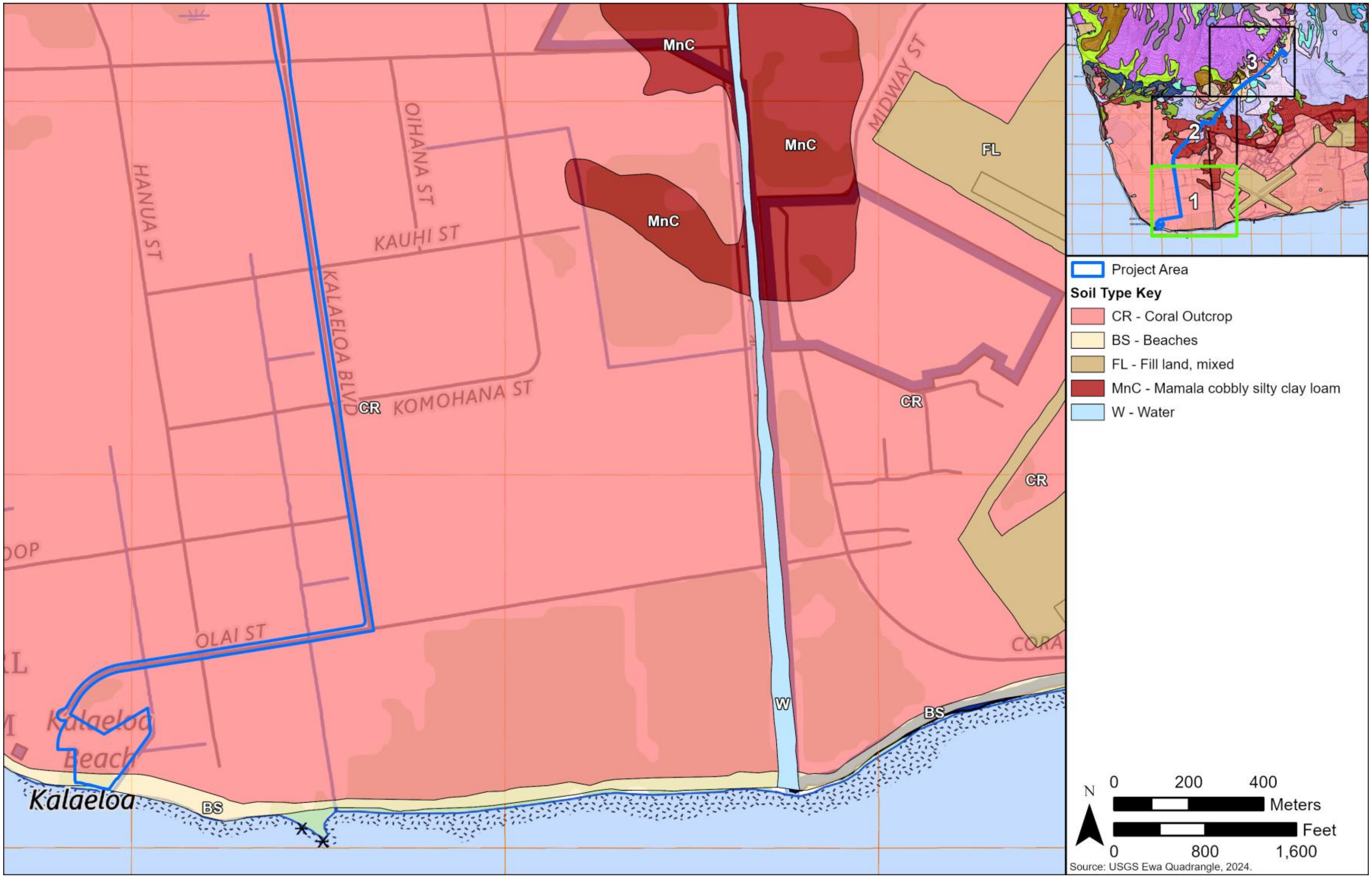


Figure 8. Map of soil types within the vicinity of the southwestern portion of the Oʻahu Subsea Cable Telecommunications Project Area (data from Soil Survey Staff, Natural Resources Conservation Service, USDA 2024).

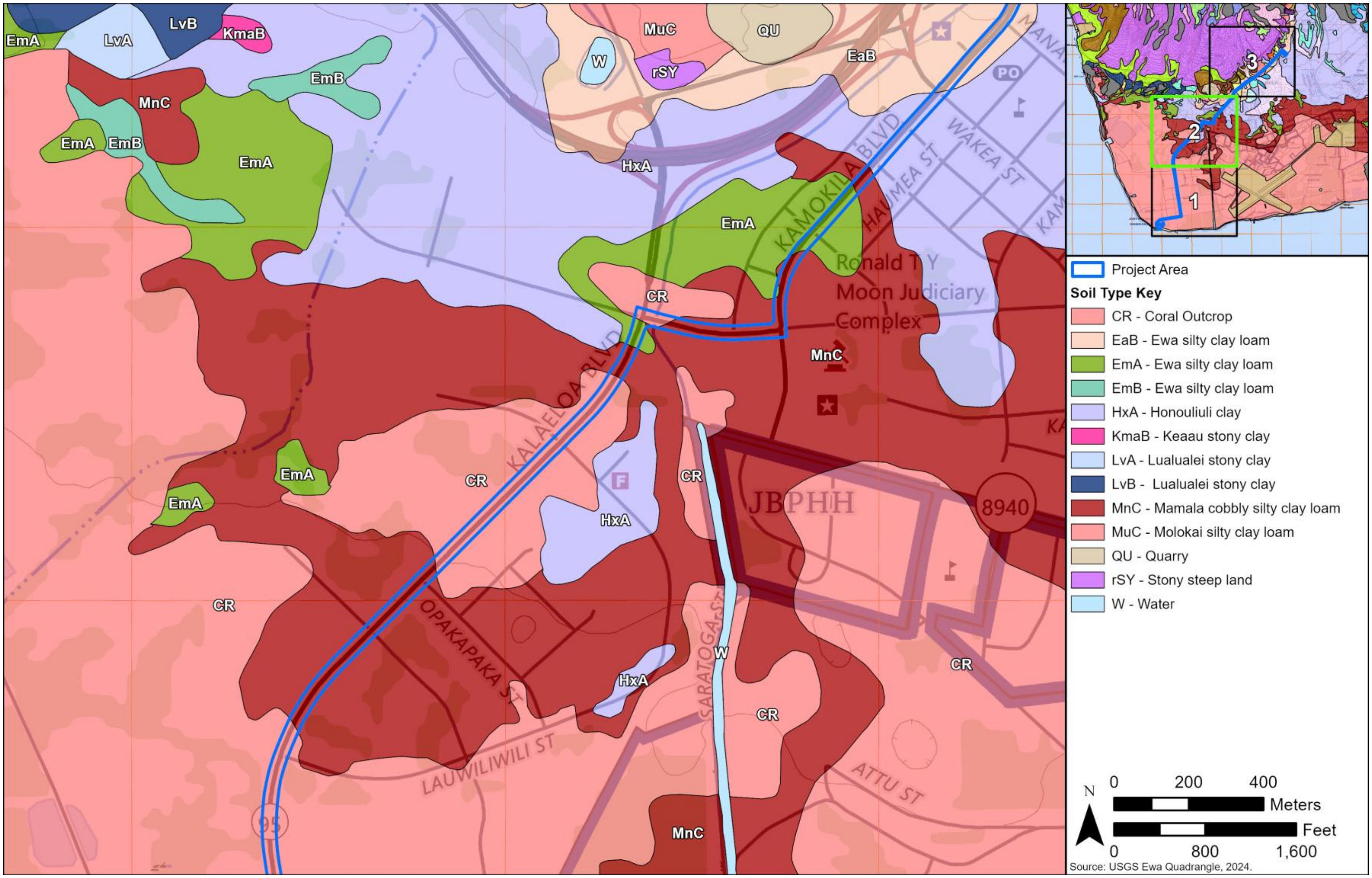


Figure 9. Map of soil types within the vicinity of the central portion of the Oʻahu Subsea Cable Telecommunications Project Area (data from Soil Survey Staff, Natural Resources Conservation Service, USDA 2024).

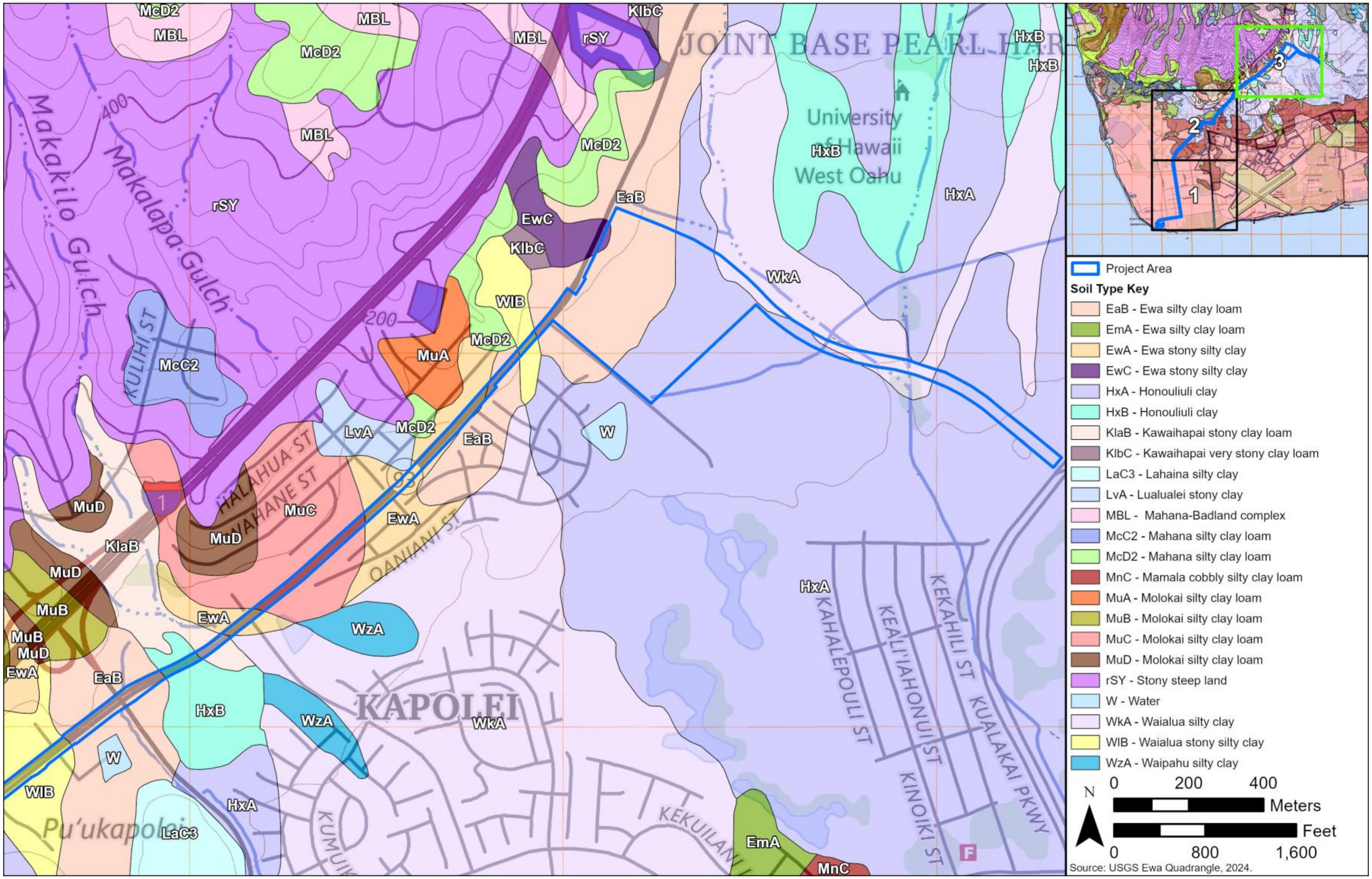


Figure 10. Map of soil types within the vicinity of the northeastern portion of the Oʻahu Subsea Cable Telecommunications Project Area (data from Soil Survey Staff, Natural Resources Conservation Service, USDA 2024).

2.0 METHODS

The methodology used in the preparation of this CIA and Ka Paʻakai Analysis followed the Office of Environmental Quality Control's (OEQC's) Guidelines for Assessing Cultural Impacts (OEQC 1997).

2.1 ARCHIVAL AND BACKGROUND RESEARCH

To compile historic background information for this CIA and Ka Paʻakai Analysis, Pacific Legacy, Inc. consulted previous archaeological studies made available through the Hawaiʻi State Historic Preservation Division (SHPD) Office, relevant cultural impact studies from the OEQC online library, and relevant historical and ethnographic sources housed in the Pacific Legacy library and found through online databases including the Office of Hawaiian Affairs (OHA) Papakilo and Kīpuka Databases (https://www.papakilodatabase.com/ and https://kipukadatabase.com/), the Hawaiian Electronic Library, Ulukau (https://ulukau.org/index.php?l=en), the Hawaiian Legends Index at the University of Hawaiʻi at Mānoa (https://manoa.hawaii.edu/hawaiiancollection/legends/), and the Digital Archives of Hawaiʻi (https://digitalarchives.hawaii.gov/).

2.2 CONSULTATION

Initial letters soliciting participation in the CIA and Ka Paʻakai Analysis for the proposed Oʻahu Subsea Cable Telecommunications Project were sent via email to individuals, cultural groups, and government agencies. Subsequent letters to additional potential consultation participants were mailed throughout the consultation phase as referrals were provided by some of the contacted agencies and individuals. A public notice was also published in the print and online editions of *Ka Wai Ola* for the month of January 2025. During the initial round of consultation, a total of 10 individuals responded to our invitation via email, and the majority either had no comment or no objections to the project. individuals shared additional information and insights into Honouliuli Ahupuaʻa. Section 4.0 includes a list of these recipients, their affiliation with the project area, and participation, if any, in the current CIA and Ka Paʻakai Analysis. Individuals who requested to have their name or other identifying information withheld are not listed. An additional round of consultation for this project is currently underway.

3.0 ARCHIVAL AND BACKGROUND RESEARCH

3.1 TRADITIONAL HISTORY

3.1.1 Traditional Boundaries

The division of the island of Oʻahu into political land divisions occurred in the fifteenth century under the rule of Māʻilikūkahi (Kamakau 1991:54–55). These divisions resulted in the creation of six districts, or *moku*: ʻEwa, Kona, Koʻolaupoko, Koʻolauloa, Waialua, and Waiʻanae. The proposed Oʻahu Subsea Cable Telecommunications Project is located in the *ahupuaʻa* (land division) of Honouliuli within the *moku* (district) of ʻEwa (Figure 10). Honouliuli is the largest *ahupuaʻa* on the island of Oʻahu (roughly 40,640 acres) and it includes a portion of the ʻEwa Plain. The project area includes cable manholes at the shoreline of Barbers Point Beach Park, and travels along Farrington Highway towards the UHWO campus, forming a long corridor across central Honouliuli.

ʻEwa is translated as "crooked", or without an ʻokina, means "unstable or wandering" (Pukui et al. 1974:28; Pukui and Elbert 1992:17, respectively). Sterling and Summers noted that ʻEwa may originate from a *moʻolelo* (oral tradition) about two gods, Kāne and Kanaloa and how their methods for determining ʻEwa's boundaries resulted from a thrown stone that could not be relocated and hence named for the rock being "strayed" (Sterling and Summers 1978:1). The traditional name for Barbers Point is Kalaeloa, translated as "the long point" (Pukui et al. 1974:72). Honouliuli is translated as "dark bay" (Pukui et al. 1974:51). An explanation of the name Honouliuli is provided by Westervelt (1915), who attributes the name of this land to an Oʻahu chief who had the same name.

3.1.2 Significant Place Names

The traditional Hawaiian place names given to significant places carry meaning, and can convey much about the history of a place, its physical characteristics, the qualities of the people who resided there, and other culturally significant information. In the preface to *Place Names of Hawaii* (Pukui et al. 1974), Samuel Elbert writes:

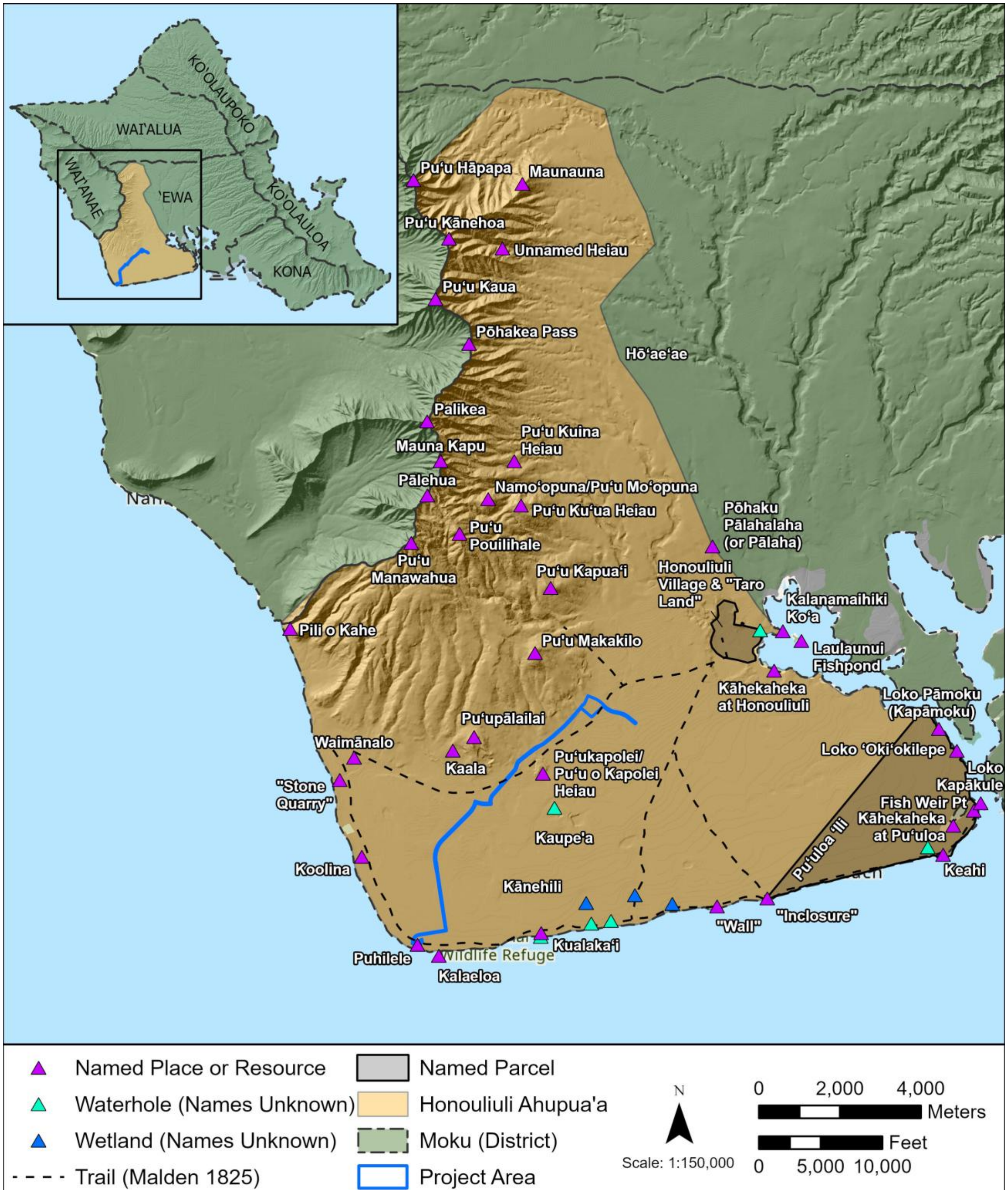
> Hawaiians named taro patches, rocks and trees that represented deities and ancestors, sites of houses and *heiau* (places of worship), canoe landings, fishing stations in the sea, resting places in the forests, and the tiniest spots where miraculous or interesting events are believed to have taken place. (Pukui et al. 1974:x)

A selection of place names associated with Honouliuli Ahupuaʻa are included in Table 1, and have been identified through Boundary Commission Testimonies, historic maps, Wahl (2021), and information received from consultation participants (Figure 11). Literal translations of place names have been added to Table 1 when they could be found in existing literature (e.g., Pukui and Elbert 1986; Pukui et al. 1974).

Table 1. Place Names within Honouliuli Ahupuaʻa and their Associated Meanings

Place Name	Meaning	Source
Fish Weir Pt.	Named place	Malden 1825
Honouliuli	"Dark bay"; village	Malden 1825
Kaala	Gulch and mountain	Malden 1825
Kāhekaheka at Honouliuli	Salt pans near *loʻi kalo*	Uyeoka et al. 2018; Wahl 2021
Kāhekaheka at Puʻuloa	Salt pans at Keahi	Uyeoka et al. 2018; Wahl 2021
Ka Leina a ka ʻUhane	Leaping places of the spirit	Maly and Maly 2012
Kalaeloa	"The long point"	Jackson 1884
Kalanamaihiki Koʻa	Fishing shrine	Uyeoka et al. 2018; Wahl 2021
Kānehili	Kula, plain	Maly and Maly 2012
Kaupeʻa	"Crisscross, interwoven"; plain	Pukui and Elbert 1986
Keahi	"The fire"; point	Monsarrat 1881
Koʻolina	Named place	Malden 1825
Kualakaʻi	"Tethys (a sea creature)"; area near Barbers Point	Monsarrat 1881
Laulaunui Fishpond	"Large leaf package"; Kuapā-type fishpond	Uyeoka et al. 2018; Wahl 2021
Loko Kapākule	"Akule fish enclosure"; ʻUme Iki type fishpond/fish trap	Uyeoka et al. 2018; Wahl 2021
Loko ʻOkiʻokilepe	Kuapā-type fishpond	Uyeoka et al. 2018; Wahl 2021
Loko Pāmoku	Kuapā-type fishpond	Uyeoka et al. 2018; Wahl 2021
Mauna Kapu	"Sacred mountain"	Uyeoka et al. 2018; Wahl 2021
Maunauna	"Mountain sent [on errands]"; hill	Uyeoka et al. 2018; Wahl 2021
Pālehua	"Lehua flower enclosure"; hill	Uyeoka et al. 2018; Wahl 2021
Palikea	"White cliff"; ridgeline	Uyeoka et al. 2018; Wahl 2021
Pili o Kahe	"Cling to Kahe"; two small hills at the boundary of ʻEwa and Waiʻanae	Uyeoka et al. 2018; Wahl 2021
Pōhakea Pass	Mountain pass	Uyeoka et al. 2018; Wahl 2021
Pōhaku Pālahalaha	Boundary marker	Uyeoka et al. 2018; Wahl 2021
Puhilele	Leaping eel	Jackson 1884
Puʻu Hāpapa	Hill on ridgeline dividing ʻEwa and Waiʻanae	Uyeoka et al. 2018; Wahl 2021
Puʻu Kānehoa	Hill on ridgeline dividing ʻEwa and Waiʻanae	Uyeoka et al. 2018; Wahl 2021
Puʻu Kapuaʻi	"Footprint hill"	Uyeoka et al. 2018; Wahl 2021
Puʻu Kauʻa	"War hill" or "fort hill"	Uyeoka et al. 2018; Wahl 2021

Place Name	Meaning	Source
Puʻu Kuina Heiau	Heiau	Uyeoka et al. 2018; Wahl 2021
Puʻu Kuʻua Heiau	"Relinquished hill"; heiau. Exact location unknown.	Uyeoka et al. 2018; Wahl 2021
Puʻu Makakilo	"Observing eyes hill"	Uyeoka et al. 2018; Wahl 2021
Puʻu Manawahua	"Great grief hill" or "nausea hill"; divides ʻEwa and Waiʻanae	Uyeoka et al. 2018; Wahl 2021
Puʻu Moʻopuna	"Grandchild hill"	Uyeoka et al. 2018; Wahl 2021
Puʻu Pouilihale	"Dark house hill"	Uyeoka et al. 2018; Wahl 2021
Puʻukapolei	Hill named for Kapo	Monsarrat 1881
Puʻuloa	"Long hill"; *ʻili*	Pukui et al. 1974
Puʻupālailai	Young *lai* fish hill	Monsarrat 1881
Waimānalo	"Potable water"; land division, road, and gulch	Monsarrat 1881



Source: USGS Topographic Map, Malden (1825), Monsarrat (1881), Alexander (1875), Monsarrat (1878), Jackson (1884), War Department (1913), USGS (1927-1928), Sterling and Summers (1978), Uyeoka et al. (2018), Wahl (2021).

Figure 11. Map of significant place names and *wahi pana* (storied places) in Honouliuli Ahupuaʻa.

Tuggle and Tomonari-Tuggle (1997:22) identified a place called “**Honouliuli Village**” located on the northwest side of Puʻuloa Harbor where the Honouliuli Stream enters the bay. This area of stream-irrigated lowlands also contained the main cluster of *kuleana* lands identified in mid-nineteenth-century Māhele records and was referred to as “Taro Lands” on an early nineteenth-century map (Malden 1825).

Kānehili is described as “an open *kula* land, noted in tradition for its association with Kaupeʻa, and as a place of wandering spirits. It was considered an inhospitable zone that was referenced in the tradition of Hiʻiaka-i-ka-poli-o-Pele and in historical narratives (Maly and Maly 2014:16).

Kaupeʻa is translated as “crisscross,” “interwoven” (Pukui and Elbert 1986) or the “Bat’s Perch” (*peʻa* translated as bat) in relation to the Southern Cross constellation or Hanaiakamalama (as defined in Polynesian Voyaging Society, Hōkūleʻa) with its upside-down cross (Kane 2011). Used as a significant navigational tool, Kane believes the Southern Cross constellation, with only a lone star that was visible from the ʻEwa Plain, marked the geographic area of Kaupeʻa and pointed to Kahiki:

> As it rises, it is an indication that one is moving into the southern latitudes. As it descends it is an indication that that one is moving toward the northern latitudes. Thus, to our ancestors or the Poe Kahiko, Kaupeʻa pointed to the lone star and the way home to Kahiki. (Kane 2011:3)

Together the plains of Honouliuli, traditionally referred to as **Kānehili** and **Kaupeʻa**, refer to an area known as a wandering place of the spirits of the dead, or realm of *ao kuewa* or *ao ʻauwana* (Maly and Maly 2012:18). Described as an uninhabited plain with *wiliwili* (*Erythrina sandwichensis*) and *ʻōhai* (*Sesbania tomentosa*), Kaupeʻa was affiliated with the place name Kānehili and Leiolono (a *leina* in Moanalua) and from Kaupeʻa, “one may see Leiolono where unclaimed spirits are lost on never ending darkness” (Maly and Maly 2012:24).

Ka leina a ka ʻuhane (leaping places of the spirit) is a place where wandering spirits, if guided by relatives or *ʻaumakua*, passed into the *ao ʻaumakua*—a realm believed to be “a good place that one day we all want to get to and restore those acquaintances with our ancestors” (Kane 2011:3). If a wandering soul is unguided or unworthy of entering the *ao ʻaumakua*, their soul would perish in the *po pau ʻole o Milu* (Kamakau 2000:48).

S.M. Kamakau in *Ka Poʻe Kahiko* provides the following description of *ka leina a ka ʻuhane* near Kaʻena:

> The *leina a ka ʻuhane* on Oahu was close to the cape of Kaʻena, on its right (or north, *ʻakau*) side, as it turns toward Waialua, and near the cutoff (*alanui ʻoki*) that goes down to Keaokuʻukuʻu. The boundaries of this *leina a ka ʻuhane*, it is said, were Kahoʻihoʻina-Wakea, a little below Kakaheʻe, and the leaping place (kawa-kai) of Kilauea at Keawaʻula. (Kamakau 2000:48)

Others believe a *leina a ka ʻuhane* or “Leilono” is located in Moanalua along the inland side of Āliamanu, east of a rock named Kapukakī and directly in line with a burial mound at Āliamanu (Maly and Maly 2012:16). Some of the wandering souls “passed this leaping place, went on to the care of their *ʻaumakua*; others, who had no one to help them, drifted down to Kaupeʻa, Kamaʻomaʻo, and Kānehili [the plains around Puʻu o Kapolei], where they would wander aimlessly in hope that someone would direct them to the spirit world” (Maly and Maly 2012:16).

The boundaries of this *leina a ka ʻuhane* are yet to be determined and are not shown on Figure 11. However, given its association with Kaupeʻa, Kamaʻomaʻo, and Kānehili, much of the ʻEwa Plain might be considered within the realm of this *leina a ka ʻuhane*. The place name Kamaʻomaʻo is also noted by Maly and Maly (2014:18) as an area of *kula* lands within view of Puʻu o Kapolei and associated with Kaupeʻa.

Sterling and Summers (1978) refer to **Koʻolina** as "a lovely and delightful place" (Sterling and Summers 1978:41), home to the chief Kākuhihewa, and cared for by the priest Napuaikamao. Pukui et al. (1976) also refers to **Waimānalo**, located north of Koʻolina, as the home of Kākuhihewa.

Keahi is a prominent point on the southeast coast of the ʻEwa Plain near the entrance to Puʻuloa (Pearl Harbor). This place name is referenced in Sterling and Summers (1978:44) as a prime fishing ground for *ʻōʻio* (*Albula vulpes*) that was "esteemed as one of the best for eating raw" and that had a distinctive smell reminiscent of *lipoa* seaweed. When the fish were caught, they were brought to market, "All the market man had to say was 'These are from Keahi' and his supply would vanish in a short time" (Sterling and Summers 1978:44). According to Pukui et al. (1974), Keahi was also a surfing site. Wahl's (2021) map of *wahi pana* located *kāhekaheka* (salt pans) at Keahi Point.

Kualakaʻi, located on the south coast of the ʻEwa Plain, is translated by Pukui et al. (1974) to mean literally, "Tethys (a sea creature)." The place is associated with a spring called Hoakalei, which means lei reflection, "because Hiʻiaka picked lehua flowers here to make a lei and saw her reflection in the water" (Pukui et al 1974: 119).

Puhilele translates literally to "leaping eel" (Pukui et al. 1974:192). It is the location of the Barbers Point Lighthouse.

Puʻukapolei, also referred to as Puu-o-kapolei or Puʻu o Kapolei, is named for a *puʻu* or hill on the northern edge of the ʻEwa Plain. Kapolei means "beloved Kapo" (a sister of Pele) and the pig-man demigod Kamapuaʻa established his grandmother here as queen after conquering much of Oʻahu (Sterling and Summers 1978:33).

Puʻuloa translated as "long hill" refers to an *ʻili* on the southeastern corner of the ʻEwa Plain (Pukui et al. 1974:201; Sterling and Summers 1978:46) and was also the Hawaiian name for the multiple harbors of Pearl Harbor ("ke-awa-lau-o-Puʻuloa") that were formed from "drowned seaward valleys of ʻEwa's main streams" (Handy et al. 1972:469). It was said that breadfruit was brought to Puʻuloa from Sāmoa (Pukui et al 1974:201).

Puʻupālailai, located at the foot of the Waianae Mountains and north of Puʻu o Kapolei, is translated literally as "young *lai* fish hill" (Pukui 1974:205). Puʻupālailai is cited in *mele* recorded in the tradition of Hiʻiaka-i-ka-poli-o-Pele (Maly and Maly 2014:20).

3.1.3 Moʻolelo

Many of the oral historical accounts of Honouliuli that have been translated into English focus on its eastern periphery in the area surrounding West Loch, as this was generally known to be the political and cultural center of Honouliuli Ahupuaʻa. However, a small number of accounts also pertain to central inland Honouliuli. Some of these accounts are related here. The reader is also referred to Maly (2022) for a detailed account of significant place names and *moʻolelo* (oral history) of Honouliuli Ahupuaʻa.

Hiʻiakaikapoliopele

Excerpts from two English translations of the famous *moʻolelo* of Hiʻiakaikapoliopele make reference to significant place names and characteristics of Honouliuli. Nogelmeier (2006) published a landmark two-volume set including an English translation of *Ka Moʻolelo o Hiʻiakaikapoliopele* ("The Epic Tale of Hiʻiakaikapoliopele: Woman of the Sunrise, Lighting-Skirted Beauty of Halemaʻumaʻu"), originally written by Hoʻoulumāhiehie and published in *Ka Naʻi Aupuni* from 1905 to 1906. The translation provided by Maly (2022) derives from *He Moʻolelo Kaʻao no Hiʻiaka-i-ka-poli-o-pele*, or "A Hawaiian Tradition of Hiʻiaka who is Held in the Bosom of Pele," which was published in *Ka Hoku o Hawaii* from 1924 through 1928. In the epic tale, Hiʻiaka travels across the lands of Honouliuli, and a number of significant places, people, and resources are referenced.

When Hiʻiaka reached the plains of Honouliuli, she found Puʻuokapolei and Nāwāhineokamaʻomaʻo relaxing under the shade of *ʻōhai* (*Sesbania tomentosa*). She called out a greeting chant to them, so they would not say to each other later that Hiʻiaka had failed to acknowledge them:

> Greetings to you, O Puʻuokapolei
> O Nāwāhineokamaʻomaʻo
> Sitting there, where you dwell
> In the shade of the ʻōhai
> Stringing kukui blossom garlands in the sun
> Wearing lei of the maʻomaʻo flower
> Lei of bright kaunoʻa upon the strand of Koʻolina
> Such a festive way, all about.
> (Nogelmeier 2006:270)

However, Puʻuokapolei warned Hiʻiaka not to stay long with them, as they did not have any vegetables or meat to share, nor *kapa* (barkcloth) for clothing or covers. Their only *kapa* was the red *pilipili* grass, which they would weave together and wear until it dried out. Noting the heat of the Honouliuli plains surrounding the hill of Puʻuokapolei, Hiʻiaka chanted:

> Kona is dazed by the powerful Makaliʻi-season sun
> The wiliwili trees sway, moving in the calm
> Long suffering are the grasses of Kānehili
> The sun is oppressively hot at Puʻuokapolei
> The maʻo is stunted, standing at the shore
> The blossom of the nohu is like a yellow halakea kapa
> Flashing, blooming bright in the strands of Kaupeʻa
> As a companion
> Befriending the wind, a gusting Nāulu
> A companion indeed.
> (Nogelmeier 2006:271)

She offered another chant as she traveled from the uplands of Honouliuli towards the sea:

> My dear man of the branching lochs of Puʻuloa
> From the plains of Peʻekāua to dwell
> Let us stay where the ʻōhai grows
> Amid the wiliwili trees and the blossoms of abundant noni
> On the descent to Kānehili
> I have strayed, ah.
> (Nogelmeier 2006:271)

Hiʻiaka traveled through the plain of Kaupeʻa and arrived at a cool spring at Kualakai called Hoakalei, which lies on the shore to the east of the project area. When she looked into the pool, she saw two *lehua* trees in bloom on either side of the pool, and strung four *lei* from its blossoms. After this, she heard her sister Kapo chant a *mele* about her actions:

> Hiʻiaka, the woman
> Plucks the blossoms of Hoakalei
> Stringing them, piercing with the needle
> Fourfold are the lei, the lehua garlands of the woman
> My little sister
> Little sister from the gusty winds of to the lee
> Rushing along to the sea of Hilo One
> For Hilo is the affection
> Beloved indeed is the lei.
> (Nogelmeier 2006:272)

According to Nogelmeier, Hilo One is an Oʻahu name for "a spot on the western side of Kualakai, adjoining Kalaeloa" (Nogelmeier 2006:272). As Hiʻiaka continued her journey towards Puʻuloa, she chanted again about the vast plain of Kaupeʻa:

> I shall not tread Kaupeʻa's expanse
> That stretch where the sun beats down on the plain
> The sun is right overhead, at the navel of Wākea
> I am spared by the Māunuunu wind
> By the uplifting ʻAoʻaoa breeze
> Urging the Nāulu storm clouds to pour down their waters
> The natives here survive on water from the clouds
> Which billowing clouds carry along to the branching lochs
> Compelling Hiʻiaka to trudge that open stretch
> Duty making rest forbidden there
> There I heard the happy trill of the ʻōʻō bird on the plain
> Befriending the sea of Wāwaemoku
> My heart grieves, thrashed by harm
> I may be harmed by this person upon arrival
> Leaving the birds to feed expansively
> On the blossoms of the wiliwili trees…
> (Nogelmeier 2006:275)

A later chant also makes reference to the *ʻōhai* and *wiliwili*, as well as the "blossoms of Kaiona's noni groves at Kānehili" (Nogelmeier 2006:280). Maly (2022) observed that the tale makes reference to Pālailai and Kaʻala, both of which are located in the uplands and to the west of the project area:

> …Turning her gaze towards the island of Hawaii, she could see the flames of Pele in the lehua forest of Hopoe, and she chanted out—
>
> Beautiful is Palailai, sacred assembly of the woman,
> I set up the drum of the sacred voice,
> The voice of the ocean is what I hear,
> The natives hear it
> [The stormy ocean of Waialua, could reportedly be heard in Ewa],
> The birds drink the water caught in the noni leaves,
> The billowy clouds pass in the calm,

> The fires of Hawaii rise above me…
> (Maly 2022:7)

Of Kaala:

> Seeing the beauty of Kaala, Hiiaka chanted:
>
> Beloved is the dew of Kaala,
> That dew which bears the fragrance of the nene grasses,
> [fragrant dew which] Kissed the natives of Puuloa,
> One searches far for love…
> (Maly 2022:5)

Puʻu o Kapolei

Puʻu o Kapolei translates to "hill of the beloved Kapo," and refers to an elder sister of the Goddess Pele (Pukui et al. 1974:89; Nogelmeier 2006). Sterling and Summers (1978) noted that Puʻu o Kapolei was "one of the most famous hills in the olden days" (Sterling and Summers 1978:33), and a major point of reference for travelers going east or west through Honouliuli. McAllister (1933) observed that the old government road passed behind Puʻu o Kapolei, and the area was covered in sugarcane by the late 1890s (McAllister 1933:108). ʻĪʻī also referenced this trail as one of the three routes to Waiʻanae: "As mentioned before, there were three trails to Waianae, one by way of Puu o Kapolei, another by way of Pohakea, and the third by way of Kolekole" (ʻĪʻī 1959:97).

Puʻu o Kapolei was also a landmark used to mark the changing of the seasons on Oʻahu:

> When the sun reached the equator and (began to) move northward, it set right over (the islet of) Kaʻula and it moved on and set over Kawaihoa; and the Makaliʻi season when the sun set (kau) from Kaʻula to Kawaihoa was called Kau, and the Kau season was also called after the resting place of Kane (Kau-lana-a-Kane). When it set (again) at Kaʻula and turned south the season was called Hoʻoilo. In the same way the people of Oahu reckoned from the time when the sun set over Puʻuokapolei until it set in the hollow of Mahinaona and called this period Kau, and when it moved south again from Puʻuokapolei and it grew cold and the time came when young sprouts started, the season was called from their germination (oilo) the season of Hoʻoilo. There were therefore two seasons, the season of Makaliʻi and the season of Hoʻoilo. (Kamakau as quoted by Sterling and Summers 1978:34)

Kamaunuaniho, the grandmother of Kamapuaʻa, is said to have had a house on Puʻu o Kapolei. However, the area around this house may have been disturbed or dismantled during post-Contact sugarcane and sisal planting.

A story of Kamaunuaniho told by Emma Nakuina is recounted in Sterling and Summers (1978):

> Kamapuaa subsequently conquered most of the island of Oahu, and, installing his grandmother as queen, took her to Puuokapolei, the lesser of the two hillocks forming the southeastern spur of the Waianae mountain range, and made her establish court there. This was to compel the people who were to pay tribute to bring all the necessities of life from a distance, to show his absolute power over all.

> Puuokapolei is some little distance from Sisal, towards Waianae, and is as desolate a spot as could be picked out on the whole island. It is almost equally distant from the sea, from which came the fish supplies; from the taro and potato patches of Ewa, and from the mountain ravines containing the banana and sugarcane plantations.
>
> A very short time ago the foundations of Kamaunuaniho's house could still be seen at Puuokapolei; also the remains of the stone wall surrounding her home. It has even been said that her grave could then be identified, but since the extension of cane and sisal planting to the base of Puukapolei, it is possible that the stones may have been removed for wall-making. (Nakuina as quoted by Sterling and Summers 1978: 34)

McAllister (1933) observed a large rock shelter on the side of Puʻu o Kapolei which was rumored to be this dwelling place of Kamapuaʻa and Kamaunuaniho. He also documented the Puʻu o Kapolei Heiau (Site 138) in the same vicinity (McAllister 1933:108). Puʻu o Kapolei has been nominated as a traditional cultural property (Monahan 2020).

The "Eyes" of Oʻahu

The subsurface cable terminus is at the UHWO campus near the southeastern end of Puʻu Makakilo, which translates to "observing eyes hill" (Pukui et al. 1974:201). A manuscript housed in the T. Kelsey Collection at Bishop Museum (Kelsey, *Hawaiian Ethnological Notes Vol. 1*, unpublished ms, p. 820) notes that the area referred to as Makakilo or Makakilo City was once called Hanalei, and was described as "a small flat land with a little gulch on either side on the right of Puuloa mauka of Puu-o-Kapolei" (as cited in Sterling and Summers 1978:34).

A *moʻolelo* related by Analu Kameeiamoku Josephides, which was passed down to him by his *kūpuna*, tells of the five brothers who protected and cared for the island, and were known as the "Eyes" of Oʻahu:

> A story that has been passed down to me from my kupuna is that there were five brothers who were the watchers. Their names were Makaiwa, Makaʻike, Makaloa, Maka-Io, and Makakilo. It was known that Makaiwa was to the farthest west and that Makakilo was to the farthest east. That these five brothers were the eyes of the O'ahu people and were their protectors. They would watch for enemy intruders and relay messages to their makulu (runners). If enemy canoes were seen the makulu would run to the various districts and warn the chief and his/her people. This is why Oʻahu was a hard island to conquer in the ancient times. By the time the war canoes of the enemies would reach the shores they would be greeted by the warriors of Oʻahu, thus the enemies were never allowed to land upon the shores of Oʻahu. (Analu Kameeiamoku Josephides as quoted in Souza et al. 2008:73)

Josephides also shared that no homes were built in these *mauka* areas, "except for the *mauka* area of Makaīwa to the west, the *mauka* area to the east known as Makakilo, and the *makai* area below where in ancient time was the dwelling place of the Kamapuaʻa *ʻohana*" (Souza et al. 2008:51), as the rest of this area was on the path of the night marchers. Josephides was told by his *tutu* (grandmother) that the night marchers would destroy anything and everything in their way, and so any *hale* (house) built on the path of the night marchers would be burned to the ground.

3.1.4 ʻŌlelo Noʻeau

Hawaiian proverbs, or *ʻōlelo noʻeau*, have been passed down through oral traditions. Many *ʻōlelo noʻeau* have been collected and published in Hawaiian-language newspapers and other primary and secondary sources. The *ʻōlelo noʻeau* presented below were compiled by Mary Kawena Pukui in the book entitled *ʻŌlelo Noʻeau Hawaiian Proverbs and Poetical Sayings* (Pukui 1983). These *ʻōlelo noʻeau* often have both a literal and metaphorical meaning (called *kaona*). *ʻŌlelo noʻeau* about geographical features and areas can help us to understand natural phenomenon, land use, and the history of a place. A selection of *ʻōlelo noʻeau* pertinent to the project area and its surroundings are compiled here, along with their translations and interpretations from Pukui (1983).

One *ʻōlelo noʻeau* references the *ʻanaeholo* fish that populated Honouliuli:

> 1330. *Ka iʻa hali a ka makani*.
> The fish fetched by the wind.
>
> The ʻanaeholo, a fish that travels from Honouliuli, where it breeds, to Kaiapāpaʻu on the windward side of Oʻahu. It then turns about and returns to its original home. It is driven closer to shore when the wind is strong.

Many more *ʻōlelo noʻeau* reference ʻEwa Moku more broadly, but still likely have relevance to Honouliuli. Some mention the area's characteristic red earth:

> 80. *ʻĀina koi ʻula i ka lepo*.
> Land reddened by the rising dust.
>
> Said of ʻEwa, Oʻahu.
>
> 2357. *O ʻEwa, ʻāina kai ʻula i ka lepo*.
> ʻEwa, land of the sea reddened by earth.
>
> ʻEwa was once noted for being dusty, and its sea was reddened by mud in time of rain.

Others speak to political organization in ʻEwa:

> 1855. *Ku aʻe ʻEwa; Noho iho ʻEwa*.
> Stand-up ʻEwa; Sit-down ʻEwa.
>
> The names of two stones, now destroyed, that once marked the boundary between the chiefs' land (Kuaʻe ʻEwa) and that of the commoners (Noho iho ʻEwa) in ʻEwa, Oʻahu.
>
> 386. ʻEwa nui a Laʻakona.
> Great ʻEwa of Laʻakona.
>
> Laʻakona was a chief of ʻEwa, which was prosperous in his day.

Most of the *ʻōlelo noʻeau* concerning ʻEwa make reference to the kinds of resources in the area. This includes the beloved Kāī O ʻEwa varieties of *kalo* (taro, *Colocasia esculenta*), the abundance of *nehu* (Hawaiian anchovy; *Encrasicholina purpurea*) in Pearl Harbor, and practices associated with gathering *pipi* (Hawaiian pearl oyster; *Pinctada radiata*):

2770. *Ua ʻai ke kāī-koi o ʻEwa*
He has eaten the kāī-koi taro of ʻEwa.

Kāī is Oʻahu's best eating taro; one who has eaten it will always like it. Said of a youth or a maiden of ʻEwa, who, like the *kāī* taro, is not easily forgotten.

661. *He kai puhi nehu, puhi lala ke kai o ʻEwa*.
A sea that blows up *nehu* fish, blows up a quantity of them, is the sea of ʻEwa.

1721. *Ke kai heʻe nehu o ʻEwa*.
The sea where the *nehu* come in schools to ʻEwa.

Nehu (anchovy) come by the millions into Pearl Harbor. They are used as bait for fishing, or eaten dried or fresh.

123. *Anu o ʻEwa i ka iʻa hāmau leo e. E hāmau!*
ʻEwa is made cold by the fish that silences the voice. Hush!

A warning to keep still. First uttered by Hiʻiaka to her friend Wahineʻomaʻo to warn her not to speak to Lohiʻau while they were in a canoe near ʻEwa.

493. *Haunāele ʻEwa i ka Moaʻe*
ʻEwa is disturbed by the Moaʻe wind.

Used about something disturbing, like a violent argument. When the people of ʻEwa went to gather the *pipi* (pearl oyster), they did so in silence, for if they spoke, a Moaʻe breeze would suddenly blow across the water, rippling it, and the oysters would disappear.

1331. *Ka iʻa hāmau leo o ʻEwa*.
The fish of ʻEwa that silences the voice.

The pearl oyster, which has to be gathered in silence.

1357. *Ka iʻa kuhi lima o ʻEwa*.
The gesturing fish of ʻEwa.

The *pipi*, or pearl oyster. Fishermen did not speak when fishing for them but gestured to each other like deaf-mutes.

Kamakau (1991) offered another saying related to the abundant *nehu* in the lochs of Puʻuloa, and the leader Laʻakona: "*He kai puhi nehu, puhi lala ke kai o ʻEwa e, e noho i ka laʻi o ʻEwa nui a Laʻakona* ("A sea that blows up *nehu*, blows them up in rows, is ʻEwa, until they rest in the calm of great ʻEwa-a-Laʻakona")" (Kamakau 1991:84).

3.1.5 Settlement and Land Use

Handy et al. (1972:469) depict the deep bays of Puʻuloa (currently known as Pearl Harbor) as the most significant feature of the ʻEwa District as it provided an ideal environment for the cultivation of *loʻi kalo* (irrigated taro) along its irrigable lowlands, and for creating fishponds and traps in its multiple bays fed with tidal waters. The bays contained *pipi*, or pearl oysters, for which the bay is currently named (Handy et al. 1972:471). The highly valued *pipi* was referenced often in Hawaiian *moʻolelo* and *ʻōlelo noʻeau* as a resource to be collected only in quiet and that it was well-protected by Hawaiian deities, such as the *moʻo* deity Kanekuaʻana.

ʻEwa was renowned for its rich marine life and *limu* (edible algae) that filled the surrounding waters. An oral history interview with Mark Kahalekulu revealed the many fish that inhabited the area, including *moi* (*Polydactylus sexfilis*), *awa* (*Chanos chanos*), *kala* (*Naso unicornis*), *palani* (*Acanthurus dussumieri*), *manini* (*Acanthurus triostegus sandvicensis*), *ʻōhua* (*Acanthurus triostegus sandvicensis*), *ʻamaʻama* (*Mugil cephalus*), *āholehole* (*Kuhlia sandvicensis*), *ʻōpae* (*Halocaridina rubra*), *heʻe* (*Octopus cyanea*), and the prized *ʻanae* (adult mullet, *Mugil cephalus*) (Maly and Maly 2014:559). One *moʻolelo* depicts the migration of the *ʻanae* as *ʻamaʻama*, young mullet. Although in a different life stage, these *iʻa* (fish) followed the same migratory pattern, moving from Honouliuli to Lāʻie (Titcomb and Pukui 1977:64). According to Wahl (2021), salt making was also an important cultural practice along the Honouliuli coast. In the 1800s, the practice became industrialized with the operation of the Puʻuloa Salt Works from the 1840s to early 1900s.

Limu along the ʻEwa coast could reach a height of two to three feet and included various important types such as *līpoa* (*Dictyopteris plagiogramma*), *kala* (*Sargassum echinocarpum*), and *manauea* (*Gracilaria coronopifolia*) (Kahalekulu, in Maly and Maly 2014:259). During certain seasons, Kahalekulu recalled that as a child he could smell the *limu* from Pōhākea Elementary School. Video interviews with the late Michael Kumukauoha Lee have highlighted the past and contemporary significance of *limu*, and the impacts development activities have had on the health of marine ecosystems. *Limu* are an important resource for food, for medicinal uses, and as keystone members of coastal ecosystems (Lee 2013). Lee (2012) called ʻEwa the "mother house of all limu," and as the progenitor for *limu* across the island. He identified four types of *limu* as the most popular: *manauea*, *palahalahā* (*Ulva fasciata*), *līpoa* (*D. plagiogramma* and *D. australis*), and *limu kohu* (*Asparagopsis taxiformis*) (Lee 2013). Of the Hawaiian species of *limu*, Lee added, "we call them kokua limu. They work together" (Lee 2012). This contrasts with the invasive species of *limu* that have become prevalent along Hawaiʻi's coastlines, which have overtaken rather than integrated into the Hawaiian *limu* system. Lee emphasized the importance of freshwater inputs to *limu* health, and that underground caves would collect water from the mountains and bring it into the ocean to provide important nutrients to the seaweed. He argued that the decline of *limu* and fishes in western Oʻahu was due to a lack of freshwater, and cited the diversion of freshwater from the coast as well as polluted runoff and heavy metals leeching into the ocean from development activities as the main causes (Lee 2012, 2013).

Frierson (1972) compiled a list of plant species present in Honouliuli prior to 1790, along with some of their potential uses. The species listed by Frierson include *ʻōhia lehua* (*Metrosideros polymorpha*), *kukui* (*Aleurites moluccana*), *wiliwili* (*Erythrina sandwicensis*), *koa* (*Acacia koa*), *hala* (pandanus, screwpine; *Pandanus odoratissimus*), *hau* (*Hibiscus tiliaceus*), *ʻōhia ʻai* (mountain apple; *Jambosa malaccensis*), *wauke* (paper mulberry; *Broussonetia papyrifera*), *ti* (*Cordyline fruticose*), *maiʻa* (banana; *Musa* sp.), *pia* (arrowroot; *Tacca leontopetaloides*), *milo* (*Thespesia populnea*), *neneleau* (sumac; *Rhus sandwicensis*), *ʻilima* (*Sida fallax*), *akiaki* (rush grass; *Sporobolus virginicus*), *hapuʻu* (*Cibotium chamissoi*), *pukiawe* (*Styphelia tameiameiae*), ʻ*iliahi* (*Santalum ellipticum*), *kou* (*Cordia subcordata*), *lama* (*Diospyros sandwicensis*), *loulu* (fan palm; *Pritchardia kaalae*), *maile* (*Alyxia stellata*), *makaloa* (sedge; *Cyperus laevigatus*), *naio* (false sandalwood; *Myoporum sandwicense*), *olonā* (*Touchardia latifolia*), *pili* grass (*Heteropogon contortus*), *ʻieʻie* (climbing *hala*; *Freycinetia arborea*), *mamaki* (*Pipturus albidus*), *kauila* (*Colubrina oppositifolia*), *uhiuhi* (*Mezoneuron kauaiense*), *mamani* (*Sophora chrysophylia*), *ʻape* (*Alocasia macrorrhiza*), ʻ*awapuhi* (shampoo ginger; *Zingiber zerumbet*), *noni* (*Morinda citrifolia*), *aheahea* (*Chenopodium oahuense*), *kakonakona* (*Panicum torridum*), ʻ*ēkaha* (birdsnest fern; *Asplenium nidus*), *honohonowai* (*Commelina nudiflora*), *maʻo* (Hawaiian cotton; *Gossypium tomentosum*), ʻ*ohe makai* (*Polyscias sandwicensis*), *ʻamaʻu* (*Sadleria cyatheoides*), *ʻŪlei* (*Osteomeles anthyllidifolia*), *mahoe* (*Alecryon micrococcus*), *uhaloa* (*Waltheria americana*), *koaliʻai* (African morning-glory; *Ipomoea cairica*), *pāʻūohiʻiaka* (*Jacquementia sandwicensis*), *ʻaiea* (*Nothocestrum breviflorum*), *koʻokoʻolau* (Wiebkes beggarticks; *Bidens wiebkei*), *olopua* (Hawaiʻi olive; *Osmanthus sandwicensis*), *aulu* (soapberry; *Sapindus oahuensis*), mēhamehame (*Flueggea neowawraea*), *kalamona* (*Cassia gaudichaudii*), *alaheʻe* (*Canthium odoratum*), *ʻaʻaliʻi* (*Dodonaea viscosa*), *ʻawa* (kava; *Piper methysticum*), *ʻulu* (breadfruit; *Artocarpus altilis*), *kalo* (taro; *Colocasia esculenta*), *niu* (coconut; *Cocos nucifera*), *piʻa* (wild yam; *Dioscorea pentaphyila*), *kō* (sugarcane; *Saccharum officinarum*), *hoi* (bitter yam; *Dioscorea bulbifera*), *uhi* (common yam; *Dioscorea alata*), *ipu* (gourd; *Lagenaria siceraria*), *ʻolena* (turmeric, *Curcuma domestica*), and *ʻuala* (sweet potato; *Ipomoea batatas*).

ʻEwa was known for a rare variety of *kalo* named Kāī O ʻEwa that was grown in mounds (*puepue*) in the marshy lowlands of the ʻEwa District (Handy et al. 1972:471). There were many sub-varieties of Kāī O ʻEwa: Kāīkeʻokeʻo, Kāīʻeleʻele, Kāīuliuli, Kāīʻulaʻula, Kāīkea, and Kāīkoi. Kāīkeʻokeʻo was said to be beloved by the chiefs for its unique aroma and flavor. Kāīkoi was known to spread out, quickly sending out *huli* (shoots) until it covered the entire *loʻi* (terrace). It was said that anyone who married someone from the area would never leave because the love of the Kāikoi was so strong (Pukui 1983:305).

The first *ʻulu* (breadfruit) is claimed to have been planted at Puʻuloa by multiple *moʻolelo* and ethnographic accounts (Tuggle and Tomonari-Tuggle 1997:16). Although it is unclear if the *ʻulu* was planted in the wetter portion of Puʻuloa or the more arid Puʻuloa ʻIli region, an account of the breadfruit by W.S. Lokai and recounted in Fornander (1919) described planting the *ʻulu* in a "large excavation" that Tuggle and Tomonari-Tuggle (1997:17) postulate might refer to a limestone pit:

> At Puuloa, Oahu. Its breadfruit plant came from Kanehunamoku, brought by two men of Puuloa who were out fishing and were blown off by a heavy wind and rain storm and landed at the uninhabited land, save gods only. Therefore by them it was introduced at Puuloa and planted in a large excavation where it grew and bore fruit, which they ate. Haumea and others afterwards knew of this breadfruit tree having been brought away secretly by these men, so she came to see it herself and made a visit to these islands, but this variety of tree was not found. That is the reason she scattered the breadfruit in all lands; hence its wide distribution. (W.S. Lokai, in Fornander 1919:678)

The use of limestone pits as traditional planting venues is also suggested in mid-nineteenth-century Māhele documents by a resident of Puʻuloa ʻIli who recounted: "planting is done in hollows of rocks, and in *kaheka* [small brackish water ponds] and are scattered about at various places" (Native Register, Vol. 5, No. 6132:243–244; in Maly and Maly 2014:261).

In addition to agricultural uses, some of the limestone pits of the ʻEwa Plain have also been found to house paleontological deposits, cultural midden deposits, and burials (see Beardsley 2001;

Spangler et al. 2020; Wickler and Tuggle 1997). The pits are typically “bell-shaped” in cross-section because of rainwater erosion that was more corrosive in the pit interiors due to a slower evaporation rate and mixing with groundwater (Ziegler 2002:97). They are often referred to in the literature as “sink holes,” however this is erroneous as the pits were formed through gradual erosion rather than a collapse or “sink” of the ground surface (Hammatt and Shideler 1995:22-24). Limestone “pit caves,” or simply “pits,” are more accurate terms.

Limestone pit features, particularly those that contain paleoenvironmental data including now-extinct or extirpated avifaunal species, have provided significant insight into the environmental history of the ʻEwa Plain. Analysis of the vertebrate remains recovered from these deposits have led to the discovery of a range of now-extinct or extirpated avifaunal species (e.g., Athens et al. 1999, 2002; Davis 1989, 1990; Dunn et al. 1991; James 1995). Similarly, fossil nonmarine mollusks from Barbers Point deposits identify 16 or more native terrestrial mollusk species that occupied the area prior to human arrival. This is followed by a sequence of replacement by Polynesian- and European-introduced taxa, as well as native taxa that were less sensitive to ecological disturbance (Christensen and Kirch 1986). Pollen analysis from sediment cores taken from the ʻEwa Plain (Ordy Pond) also indicate a dramatic transformation in the region’s botanical composition at around this same time: disturbances in native forest cover rapidly give way to replacement by more open canopy flora (Athens et al. 2002).

More recent test excavations of a complex of 68 limestone pit caves (SIHP 50-80-12-07835) by Cultural Surveys Hawaiʻl, Inc. (Belluomini et al. 2017; Spangler et al. 2020) recovered additional faunal material, including cat (*Felis catus*), rat (*Rattus* sp.), pig (*Sus scrofa*), and numerous avifaunal remains including shearwater (*Puffinus* cf. *pacificus*), petrels (Procellariiformes), and potentially the tibiotarsus of an extinct or extirpated eagle (cf. *Haliaeetus albicilla*). SIHP 50- 80-12-07835 was evaluated as significant under criteria d and e. Community consultation highlighted concerns about potential burials and cultural resources in the limestone pits, a desire to see pits preserved as much as possible, and concerns over endangered bird species and federal restrictions. The potential discovery of now-extinct or extirpated faunal remains, and concerns expressed during community consultation, led to the preservation of 59 out of the 68 limestone pits at SIHP -07835. The remaining nine pits were previously disturbed and recommended for on-site monitoring (Belluomini et al. 2017; Spangler et al. 2020).

Trails

The trails documented by Malden (1825) likely show pre-Contact travel routes between significant resources and coastal and inland settlements of Honouliuli (Figure 12). These trails include a coastal trail that encircled the ʻEwa Plain, beginning at a settlement at the entrance to the waters of Puʻuloa, and three inland trails: one beginning at Honouliuli Village and ascending the southeast slope of the Waiʻanae Mountains though Kaloʻi Gulch and two *mauka-makai* (coastal-upland) trails aligned north and northwest (respectively) until merging into a single trail that ascended in a northeasterly direction to Honouliuli Village. A later 1899 map of Oʻahu Island (Beasley 1899; Figure 13) shows a similar configuration of Malden’s (1825; see Figure 12) *mauka-makai* trails labelled as roads.

The more western of the Malden trails appears to align with the lower half of current-day Coral Sea Road and continues in a straight direction beyond where Coral Sea Road curves to the west. This suggests that these possible pre-Contact trails were used during the nineteenth century and possibly improved with curbstones and ramps to make the pedestrian trails more easily navigable for horse travel (Apple 1965).

Hawaiian scholar John Papa ʻĪʻī describes a single trail crossing the northern edge of the ʻEwa Plain of Honouliuli and continuing northwest to Waiʻanae:

> At Pueohulunui was the place where a trail branched off to go to Wailua [north] and then down to Honouliuli [west] and on the Waianae. As mentioned before, there were three trails to Waianae, one by way of Puu o Kapolei, another by way of Pohakea, and the third by way of Kolekole. (ʻĪʻī 1995:97)

John Papa ʻĪʻī's Honouliuli trail follows a similar configuration as one of Malden's 1825 east-west inland trails and a later road crossing the ʻEwa Plain between Waiʻanae and the south coast of Oʻahu Island (Rockwood 1959; Figure 14). A 1902 Oʻahu Island map also illustrates a new *mauka-makai* road that appears to intersect the project area and connects these upland roads with the Barbers Point Lighthouse (Donn and Wall 1902; Figure 15). The road also appears to connect with an old "Oahu R.R." line and may be the "rough coral road" described by Dean (1991:20) that led from the Oahu Railroad and Land Company line to the Barbers Point Lighthouse.

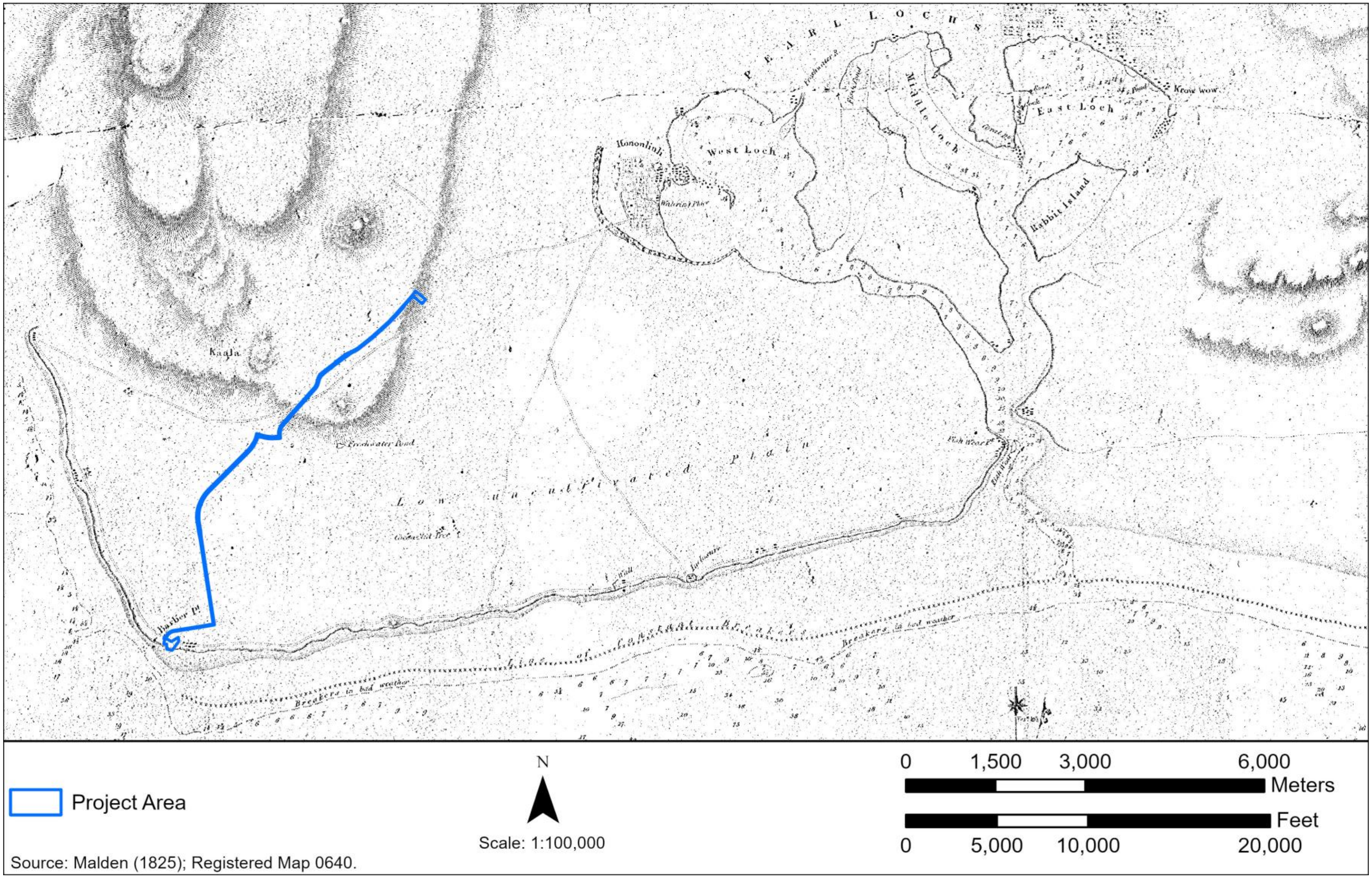


Figure 12. An 1825 map by Malden shows the project area passing through the "uncultivated plain" of ʻEwa, with early post-Contact trails and possible areas of settlement (suggested by rectangular structures) in Honouliuli.

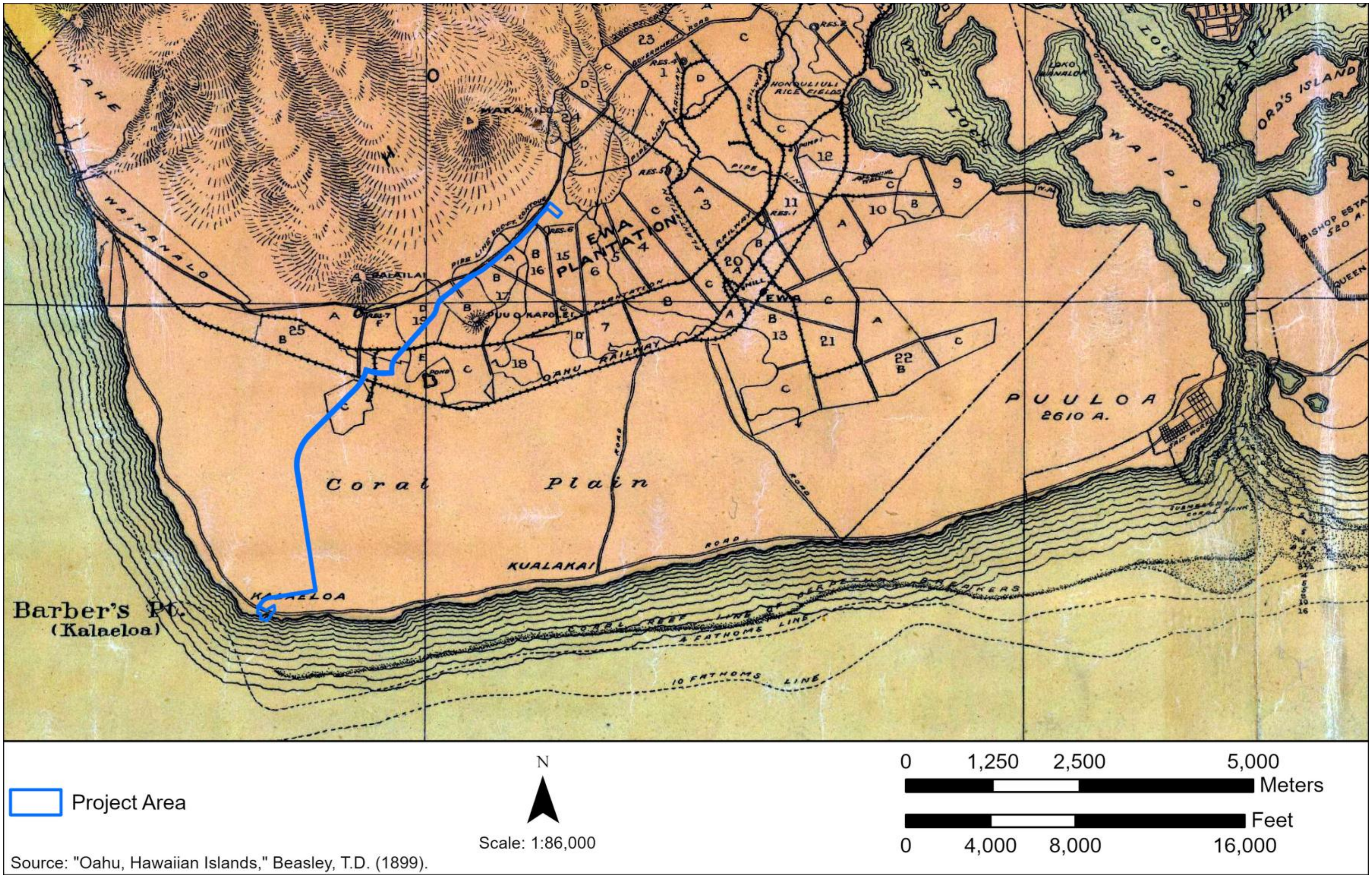


Figure 13. 1899 map by T.D. Beasley showing the project area crossing through the "Coral Plain," the "Oahu Railway" and "Plantation Railway," and several Ewa Plantation field parcels.

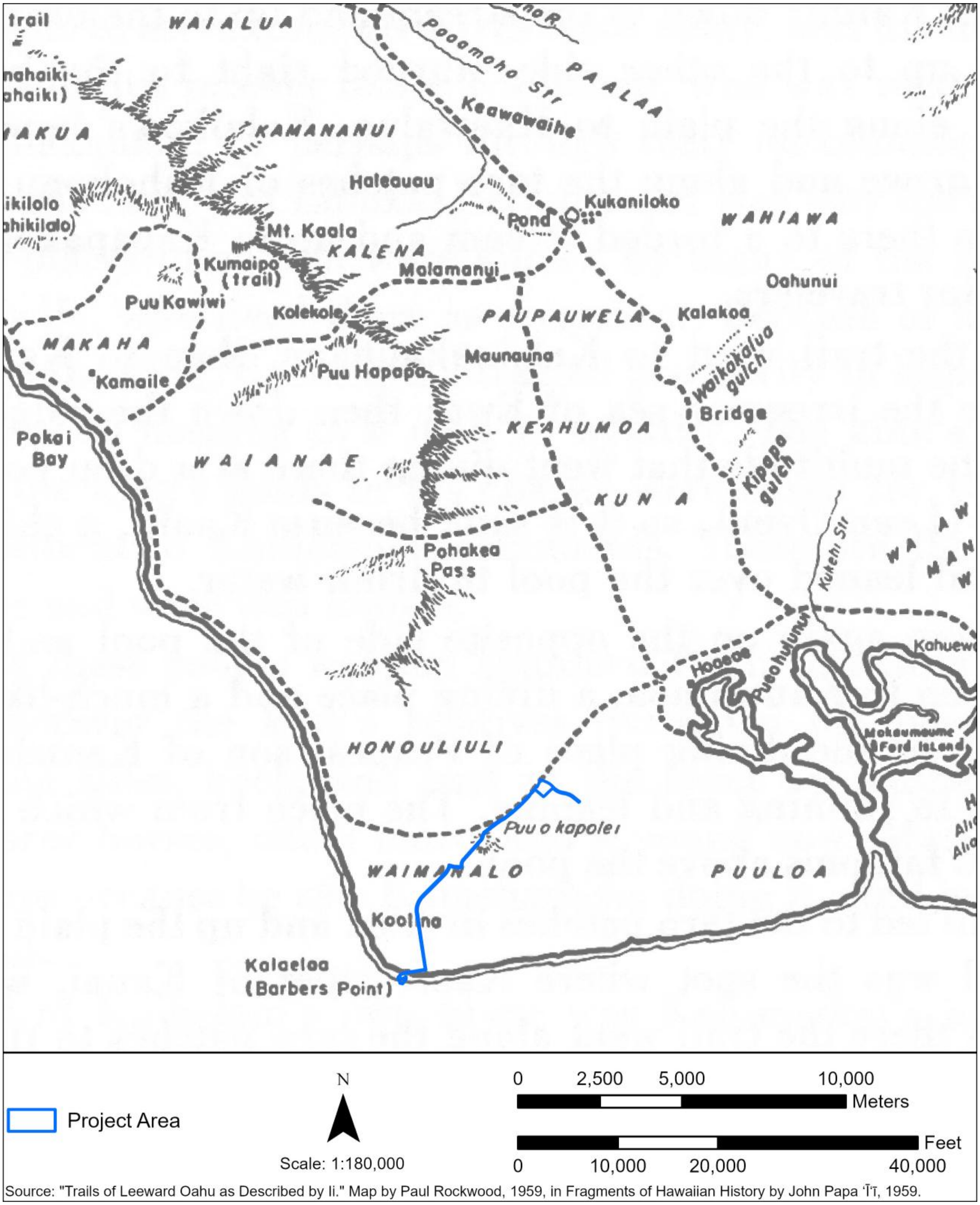


Figure 14. A 1959 map by Paul Rockwood depicting the trails of leeward Oʻahu as described by John Papa ʻĪʻī.

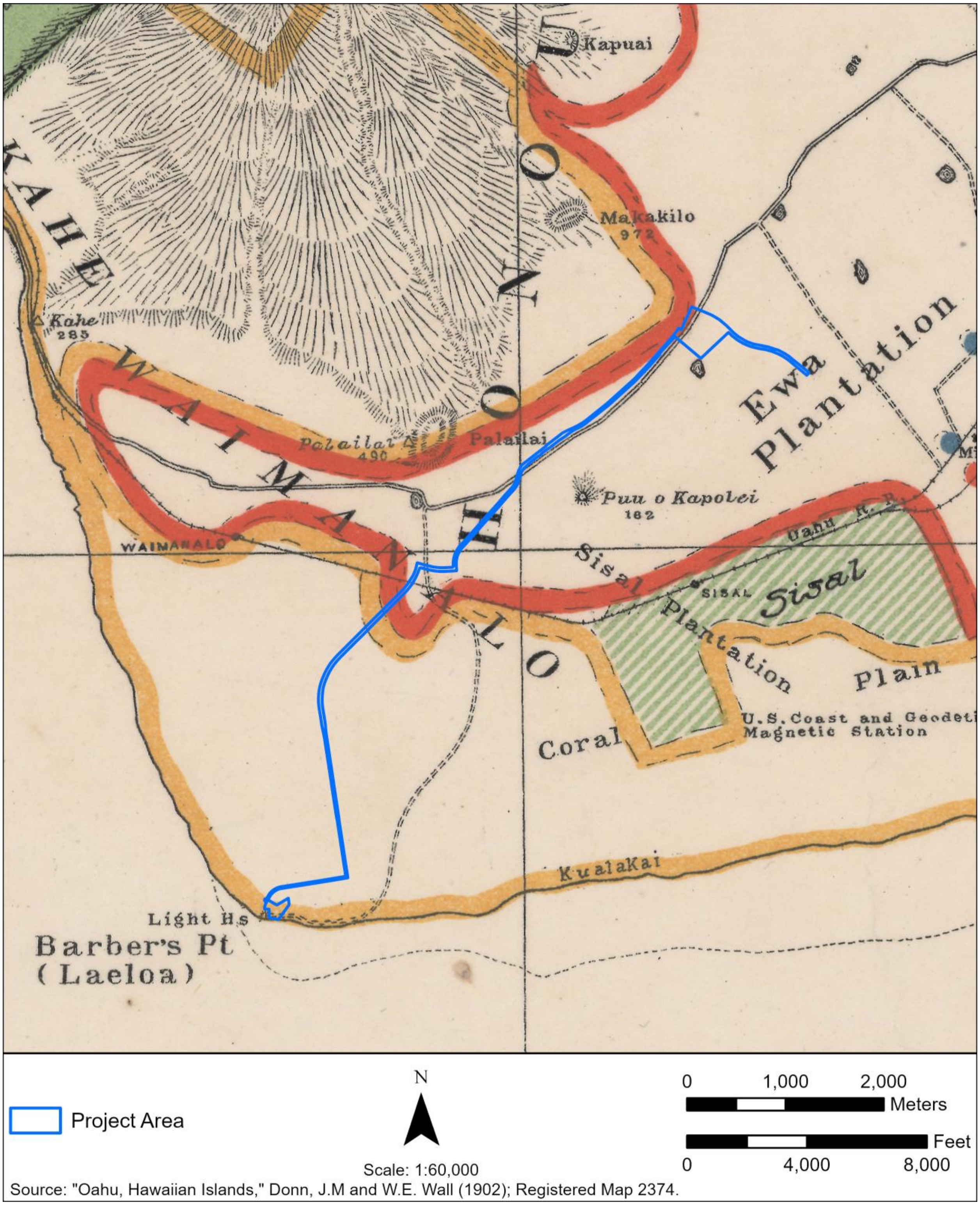


Figure 15. Portion of a 1906 Hawaii Territory Survey Map of Oʻahu Island showing plantation boundaries, early twentieth-century land use features, and a new mauka-makai road connecting the Barbers Point Lighthouse to the uplands.

3.2 POST-CONTACT TRANSITIONS

The arrival of western naturalists, explorers, and industrialists to the shores of the Hawaiian archipelago rapidly accelerated after Captain James Cook first arrived at Waimea Harbor in 1778. The subsequent centuries are often referred to as the ‘post-Contact’ period, demarcating a period of significant transformation in Hawaiʻi’s history that was highly influenced by increased interactions with Europe, the United States, and other regions. The following centuries saw the unification of the archipelago and the formation of an independent, constitutional monarchy under the Kamehameha Dynasty (1810-1874), followed by the Kalākaua Dynasty (1874-1893). It also saw the introduction of a wide range of plant and animal species, foreign diseases, and a rapid influx of foreign settlers and business interests. This latter introduction ultimately brought about the overthrow and annexation of the Hawaiian Kingdom by the U.S. in the late nineteenth century, followed by statehood in the mid-twentieth century. These significant social, political, and biological transformations had diverse and wide-ranging impacts on island ecosystems, land tenure and use, and cultural practices.

3.2.1 Barbers Point

One of the earliest foreign accounts of Kalaeloa, now also known as Barbers Point, is by Captain George Vancouver, who led a voyage to Hawaiʻi in 1792. Of Kalaeloa, he wrote “this tract of land was of some extent but did not seem to be populous, nor to possess any great degree of fertility; although we were told that at a little distance from the sea, the soil is rich, and all necessaries of life are abundantly produced” (Vancouver and Vancouver 1798:361–363).

As part of the Vancouver Expedition, cartographer C.R. Malden produced a map of southern Oʻahu that included the southern portion of the Waiʻanae Mountains, the bays of Puʻuloa (Pearl Harbor) and all of Honouliuli’s ʻEwa Plain (Malden 1825; see Figure 13). Malden’s 1825 map labeled the ʻEwa Plain as a “low uncultivated plain” and drew a network of coastal and inland trails crossing the plain. Small settlements are suggested by clusters of rectangular structures along the southern and eastern coastline. The village of Honouliuli, shown in the northwest corner of the bays of Puʻuloa (West Loch portion of Pearl Harbor), was likely the most populated post-Contact settlement in Honouliuli Ahupuaʻa. Malden’s map also shows a grid of rectangular structures and a “Watering Place” at Honouliuli Village.

The post-Contact name for Kalaeloa, Barbers Point, comes from Captain Henry Barber, whose ship, the *Arthur*, ran aground there.

> In October 1796, a ship went aground at Kalaeloa, Oahu. This ship had visited the island on several occasions during the rule of Ka-lani-ku-pule. This was the first time a foreign ship had grounded on these shores. Kamehameha was on Hawaii, but Young had remained on Oahu. All the men on the ship came ashore at night in their boats. At daylight when the ship was seen ashore Ku-i-helani placed a ban on the property of the ship and took care of the foreigners. Hawaiian divers recovered the valuables, and they were given over to the care of Ku-i-helani, but part were given by Captain Barber to the men who had recovered them. (Kamakau 1991:174)

Captain Barber was a fur trader on his way from North America to Canton [Guangzhou]. He had planned to stop on Kauaʻi to pick up a supply of yams when his ship got caught in the swell near Kalaeloa and smashed into the rocks. As Dean (1991) notes, the wreck of the *Arthur* was the first recorded wreck of a European ship in the Hawaiian Islands that also claimed human lives: although Barber survived, six of his 22-man crew perished.

With foreign arrivals also came foreign diseases like smallpox, cholera, and measles, broadly referred to as "the plague" (Lewis 1970:9). In Honouliuli, as it was across the archipelago, introduced diseases rapidly and drastically reduced the Native Hawaiian population. A missionary census from the 1820s recorded a Native Hawaiian population residing in the ʻEwa District of 1,026 people. However, by the 1831–1832 census, this population had declined to 870 people, amounting to a 15% decline of the population within four years (Kelly 1991:157).

According to Lewis (1970), L. Smith, the first missionary to build a church in ʻEwa, had called the people of Ewa a "dying people," and estimated eight to ten deaths for every birth (Lewis 1970). The Protestant missionary who succeeded Smith in ʻEwa, Artemas Bishop, observed that:

> The people of the district are rapidly diminishing, and whole neighborhoods where in former years were numerous families and cultivated lands, there are now no inhabitants, and the land is left to run to waste. The fathers have died off, and the children wander into other parts, and there are none to fill their places. (Bishop 1854)

After traversing much of the island of Oʻahu in the early 1800s, Edwin Hall, Hawaiian Minister of Finance, described west ʻEwa as a "barren, desolate plain" (Hall 1839 as cited in Lewis 1970:8).

Kamakau (1961) observed: "Honouliuli had over ten school houses with their teachers. The lowest number of pupils to each school was 50 up to 200 or more. Oahu was then thickly populated. It is sad to see how in so short a time whole villages have vanished leaving not a man…" (Kamakau 1961:424-425).

Wilkes (1845) observed a warm reception by Reverend Bishop, and noted that within ʻEwa, "There are no chiefs or any persons of distinction residing in this district; the people are labourers or Kanakas, and the landholders reside near the king at Lahaina, or at Honolulu. The taxes and occasional levies without any outlay have hitherto kept them poor" (Wilkes 1845:84-85). He went on to describe ʻEwa as having soils of a hard, red clay ("deemed useless except for pasturage"; Wilkes 1845:86), plentiful springs and streams, which kept the sugar mills and taro patches well supplied in fresh water, and the "calcareous sandstone" of the ʻEwa Plain, which he noted had resisted any attempts to convert to lime. He observed that ʻEwa was the best part of the island for raising cattle and sheep, and that they were found in larger numbers there than anywhere else on Oʻahu. His description of the day-to-day for ʻEwa's Native Hawaiian population in 1840 emphasized the sugar mill, trade work, and an increased influence of European styles:

> …there is a sugar-mill which, in the season, makes two hundred pounds of sugar a day. They have been taught, and many of them are now able to make their own clothes, after the European pattern. There is a native blacksmith and several native carpenters and masons, who are able to work well. (Wilkes 1845:86)

3.2.2 The Māhele

In the mid-nineteenth century the Hawaiian Kingdom, under the leadership of King Kamehameha III (Kauikeaouli), undertook a momentous reformation of land tenure that had far-reaching and profound consequences for Native Hawaiians. The impetus for this transition arose from compounding pressures from outside entities: foreign traders, merchants, missionaries, and their governments desired control of private lands and contested the prerogative of the king and *ali'i nui* (high chiefs) to distribute or revoke land rights at will according to traditional custom. The increasing danger of annexation by a European nation loomed large after the Paulet Affair in 1843, and with similar processes occurring throughout southern Polynesia. There were also unprecedented challenges with regard to integrating into a Western economic system, and the desire of the king to safeguard the rights of Hawaiians to their native lands, particularly in light of the mass loss of Hawaiians under the onslaught of introduced diseases (Van Dyke 2007:30-31; Chinen 1958:25).

In response to such pressures, Kamehameha III and his chiefs enacted the Bill of Rights in 1839, as an initial if limited attempt to define property rights. This was followed by the creation of the first constitution of the Hawaiian Kingdom in 1840, which established legislative and judicial bodies suited to addressing land ownership reformation. The Organic Acts of 1845 which further organized the executive branch and defined the king's role and power in Western legal concepts. Also in 1845, the Board of Commissioners to Quiet Land Titles, commonly referred to as the Land Commission, was created. The Land Commission oversaw the adjudication of all land claims.
In December of 1847, the king and his Privy Council determined to initiate a division (*māhele*) of the kingdom's lands; this became known as the Māhele. The initial *māhele*, which transpired between January 27 and March 7 of 1848, involved the division of the lands between the king and approximately 250 *ali'i* and *konohiki*, wherein the king selected lands he would personally retain and quitclaimed all rights to the remaining land, and the *ali'i* did the same. The 1848 Māhele was recorded in a legal document titled "Buke Kakau Paa no ka mahele aina i Hooholoia i waena o Kamehameha III a me Na Lii a me na Konohiki ana" (which was later known as the *Buke Māhele*, or Māhele Book). These land claims only involved the larger land divisions consisting of *ahupua'a* and *'ili kūpono* (*'ili* situated within an *ahupua'a* but independent from it).

After the 1848 Māhele, the king retained roughly 60 percent (ca. 2.5 million acres) of the Kingdom's land ("Crown Lands"); however, he then apportioned 1.5 million acres of that land to the Government, which became known as "Government Lands." The *ali'i* ended up with between 56-74% of their original holdings, and these lands became known as "Konohiki Lands" (Kame'eleihiwa 1992:219). Notably, during the initial *māhele*, land surveys defining the boundaries of the *ahupua'a* and *'ili kūpono* land claims were not required and the claims were rewarded based on their traditional names only. In 1862, in order to address the lack of clearly defined boundaries and emergent land disputations, the Commissioner of Boundaries was created and all *ahupua'a* and *'ili kūpono* award recipients were required to present land surveys for confirmation.

Soon after the 1848 Māhele, it became apparent that the land rights of the Native Hawaiian populace, or native tenants, needed to be ensured (Chinen 1958:29). In the Kuleana Act of 1850, the legislature authorized the *maka'āinana* to claim lands which they actively cultivated or inhabited. These became known as "Kuleana Lands." Kuleana Lands were often the most fertile of the lands in Hawai'i, as claims often centered on arable or cultivable land (Chinen 1958:31). Claimants were required to provide a professional land survey to the Land Commission as well as supporting testimony for their claim. Testimony was collected from neighbors, current or previous residents of the area, and the *konohiki* of that area, in either 'Ōlelo Hawai'i (Native Testimony) or English (Foreign Testimony). An awarded claim was termed a Land Commission Award (L.C.Aw., or L.C.A.) and assigned a *helu* (number). A Royal Patent was then issued which confirmed the government's quitclaim of interest to the land (Chinen 1958:14). These land claims were recorded in ten large volumes (LCA Books 1–10) and the associated testimonies are included within an additional 50 volumes. The survey maps and descriptive testimonies provided with the land claims contain invaluable information on land use practices and resources at that time period. Ultimately, however, the majority of the lands to be set aside for the *makaʻāinana* were not awarded or claimed, resulting in only 28,658 acres being distributed to the *makaʻāinana* (Kameʻeleihiwa 1992:295). Thus, much land shown as blanks on nineteenth-century maps was not necessarily unused land, but rather, land without written or illustrated legal records. Notably in this regard, not all *aliʻi nui* and *aliʻi* participated in the Māhele (Hopkins 2022).

The Alien Land Ownership Act, also issued in 1850, granted foreigners the right to own land. Beginning in 1845, foreigners were allowed to take the oath of citizenship, and by 1847, foreigners were allowed to hold lands but could only sell such lands to legal citizens of the Hawaiian Kingdom (Kameʻeleihiwa 1992).

During the Māhele, the entire *ahupuaʻa* of Honouliuli was awarded to Miriam Keʻahikuni Kekauʻōnohi, granddaughter of Kamehameha I and heir of Kalaniomōkū (Yucha et al. 2015:26). Upon her death in 1851, her lands were transferred to her husband, Levi Haʻalelea. In 1864, the land was passed on to Haʻalelea's second wife and widow Anadelia Amoe and subsequently to her brother-in-law John H. Coney (Yucha et al. 2015:26).

Maly and Maly (2014:253–509) conducted extensive research of the Honouliuli land claims and provide a complete list of the LCA claimant names, associated place names, land uses, and cultural features cited in the Land Commission testimonies. According to Maly and Maly (2014:248), a total 106 native claims made for Honouliuli, 74 were awarded as Land Commission Awards (LCAs), 33 were denied and the status of the remaining native claim is not given (or the correct number of denied claims is 32).

Most of the Honouliuli LCAs were awarded to claimants for parcels along Honouliuli Stream at its juncture with the waters of Puʻuloa or West Loch area of Pearl Harbor, far from the project area. These claims, covering a roughly 287-acre area, are shown on an 1878 "Map of Honouliuli Taro Land" (Monsarrat 1878; Figure 16). Monsarrat's 1878 map shows the distribution of LCAs with the stream at the center and the presence of two churches, a schoolhouse, and a parcel with multiple structures in J. Campbell's name. No other Honouliuli maps with LCA locations were identified through archival research.

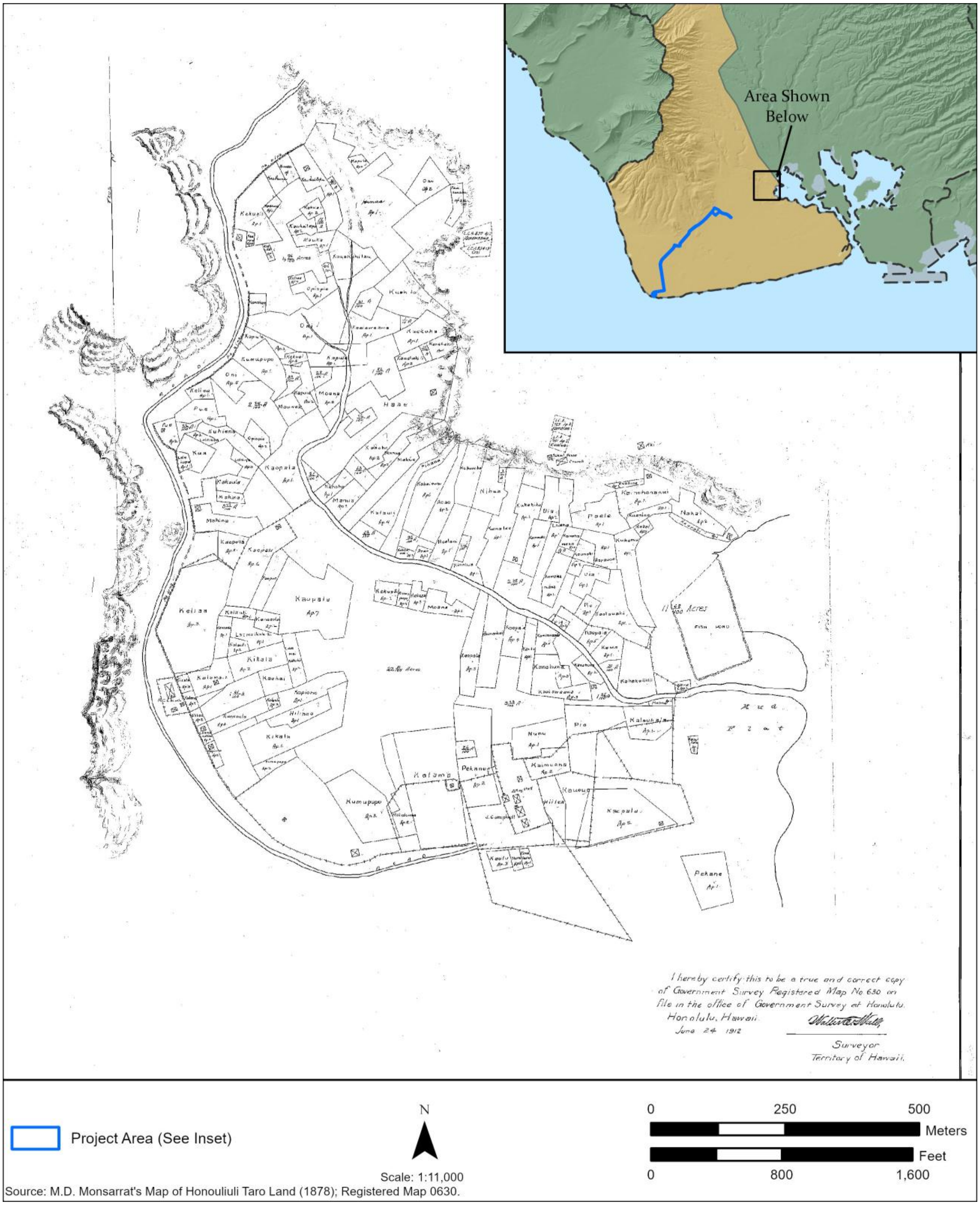


Figure 16. Map of Honouliuli Land Commission Awards (Monsarrat 1878).

3.2.3 Honouliuli Ranch

After Levi Haʻalelea passed on, his widow Anadelia Amoe inherited the Honouliuli lands and rented them to James Dowsett and John Meek for stock running and grazing in 1871 (Frierson 1972). According to the journal Lloyd Vernon Briggs, a medical student who visited Oʻahu in 1880 and 1881, James Campbell purchased the 41,000 acres of Honouliuli Ranch from J.H. Coney in 1877 for $95,000. At the time of the sale, there were around 32,300 head of branded cattle, which Campbell drove off and replaced with his own herd (Briggs 1926). Shortly thereafter, the industrious Campbell also began leasing out rice lands, the fishing rights at Pearl Harbor, and a lime quarry (Lewis 1970).

Briggs noted that Mr. Campbell was the source of most of Honolulu's supply of meat: cattle intended for the slaughterhouse were brought there to fatten, and he estimated roughly six head were slaughtered per day to supply the Honolulu markets. He noted there were "at least 5000 head of Durhams, Herefords, Jerseys, Ayrshires and Holsteins, besides horses and mules. Mr. Campbell has 42,000 acres here, of which 10,000 are adapted to agriculture" (Briggs 1926:65). Haun (1991) noted that the *kiawe* growing in the ranch would have proven useful in multiple ways, with the beans provided food for cattle, and the wood making excellent charcoal (Haun 1991:162).

In 1879, Campbell imported a well-driller from California and bore 250 feet into the earth where "a sheet of pure water flowing like a dome of glass from all sides of the well casing" gushed forth (Campbell 2003). The first artesian well was opened in Honouliuli in 1879 (Campbell 2003). With the discovery of water and the presence of a new fence, Campbell opened Honouliuli Ranch in 1881 and focused his efforts on cattle ranching (Campbell 2003). An 1881 map of a portion of Honouliuli by Monsarrat depicts the project area and surroundings around the time the ranch first opened (Figure 17).

Campbell restocked the ranch, starting with 1,100 heads of cattle and eventually building up to 5,500. Frierson (1972) notes that the coral plains were grazed, and sugar was grown in the area between the plains and the mountains. An 1873 map of Honouliuli by Alexander shows the project area running through these *mauka* areas alongside the old Government Road (Figure 18).

Briggs described his visit to Honouliuli Ranch on January 9, 1881:

> Ewa has a spacious and deep harbor, which is rendered almost useless by a coral reef. I took a ride over the Honouliuli Ranch which is quite romantic. The soil is a deep, reddish loam, up to the highest peaks, and the country is well-grassed. Springs of water abound. The *ilima*, which grows in endless quantities on the plains of this ranch, is considered excellent for feeding cattle; beside it grows the indigo plant, whose young shoots are also good fodder, of which the cattle are fond. Beneath these grows the *manienie* grass, and Spanish clover and native grasses grow in the open; so there is abundant pasturage of various kinds here.
>
> As I rode, to the left were towering mountains and gaping gorges; ahead, undulating plains, and to the right, creeks and indentations from the sea. A wide valley of fertile land extends between the Nuuanu Range and the Waianae Mountains and thence to the coast of Waialua. There are many wild goats in this valley, which are left more or less undisturbed because they kill the growth of mimosa bushes, which would otherwise overrun the country and destroy the pasturage for cattle. These wild goats were found on the island by the earliest navigators. Royalty alone hunted them in the early days, one person sometimes taking several hundred in a day. They chased them on horseback. Clinging by his legs around the

> belly of the horse, the rider swung his body over one side, while the horse was going at full speed, reached down and grabbed the goats by the hind legs, one after another, breaking the legs by a sudden expert movement, and leaving the victims to be dispatched by attendants who followed close behind. (Briggs 1926:62–63)

By 1929, the Honouliuli lands encompassed approximately 23,000 acres of pasture lands of varying quality, and continued to serve as the fattening area for the other ranches. Lower lands were noted to have abundant algaroba trees, also known as mesquite in the southwestern United States and Mexico, and better known in Hawaiʻi as long-thorn *kiawe* (*Prosopis juliflora*).

By 1904, *kiawe* forests covered 20,000 acres along a narrow, nearly continuous band of the southern and western coasts of Oʻahu (Hall 1904). The wood from the *kiawe* forests was a valuable resource, as it supplied a large quantity of fuel necessary for processing the massive amounts of sugarcane that were now being produced, as well as a reliable construction material for homesteads, railroad ties, and fenceposts (Frierson 1972). According to Hall (1904), the first long-thorn *kiawe* tree in Hawaiʻi was from a seed planted in 1837 at the corner of Fort and Beretania Streets in Honolulu by Father Bachelot, the founder of the Roman Catholic mission. This tree became the progenitor of at least 50,000 acres of *kiawe* forest across the islands. During this time, *kiawe* forests were considered a valuable asset whose wood and seed pods could be put to a variety of uses such as fuel, fence posts, and stock feed. A symbiotic relationship developed between the *kiawe* forests and animals introduced for ranching: not only did the *kiawe* forests provide a significant source of food for cattle and other stock animals, but these introduced domestic fauna played a key role in promoting *kiawe* forest expansion through both eliminating competing vegetation and dispersing digested *kiawe* seeds across the expansive ranchlands. So significant was this relationship that Hall (1904) attributed the introduced ranching fauna as solely responsible for the rapid and widespread abundance of *kiawe*.

Hencke observed: "During the rainy seasons native weeds afford good pasturage but during the dry season algaroba beans and Klu (Acacia farnesiana) are the principal feeds" (Hencke 1929:64). Hencke (1929) also recorded that the Honouliuli portion of the ranch had about 100 Duroc Jersey hogs, and was the site of the ranch headquarters and slaughterhouse. Aerial imagery from 1927-1928 shows the dense *kiawe* forests in the *makai* portion of the project area, and cultivated sugarcane fields in the *mauka* portion (Figure 19).

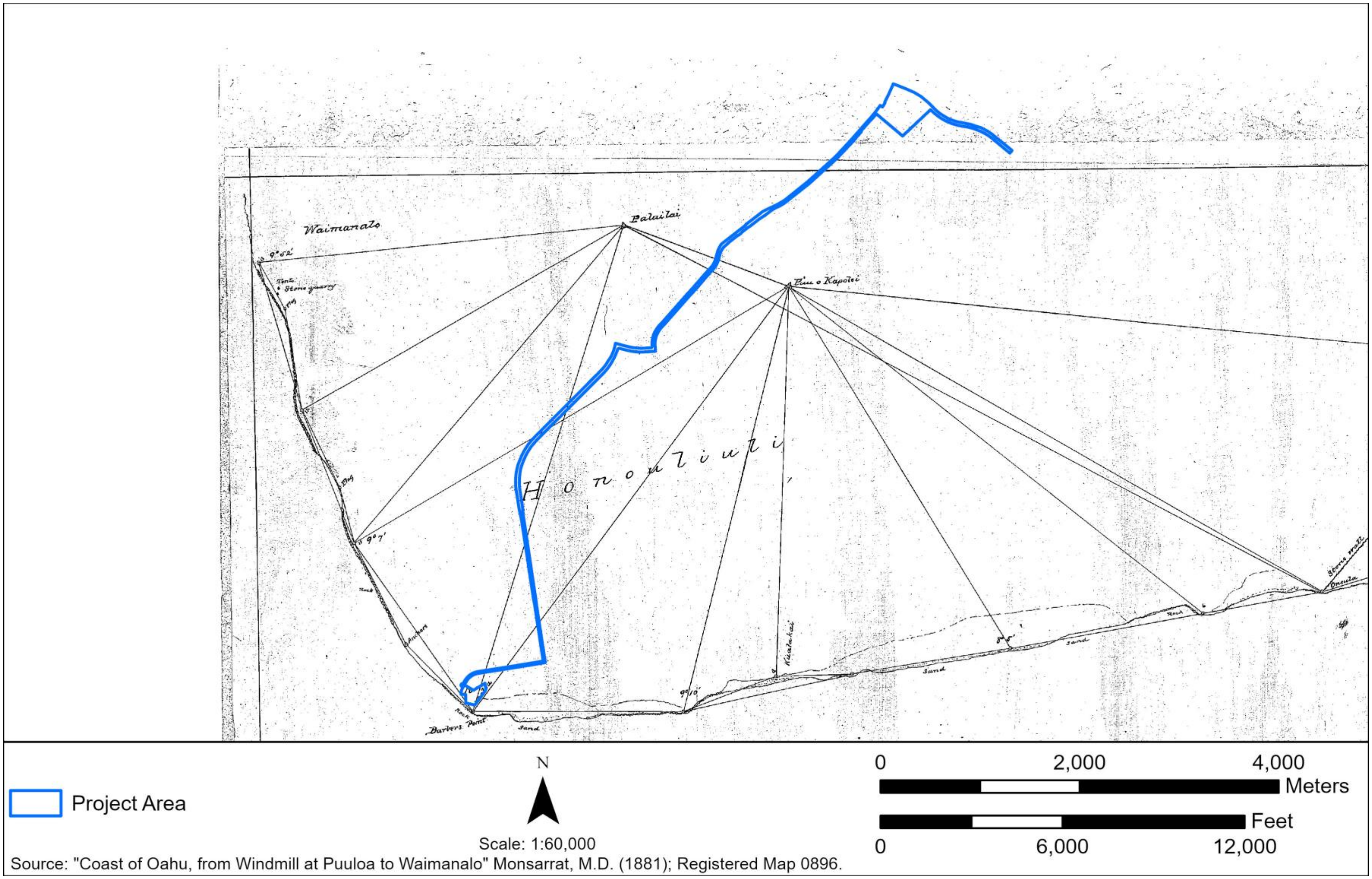


Figure 17. 1881 map by M.D. Monsarrat, showing the re-named "Barbers Point" and the project area passing between Palailai and Puu o Kapolei.

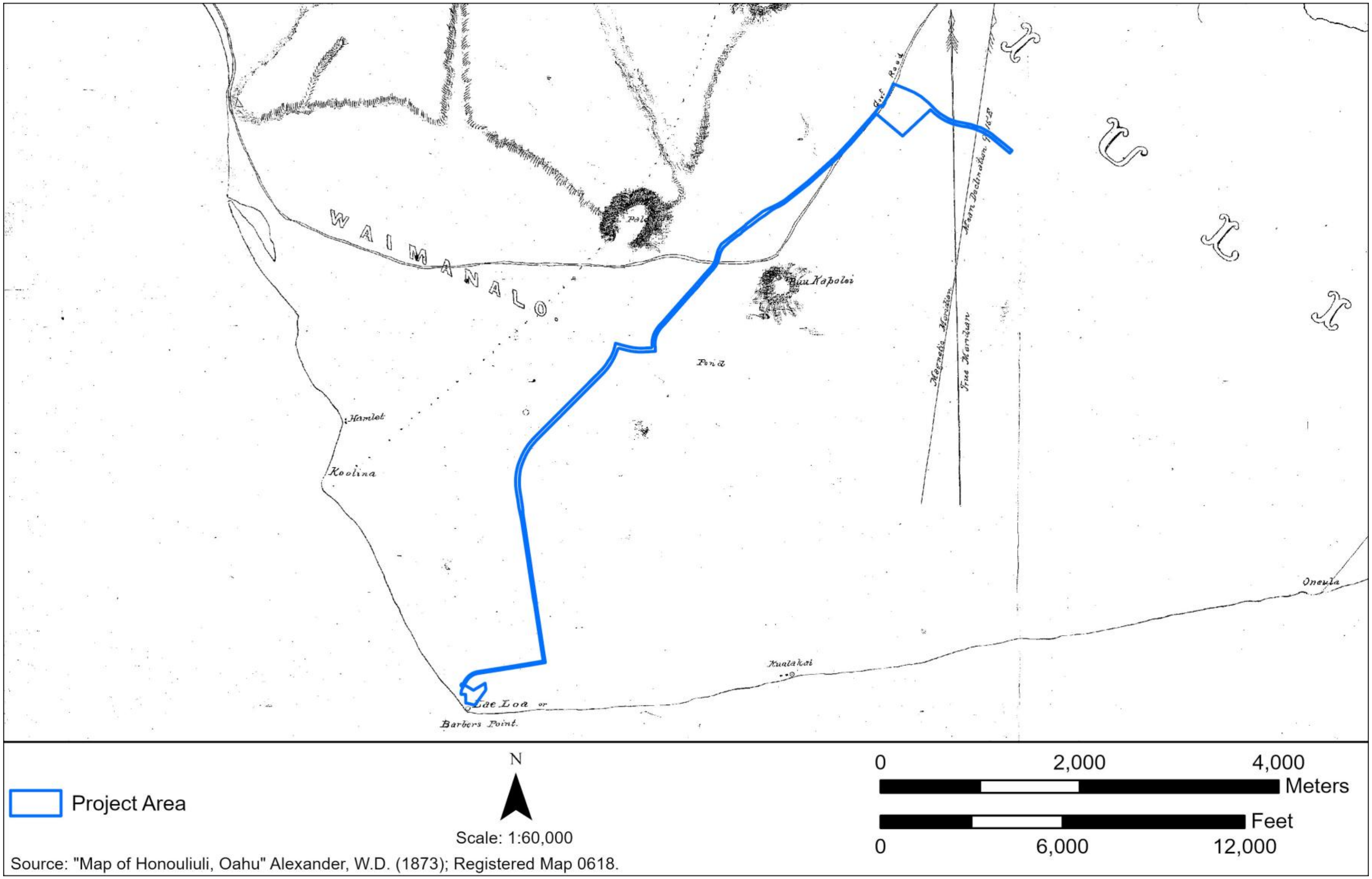


Figure 18. An 1873 map by Alexander shows the *mauka* portions of the project area intersecting with and running alongside the “Govt. Road”.

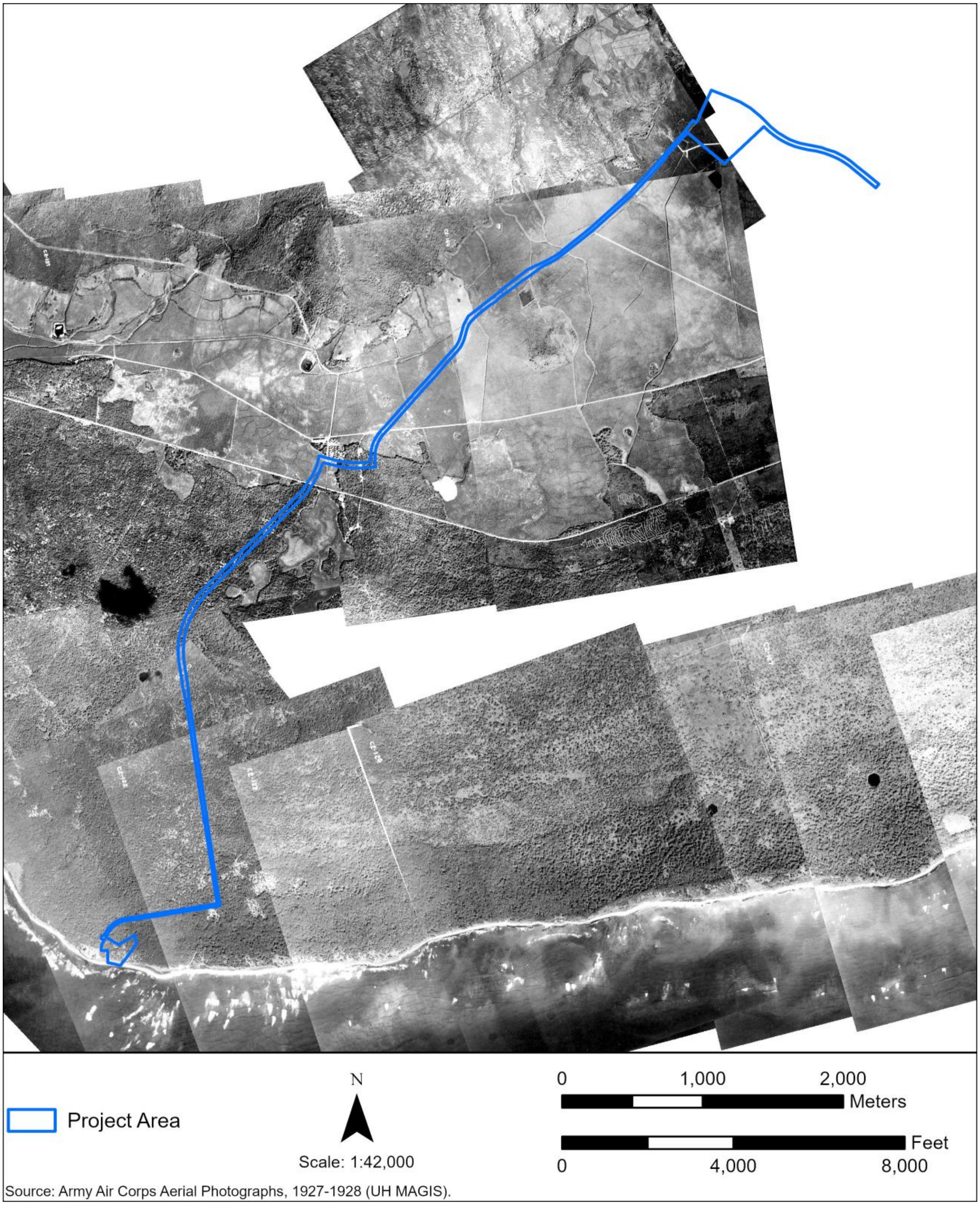


Figure 19. A composite of 1927-1928 Army Air Corps aerial images show the dense *kiawe* forests in the Barbers Point area during this time, as well as Ewa Plantation fields under cultivation to the north.

3.2.4 Ewa Plantation

The Ewa Plantation Company was established in Honouliuli in 1890, after the sub-subletting of more than 11,000 acres of land from B.F. Dillingham, to Castle, then to Ewa Plantation Company (Campbell 1994). The leases and other documentation mention some of the resources contained on the property, which included "ridge land, pasture, a wood lot at Waimanalo, bee-keeping and garden crops," as well as two limestone quarries on the coral flats, one near Waimānalo and one near Barbers Point (Frierson 1972:15).

By 1899, Ewa Plantation had an operational mill and over 2000 acres in sugarcane cultivation (Frierson 1972). By 1913, the plantation had expanded over much of the northern half of the ʻEwa Plain (Figure 20). By 1931, it was known as one of the most prosperous plantations in the Hawaiian Islands and, by the 1930s, most of the eastern half of Honouliuli was plantation land (Yucha et al. 2015:37). A 1939 map of the Ewa Plantation Co. illustrates the numerous subdivided agricultural plots within and around the project area (Figure 21). In 1970, Oahu Sugar Co. took over ownership of Ewa Plantation and continued its operation until 1995.

In the early 1900s, the Ewa Plantation operators began installing a system of drainage ditches that ran from the lower slopes of Honouliuli into the lowlands, in order to wash soil from the slopes into the plain and "reclaim" parts of the coral plain. Just before the rainy season, the hill slopes would be plowed vertically to induce soil erosion. At least 373 acres were reportedly claimed this way in a matter of years, though notably, this "gullying and soil removal" process had already been underway as a natural effect of removing vegetation (Frierson 1972).

Beekeeping was a commercial activity in the ʻEwa Plain between the late 1800s and early 1900s and various lease documents for the *ahupuaʻa* identified bees as one of the Ewa Plantation's assets in 1920 (Tuggle and Tomonari-Tuggle 1997:11).

Amateur historian John Bond described honey production on the ʻEwa Plain as follows:

> The Ewa Kiawe honey production industry also included many independent operations as well as the Hawaiian Honey Company. Incorporated in 1901, HHC was located along the Oahu Railway in Ewa, west of Ewa Mooring Mast Field, and managed approximately eighteen hundred colonies of hybrid bees, yielding some180,000 pounds of honey annually and shipping fifty to sixty tons of honey and wax from Honolulu each year. Honey Bees today remain one of the most important links in the ecological food chain and the Ewa Field park will have honey bees as a key park natural resource as well as preservation of the Karst caves and sinkholes. (J. Bond, Ewa Field – MCAS Ewa Historic World War II Memorial Park – American Veterans Hawaii [amvetshawaii.org])

Sisal (*Agave sisalana*) was imported from Florida in 1893 for cordage, and cultivated in the area southeast of Puʻu o Kapolei starting in 1894 (Kelly 1991:162). This cultivation was expanded during the early twentieth century under the Hawaiian Fibre Company, who had two primary plantations, one in Waipahu and the other on the ʻEwa Plain among "disintegrated coral" not deemed optimal for sugar cultivation (*Paradise of the Pacific*, in Yucha et al. 2015:31; Tuggle and Tomonari-Tuggle 1997:27). The Hawaiian Sisal Co. continued sisal production on Ewa Plantation lands from 1898 until the 1920s (Frierson 1972). By 1918, it was claimed that sisal was the most extensively used fiber in the U.S. The sisal cultivated in Hawaiʻi was shipped mainly to San Francisco, New York, and Japan (Kelly 1991:165). The 1902 map of Oʻahu by Donn and Wall shows a large sisal plot between the Ewa Plantation lands and the coral plains, to the east of the project area (see Figure 15).

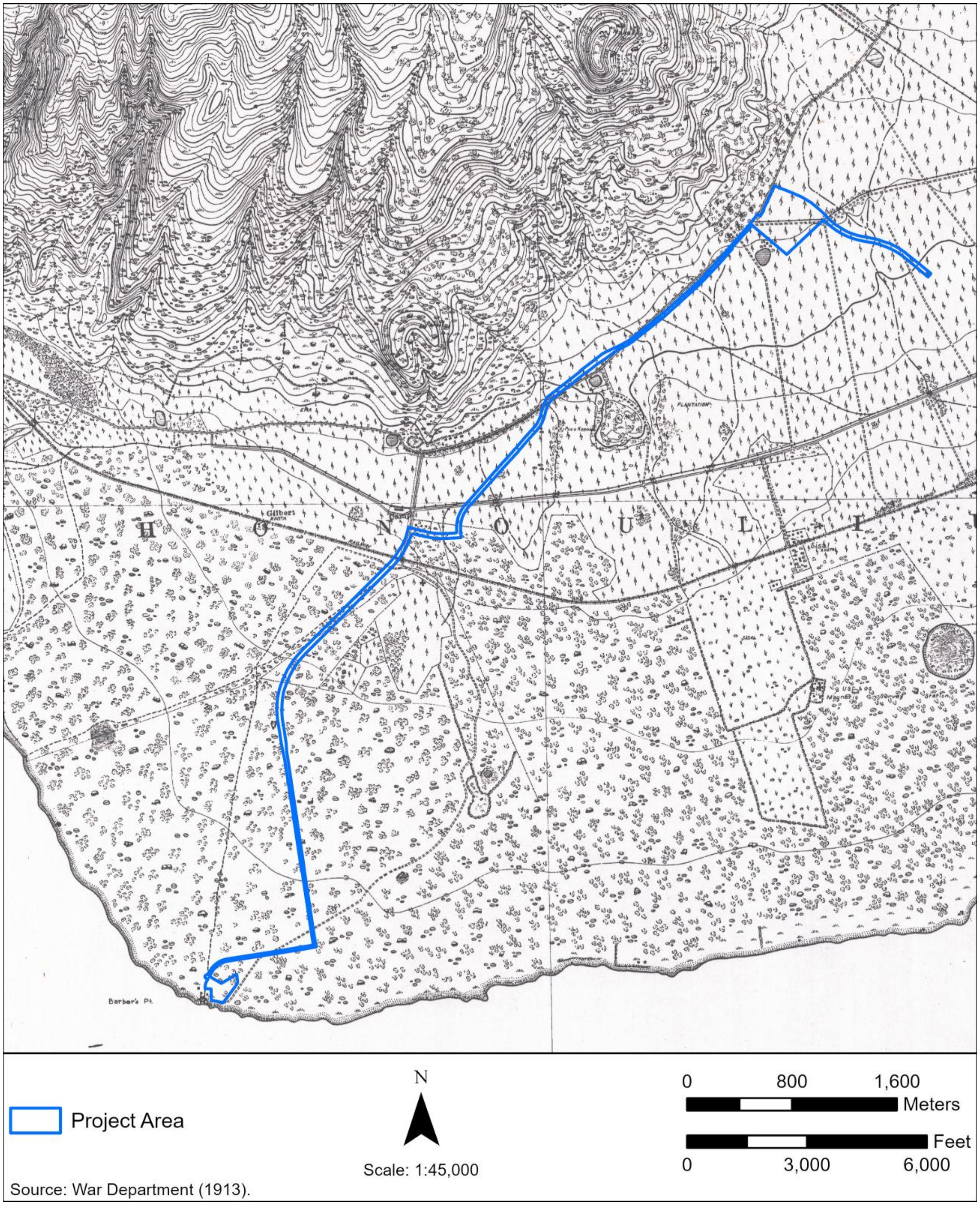


Figure 20. 1913 military survey map showing the project area passing through commercial agricultural fields, trails, boundary walls, and the OR&L Railroad.

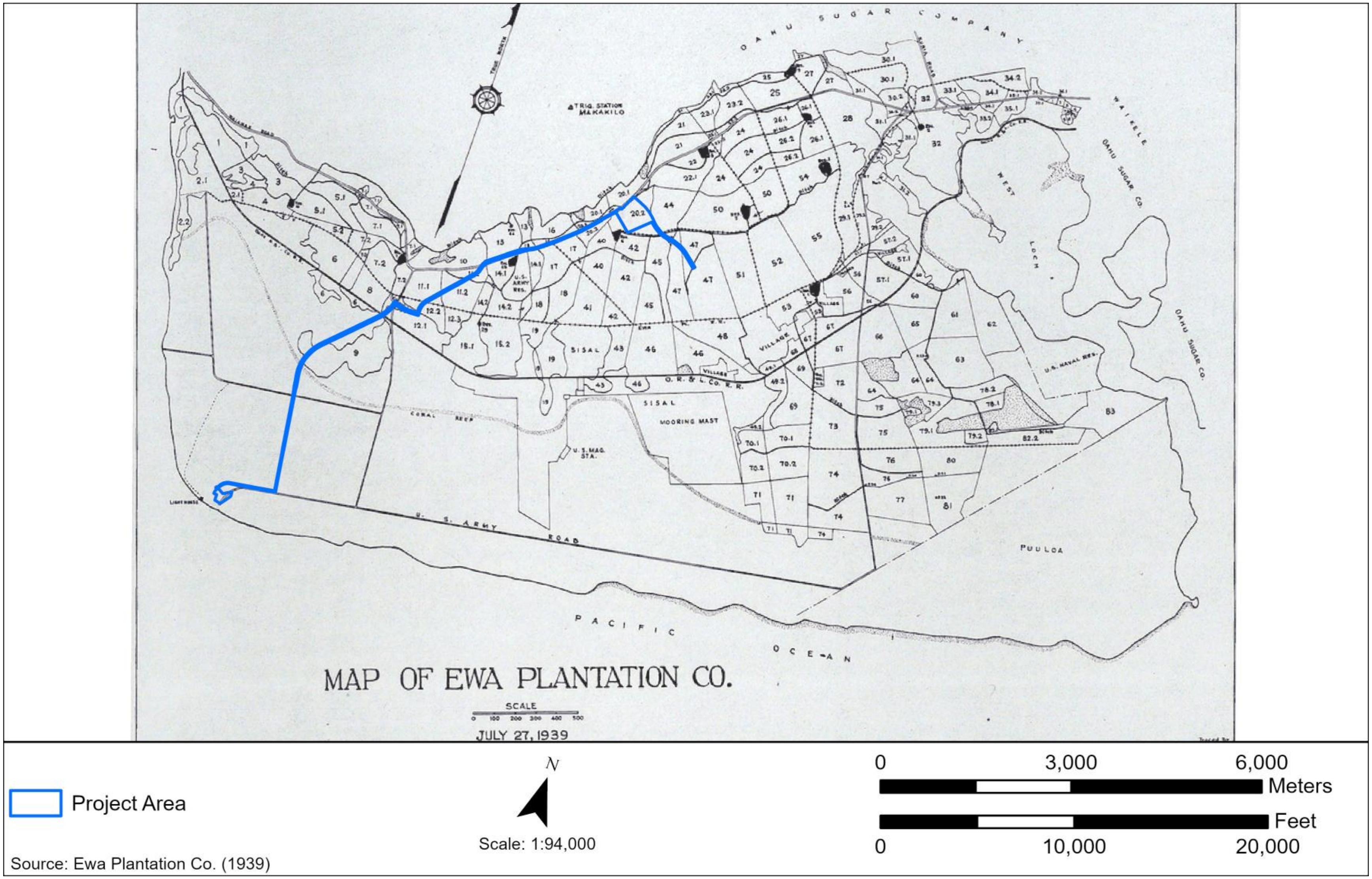


Figure 21. 1939 map made by the Ewa Plantation Co. showing the project area crossing through numerous Ewa Plantation agricultural parcels, which by this time extended to the boundary of the karstic "coral reef" plain.

3.2.5 The Oʻahu Railway & Land Company

Between 1885 and 1886, Campbell worked with B.F. Dillingham to develop small tracts of agricultural lands and homesteads in Honouliuli in what Thrum referred to as the “Great Land Colonization Scheme” (Thrum 1886). Their aim was to sell roughly 10,000 acres of homestead and agricultural land in lots sized between 10 and 100 acres, at $50 per acre, “for colonization purposes” (Thrum 1886:75). The parcels were to be sold under a 10-year installment plan, the terms of which included that the land would be fenced (“with a good substantial fence”; Thrum 1886:75) and the owner would build a suitable house for themselves on the lot within six months of the sale. Within a period of two years, they also required that at least 10 fruit and other trees per acre were planted. The 1886 description of the scheme cast the Honouliuli Ranch lands in a favorable light:

> This land is favorably situated, having direct communication with Honolulu by water, distance 10 miles, or by land by a good road, distance 17 miles, the latter offering singular facilities for an inexpensive railway track. The water route to Honouliuli is from Honolulu harbor skirting the reef to pearl harbor, a magnificent inlet of the ocean protected by a reef or bar with 11 to 13 feet, but inside with from 20 fathoms to 3 fathoms of land-locked, protected anchorage, fit for all classes of coasters and yachts…
>
> …where Honouliuli adjoins the neighboring properties, it is securely fenced. There are twenty miles of five wire fence with redwood posts, and ten miles batten fence, all in good order and erected within the last seven years.
>
> Stretching from Pearl harbor and skirting the base of Waianae mountains southward and eastward is a plain of about 7,000 acres of rich alluvial soil, eminently suitable—the upper portions for sugar and the lower for rice lands. Of these latter, from 3,000 to 4,000 acres may be irrigated by artesian wells, the elevation above high water mark being between 12 and 35 feet. A well sunk on this property in 1881, to a depth of 186 feet, has yielded unceasingly 2,400 gallons per hour since completion. Wells have been sunk at elevations from 400 to 700 feet about the sea level. Water was found at from 30 to 60 feet below surface. One is a flowing well; on the other a windmill suffices to raise drinking water for surrounding herds. The ravines of the Waianae slope are narrow wand readily lend themselves to favoring the construction of storage dams for purposes of irrigation. On the eastern slopes, among the foothills of the Waianae mountains are over 10,000 acres of land, suitable for smal [sic] arms, vineyards, orchards, &c…
> (Thrum 1886:74-75)

The description goes on to tout the abundance of perennial springs in the valleys and ravines, and past taro cultivation as evidence for abundant water. At the time, the sugar and rice lands were valued at $100-200 per acre, and the grazing and orchard lands were valued from $10-50 per acre.

The venture met with little success, likely in part due to the distance between Honouliuli and Honolulu. Consequently, in 1888, Dillingham and Campbell partnered to develop a railway system through the area, in what Thrum subsequently called the “the Colonization and Railroad scheme of Mr. B.F. Dillingham” (Thrum 1887:74), and what others called “Dillingham’s Folly” (Hungerford 1963:8). Campbell had offered to sell 56,000 acres in ʻEwa and Kahuku to Dillingham, but they ultimately settled on a 50-year lease when Dillingham was unable to come up with the funds needed to purchase (Chiddix and Simpson 2004; Frierson 1972). In 1889 Dillingham signed the lease and formed the Oahu Railway & Land Company (OR&L).

Building on Kalākaua's 1878 Act to Promote the Construction of Railways, which had already seen the development of passenger railroads on Maui and Hawaiʻi Island, in 1888 the legislature voted to approve Dillingham's franchise for a proposed new railroad. The charter allowed for 20 years of operation and required that the steam railway be operational between Honolulu and Pearl Harbor (then known as the Pearl River Lagoon) within three years, with no government subsidies (Chiddix and Simpson 2004). To save costs, Dillingham opted for the three-foot wide narrow-gauge track, rather than the 4'8.5" width standard gauge that was used for long haul railroads in the U.S. The rails were ordered from Germany, and the labor completed mostly by migrants from China.

Much of the OR&L permanent right-of-way was heavily ballasted by coral rock, and according to Lewis (1970):

> Miles of this coral roadbed are still visible on the coral plain, and where the railroad passes less than 200 feet from the robbed east end of our "Long Wall" it is hard not to believe that the ballast contains the crushed remains of many a house foundation, ancient wall, or even heiau. (Lewis 1970:16)

On King Kalākaua's birthday (November 16, 1889), the railroad opened and gave over 4,000 passengers a free 18-mile round trip ride. In 1890, OR&L's railroad was running from Honolulu to Pearl Harbor. In 1892, the first Ewa Plantation sugar crop was carried. The expansion of the railroad paused shortly after this. Hungerford (1963) speculated this was due to the political turmoil of the ensuing years, which saw Liliʻuokalani ascend to the throne followed by the overthrow of the Hawaiian Kingdom and the installation of a provisional government and republic under the presidency of Sanford Dole. In 1895, expansion of the railroad continued across the entirety of the ʻEwa Plain and into Waiʻanae (see Figure 13).

Dillingham established five ranches along his proposed railway line, all under the banner of the Oahu Railway and Land Company Ranches. There were ranches in Honouliuli, Nanakuli, Mokuleia, Kawailoa, and Kahuku. Harry M. Von Holt became the first ranch manager in 1890, and introduced the Shorthorn breed of cattle shortly thereafter, as they were known to be "good hustlers" and good for both dairy and beef (Hencke 1929:63).

The romantic picture of abundant springs and limitless artesian wells painted by Thrum's Almanac just a few years earlier may have been overstretched. Ida Elizabeth Knudsen Von Holt, wife of Harry Von Holt, described the struggle with finding sufficient water to maintain the herd:

> In the early days of the Ranch Department of the Oahu Railway & Land Co., of which Harry was Superintendent, the outstanding need for water for the stock, as the year before the ranches were taken over by the railway company a thousand head of cattle had died from want of water. Harry's first thought when out riding over the country was where to find water, and during the years 1890-91-92 much was done in the way of new troughs, getting water from the plantation flumes, and digging out wet places that showed any prospects of water. One of those places is on the old trail to Palehua, and had evidently been a place of which the Hawaiians had known, for its name is Kaloi (the taro patch), and even in dry weather water would be standing in the holes made by the cattle, as they tried to get a drop or two. (Von Holt 1985:136)

In an interview with Ernest Lewis, Herman V. Von Holt, a descendant of Harry Von Holt, provided his recollections of the OR&L Ranch:

> Only two Hawaiian cowboys ran the whole thing. The kiawe was too thick for herding cattle, so they built walls and fences around the water holes. When they wanted some cattle, they closed the gate and trapped them at the water. Then they ran them through all the way to the slaughterhouse at Honouliuli, through the cane fields.
> (Von Holt interviewed in Lewis 1970:15)

Von Holt also identified a shrimp pond in the vicinity of Barbers Point, and described the fishermen who would squat in shanties along the shore, trading fish for taro and drinking water from ponds “so brackish that other people could not bear to drink it” (Lewis 1970:15).

During World War II, OR&L began running day and night to shuttle troops, workers, supplies, and ammunition across the island. From 1941 to 1943, the annual OR&L passenger total exploded from under 1 million to 2,642,516. Old, discarded train coaches were brought back into commission to keep up with the volume, even those “from which seats had been removed and sliding side doors installed for use in conveying new cans from the American Can Co. factory to the pineapple canneries” (Hungerford 1963:34). There were times when a new train would arrive from Pearl Harbor and Barbers Point to Honolulu every 5 minutes. An Army Connecting Railroad was built as an alternate route in case the OR&L tracks were destroyed by enemy action, but it never became necessary (Hungerford 1963).

After the war, operations slowed and revenues shrank by 55%. Heavy wear on locomotives, tidal wave damage to the tracks, and increased short-haul competition from trucks placed significant pressures on OR&L. In 1947, B.F. Dillingham’s son Walter reluctantly applied for permission to abandon 81.2 miles of railway and close down operations outside of Honolulu. In 1950, Congress approved the sale of 30 miles of the OR&L track and right-of-way, extending from Pearl Harbor to the Lualualei ammunition depot, to the U.S. Navy for $1. This action preserved much of the original line through ‘Ewa and Nanakuli. A 1951 aerial image shows the OR&L Railroad right after this sale to the U.S. Navy (Figure 22).

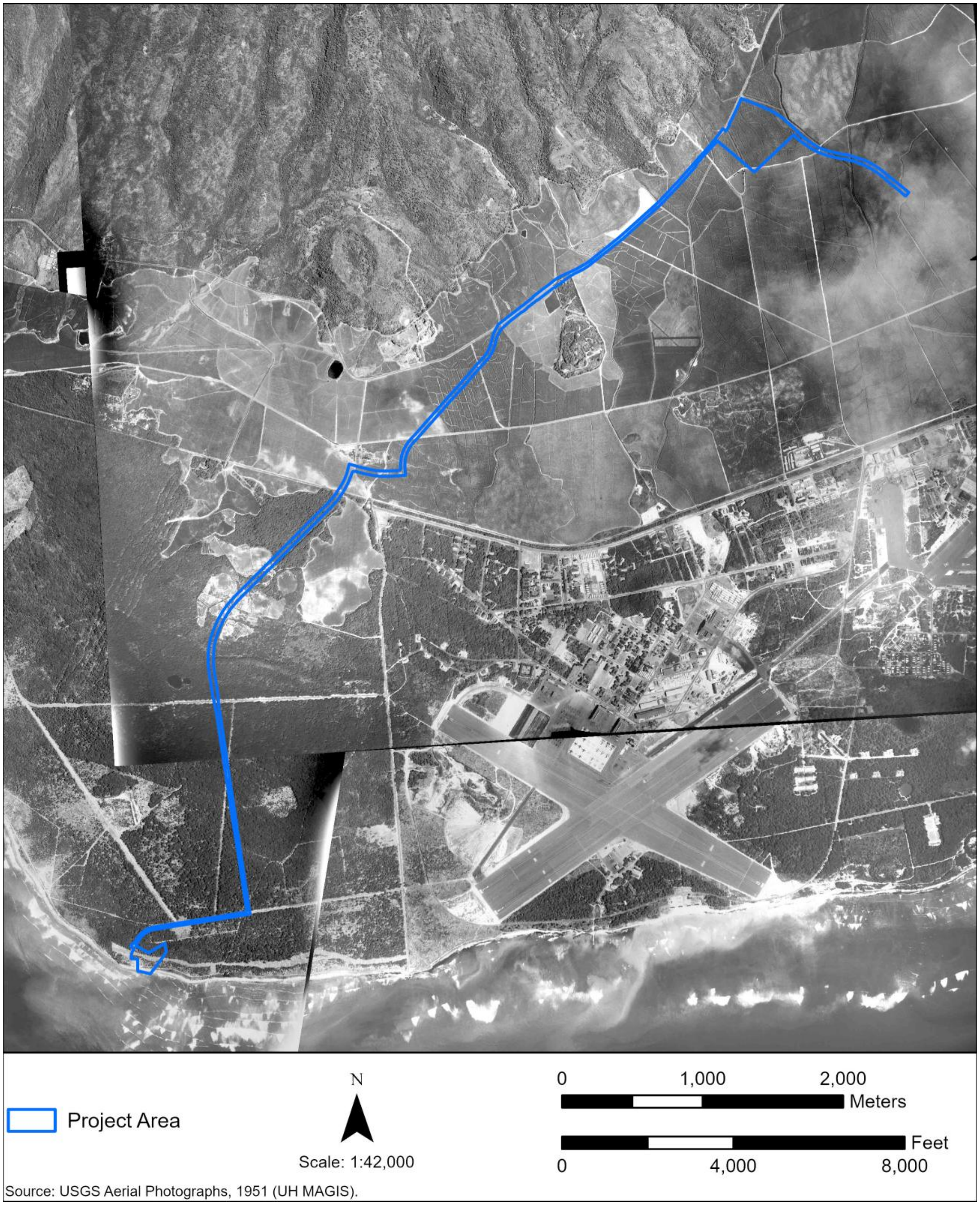


Figure 22. 1951 USGS aerial photo which shows the OR&L Railroad and military features shortly after WWII.

3.2.6 The Barbers Point Lighthouse

Henry Barber's ship, Arthur, may have been the first Western ship to run aground at Kalaeloa, but it would not be the last. Notably in 1855, the French whaleship *Marquis de Turenne* ran aground at Barbers Point after departing from Honolulu Harbor (Dean 1991). By this time, it has become clear that Barbers Point posed a hazard to seafarers and should be marked in some way. In 1880, William Dewitt Alexander was tasked with surveying the area to determine the best location for a lighthouse. His description of these efforts is reprinted in Dean (1991):

> I examined the coast for some miles in the neighborhood of Barber's Point, selected a site for a light house and marked the spot by a pile of stones and a staff with a red and white flag. I also fixed the position by triangulation and corrected our chart of that locality. It is the SW point of Oahu, known as Lae loa where there are several pieces of…the French whaleship *Marquis de Turenne*, which was wrecked about a mile off the point in 1855. A shoal with only 6 to 10 feet of water on it is said to extend 2 or 3 miles south by west from the point, and it should be sounded. In fact it is a question whether the light house might not be placed on a shallow spot or "okohola" whale's back, as the natives call it, a mile or more offshore. The best guide is old Moke, who lives in Honolulu not far from the Catholic Church and ought to accompany the sounding party. The best landing place in the neighborhood is at Koolina about 2 miles N.W. of the point under the lee of the land…Distance to Honolulu light house about 14 nautical miles." (Alexander 1880 in Dean 1991:18).

An 1873 map by Alexander (see Figure 18) shows the point, labeled "Lae Loa, or Barbers Point," to the south of the project area.

With Alexander having found the appropriate spot for the lighthouse on Barbers Point, in 1880 funds were appropriated for its construction. Unfortunately, due to shipping complications, these funds were exhausted before the lighthouse could be built and plans were postponed. Finally in 1887, funds were once again made available for lighthouse construction. James Campbell deeded roughly ½ acre at Barbers Point to the government for the lighthouse. A. Alona was appointed as the first lightkeeper in 1888 and paid $20 per month for the job (Dean 1991).

By 1904, the light station site had expanded to encompass two acres. By 1910, three more acres were added:

> An assistant keeper's dwelling stood close to the light tower, and a separate oil house had been built. At the edge of a thick growth of *kiawe* (algaroba) trees were the keeper's dwelling, a storeroom and barn, the laundry and the water tank.
>
> Kiawe, which grew abundantly throughout the light station acreage and beyond, was considered to be one of the most valuable trees introduced to Hawaiʻi, providing both animal fodder and firewood. Barbers Point was a major source of firewood for Honolulu after 1880, and there was continuous logging of the kiawe trees in the lighthouse area. (Dean 1991:20)

In 1915, a new lightkeeper's dwelling was built on the property, and over 3.5 miles of one-and-a-half inch pipes were laid to provide indoor plumbing to the site. Dean (1991) described an inspection visit from Frederick Edgecomb, a Lighthouse Service engineer, in 1916:

> He reached Barbers Point by traveling on the Oahu Railroad and Land Company train to "Gilbert Number 2" and then walking three miles along a rough coral road to the light station. The nearest post office was six miles distant at Ewa Mill. The station was fenced in;

> on the property, besides the light tower, there was a concrete oil house, a two-room storehouse, and two keepers' dwellings. The buildings were painted brown with white trim and had brown metal roofs. The keepers had recently whitewashed the tower, and Edgecomb reported that the station was well maintained. (Dean 1991:20)

According to Dean (1991), only two significant ship groundings have occurred since the lighthouse was established. The first was the *Sheridan*, an Army transport ship from Manila, which struck uncharted coral reef off Barbers Point in 1906. All 132 passengers were brought ashore, and all of its freight had to be offloaded, with tons of coal dumped overboard, before the *Sheridan* could be hauled off the reef. The second was the *West Eldura*, a cargo ship transporting sugar from Manila to New York, which ran aground in 1920 (Dean 1991).

By 1930, the lighthouse was showing signs of deterioration, and in 1933, funds were allotted to build a new reinforced concrete tower. The old tower was easily toppled, and in the words of Dean (1991): "Workmen cut into the soft coral foundation, in the same way a tree is felled, and the last of the old Hawaiian lighthouses crashed to earth" (Dean 1991:23). The new light proved useful not just for ships, but for airplanes landing in the Barbers Point Naval Air Station as well. In 1964, the new lighthouse was made automatic and no longer required a lightkeeper. As the Barbers Point industrial complex sprawled in the late 1980s, the lighthouse's former acreage diminished to a chain-link fence around "a small bit of rock and dry grass around the light" (Dean 1991:24).

3.2.7 U.S. Military Occupation

There was a major shift in land use in Honouliuli from agricultural to military in the late nineteenth century, as interest grew from the U.S. to utilize the islands as a geographically strategic base. Although the primary focus was the lochs of Puʻuloa, the adjacent plains of ʻEwa at Barbers Point were also a key site of U.S. military development in Hawaiʻi. An in-depth account of the military history at Barbers Point can be found in the main report and Appendix B of the Cultural Resource Survey by Tuggle and Tomonari-Tuggle (1997). The interested reader should seek the full account there.

The military presence on the ʻEwa Plain and Puʻuloa area started with the Reciprocity Treaty in 1887 which granted the U.S. exclusive rights to the waters of Puʻuloa, known today as Pearl Harbor. Strategically, having use of the lochs of Puʻuloa was a great advantage to the U.S. military operations because of Hawaiʻi's central location within the Pacific.

In July 1931, a battery of two 16-inch guns named Battery Hatch was established at Puʻu o Kapolei:

> Battery Hatch was comprised of two gun emplacements with 360 degree fields of fire. There was also a railroad connecting the dispersed emplacements, barracks, and pillboxes for machine guns to provide local defense. (Denfeld 1995:175)

Battery Hatch was named after Brigadier General Henry J. Hatch, who served in Hawaiʻi as a captain in the U.S. Army. The battery stood at the Fort Barrette Military Reservation (Denfeld 1995:175).

The Ewa Mooring Mast Field, which later became known as the Marine Corps Air Station Ewa (MCAS Ewa), was established east of the project area by the U.S. Navy with the intent to develop a base for airships, also known as dirigibles. In 1940, the U.S. military increased their leased area around the Ewa Mooring Mast Field to 3,500 acres and reinstated the mooring mast area to active military use as a Marine Corps Airfield (Tuggle and Tomonari-Tuggle 1997:27). At the time of the December 7, 1941 Japanese attack, the Marine Corps had expanded the Ewa Mooring Mast Field into an active airfield with two intersecting runways as well as an aircraft warmup platform and mooring apron, and the original mooring mast was converted to a control tower (Truluck and Ruzicka 2014:6). Squadrons were housed in a temporary camp on the north side of the airfield that consisted of "a mixture of quickly built wooden buildings and tents with wooden floors organized on a grid system" (Frye and Resnick 2013:7). Some of the larger caves and pits formed in the underlying coral bedrock were used as ammunition storage bunkers and the smaller ones served as machine gun nests (J. Bond, personal communication, November 8, 2021). The surprise attack on Ewa Field on December 7, 1941 by Imperial Japanese Navy aircrafts resulted in the death of four individuals, wounding of 13 others, and the destruction or partial destruction of all 49 planes parked on the apron. It motivated an expansion of the Marine base as Marine Corps Air Station (MCAS) Ewa from 1942–1943.

In 1942, the Navy moved their Carrier Air Service Units to the newly completed airfield at Naval Air Station (NAS) Barbers Point immediately to the southwest (Frye and Resnick 2013:11). NAS Barbers Point served as "a primary facility for carrier aircraft repair" while neighboring MCAS Ewa was a staging area for aircraft heading to the Pacific front (Tuggle and Tomonari-Tuggle 1997:40). Naval and Marine pilots and support staff who trained at MCAS Ewa were involved in most of the major battles in the Pacific, including Wake Island, Mariana Islands, Solomon Islands and Guadalcanal, Okinawa Island, Emirau Island, Gilbert Islands, Iwo Jima, and the Battles of Coral Sea and Midway (Resnick et al. 2018:7-2). During the Cold War era, NAS Barbers Point was an integral mid-Pacific military facility with multiple functions, such as antisubmarine patrol, and guided missile units. It served as the Pacific Airborne Barrier Command, among other top-secret surveillance programs (Tuggle and Tomonari-Tuggle 1997:41).

MCAS Ewa was decommissioned in 1952, its airfield was closed, and the surrounding land was absorbed into NAS Barbers Point (Mason 2020:104). Although the MCAS Ewa airfield and support buildings were abandoned at this time, most of the administration and technical buildings next to the airfield continued to be used by the Navy (Tuggle and Tomonari-Tuggle 1997:41). NAS Barbers Point was closed in 1999 and, except for a few leased parcels, much of the former base property is vacant and is presently overgrown with vegetation.

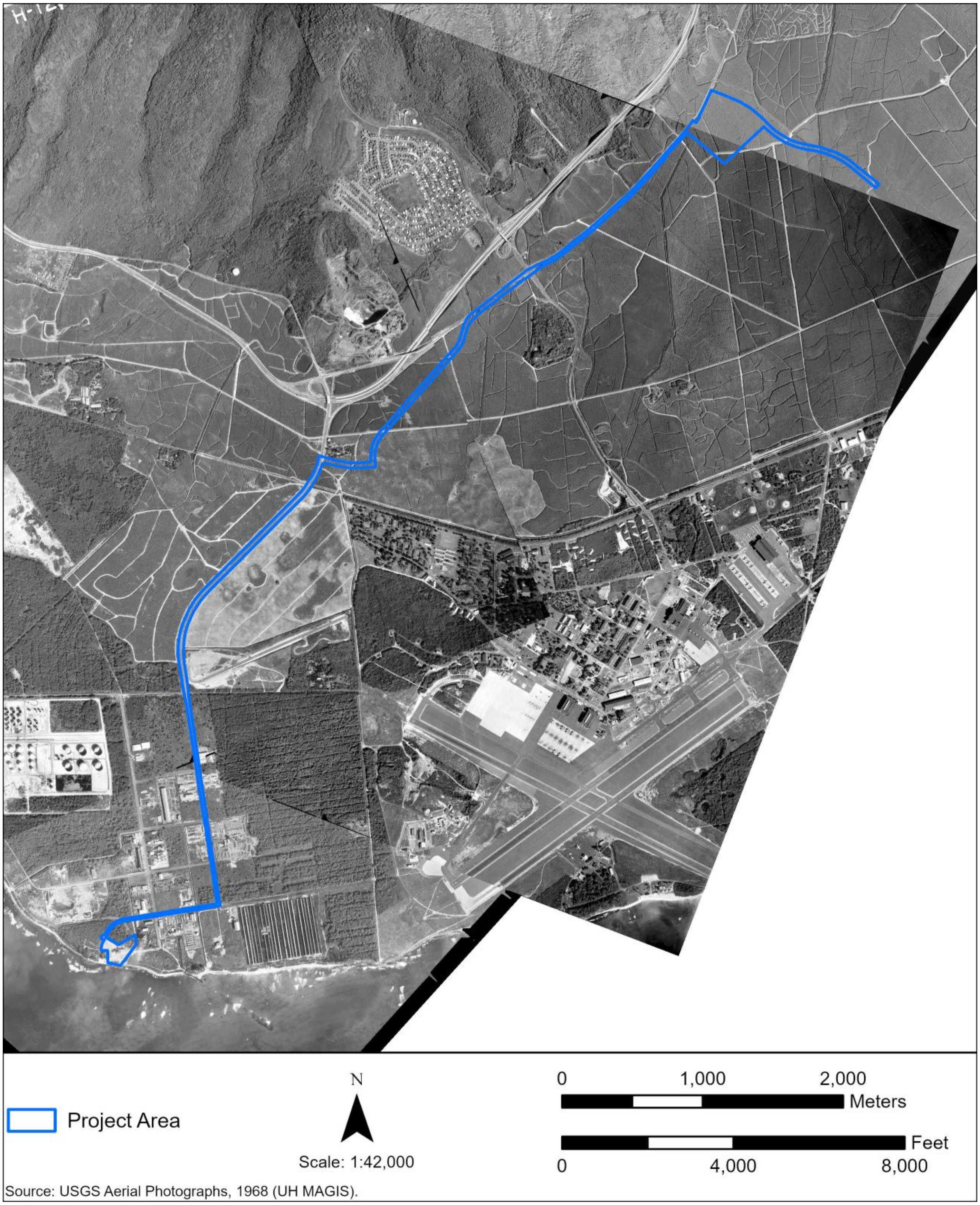


Figure 23. 1968 USGS aerial photo showing military presence on the Honouliuli landscape including the runways of Naval Air Station Barbers Point, as well as the continued agricultural land use and the growing industrialism in the area.

Figure 24. A 1977 USGS aerial photograph shows the growing industrial infrastructure in the Barbers Point area, with continued agricultural land use and growing urban development in the *mauka* portions of the project area.

3.2.8 Recent Development in Honouliuli

Between the end of WWII and the residential boom of the early 1960s, the land in many parts of Honouliuli remained primarily agricultural. However, the growth of activity around Barbers Point throughout the twentieth century still proved to be too much for some: a 1953 USGS map depicts the *makai* portion of the project area with the US Coast and Geodetic Survey (USC&GS) Observatory to the east (Figure 25). The USC&GS relocated their magnetometer to this site in the 1920s to move away from the "increasing cultural activity at Barbers Point" (Napier 2010). Then known as the Honolulu Observatory, it had been relocated to this portion of land on the ʻEwa Plain which was unsuitable for sugarcane agriculture, "far from civilization and at least a thousand feet above the nearest lava": the ideal conditions for magnetometry (Napier 2010). In 1947, the University of Hawaiʻi relocated their seismograph to this site and it became the Honolulu Magnetic and Seismological Observatory (Nature 1947). In the 2010s, the station relocated to Ford Island and is now known as the Pacific Tsunami Warning Center. The *mauka* portion of the 1953 map shows the project area passing near Waimanalo Village, as well as a number of military features in the areas *mauka* of the project area corridor (see Figure 25). A USGS map from nine years later labels the Honolulu Observatory a "Naval Reservation," and no longer depicts Waimanalo Village (Figure 26).

In 1960, it was announced that work would start on a "Giant New Oahu City" in a 1,300-acre area of the Campbell Estate named Makakilo (Penny 1960). At the time, Makakilo was planned to be the largest residential area in the Campbell Estate 20-year master plan for Honouliuli. It would include a civic center, churches, schools, small and large shopping centers, playgrounds, parks, a cemetery, and an apartment area. Houses would be offered on a 75-year lease for $15,000 to $40,000 (Penny 1960). Ground was broken for the Makakilo development on December 11, 1961 (*Honolulu Advertiser* 1961). By the next year, Makakilo City was heavily advertised in the local newspapers as "Oahu's First Planned City" (Figure 27). A 1968 USGS map shows more residentially-focused developments around the project area, including Makakilo City (Figure 28). Over time, subdivisions have gradually replaced many of the areas previously used for ranching, sugar cultivation, or military activities. A series of USGS maps illustrates this continued development into the 2010s (Figure 29). In the *makai* portions of the project area, this includes development of Campbell Industrial Park. The *mauka* areas include further residential development and the addition of a golf course and quarry. The surrounding area of Honouliuli, including Makakilo and Kapolei, has continued to grow, evolve, and face the effects of urbanization.

In January 1976, West Oʻahu College opened in Kapolei. In 1989, the institution's name was changed to the University of Hawaiʻi – West Oʻahu. The campus is located near the *mauka* portion of the project area. In April 2020, the United States Census Bureau reported that Kapolei had a population of 21,411 people (United States Census Bureau 2024). Aerial images from the 1990s and 2000s show a highly developed industrial and residential landscape around the project area (Figure 32 and Figure 33), which has continued in recent years.

Figure 25. 1953 USGS map showing railroad alignments, the United States Coast and Geodetic Survey Observatory to the east of the project area, passing near Waimanalo Village, with a number of military features on the *mauka* side.

Figure 26. 1962 USGS map shows the continued development of Barbers Point and the persistence of numerous military features in *mauka* areas of Honouliuli.

Figure 27. Advertisement for Makakilo City printed in the July 15, 1962 issue of the *Honolulu Advertiser*.

Figure 28. 1968 USGS map shows further development of Barbers Point including a raceway park to the east of the project area, the newly developed Makakilo City, and a quarry *mauka* of the northeastern portion of the project area.

Figure 29. 1983 USGS map shows the southwestern portion of the project area within Barbers Point Beach Park, industrial growth, a growing Makakilo City, and Naval Reservations around the northeastern portion of the project area.

Figure 30. 1998 USGS map shows a Coast Guard Reservation to the west of the southwestern portion of the project area, and the development of Makakilo City and Kapolei on either side of the northeastern portion of the project area.

Figure 31. 2017 USGS map shows the southwestern portion of the project area within "Kalaeloa Beach" and aligned with Olai St. and Kalaeloa Blvd, urban development and infrastructure around Makakilo City and Kapolei, and a series of gulches northwest of the proposed cable corridor.

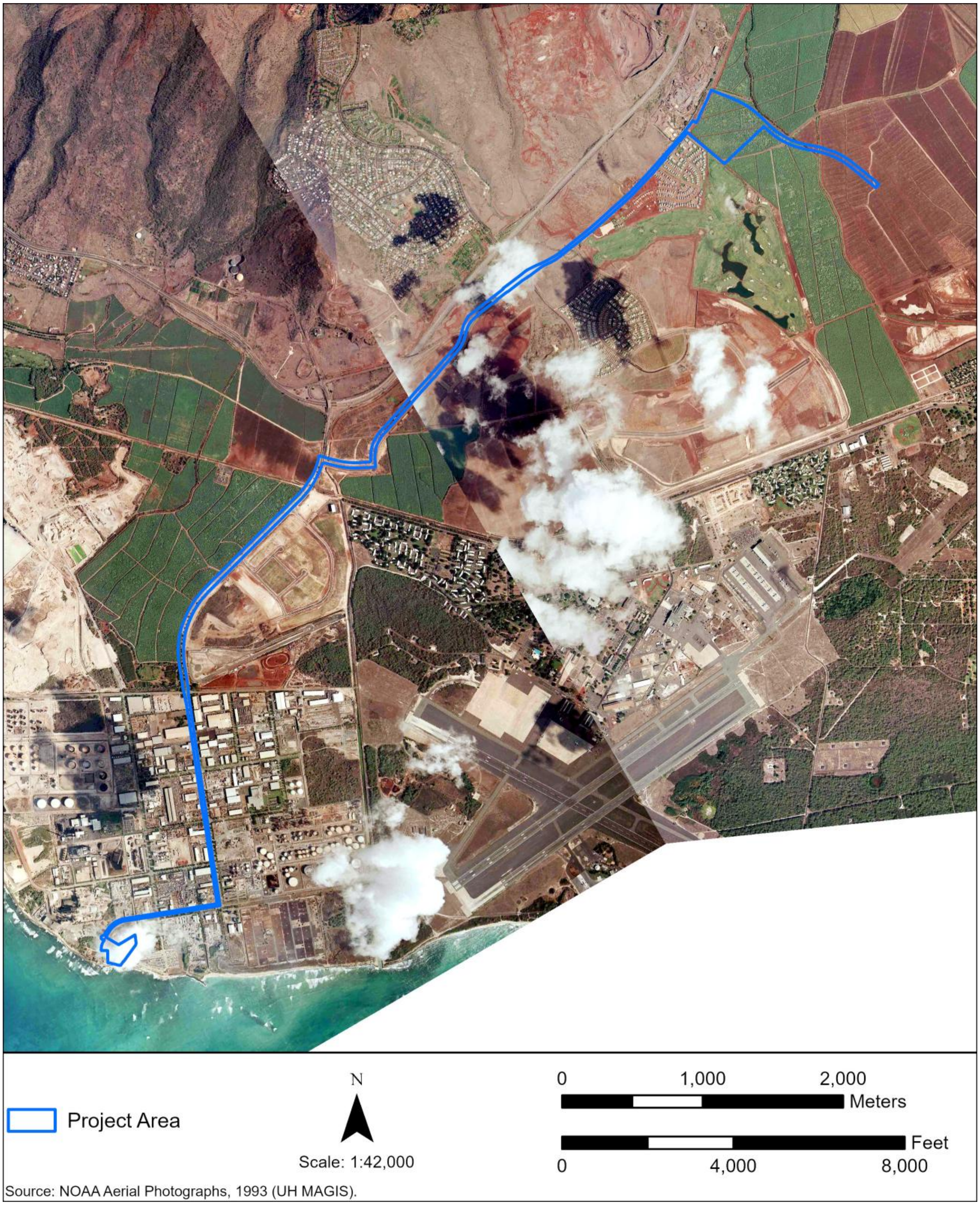


Figure 32. 1993 NOAA aerial photo. Note the encroaching subdivisions and other urban and industrial developments within former agricultural lands.

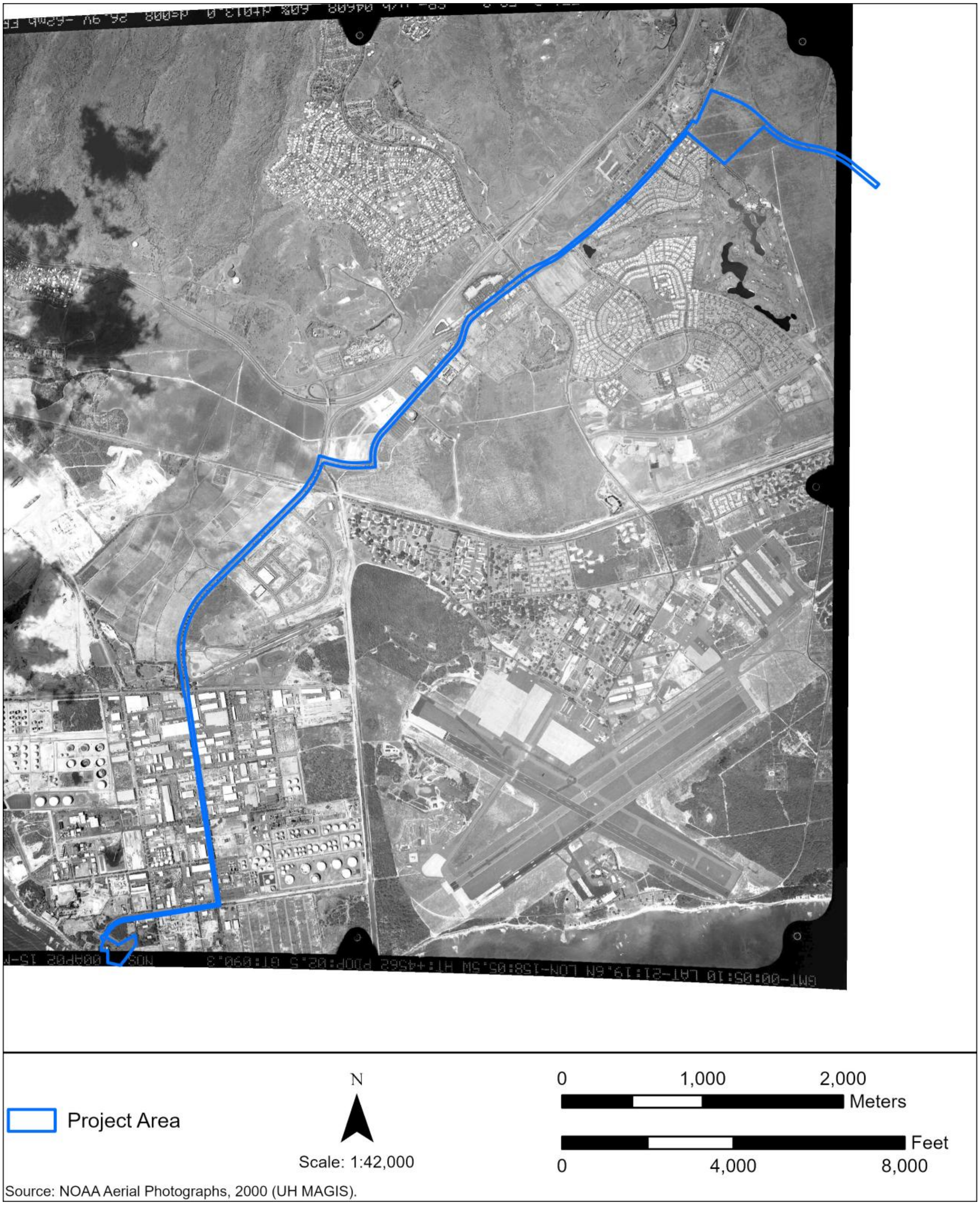


Figure 33. 2000 NOAA aerial photo showing a further intensified Honouliuli landscape, particularly the growth of Makakilo City, Kapolei, and the Campbell Industrial Park.

3.3 PREVIOUS ARCHAEOLOGY

A total of 63 archaeological studies have been conducted within a 0.5-mile buffer around the Oʻahu Subsea Cable Telecommunications Project Area (Figure 34 through Figure 38). Table 2 provides an overview of previous archaeological investigations with a summary of their findings. All previously identified historic properties within the 0.5-mile buffer are described in Table 3.

Within 0.5 miles of the project area, a total of 78 historic properties have been identified. Previously identified historic properties encompass a wide range of site types with both pre- and post-Contact associations. Pre-Contact historic properties include Puʻu o Kapolei Heiau (SIHP 50-80-12-00138), first documented by McAllister (1933). Puʻu o Kapolei was later designated as a Traditional Cultural Property (SIHP 50-80-12-08924) and is also the location of Fort Barrette, a post-Contact U.S. military structural complex (SIHP 50-80-12-05919; see Clark 1977; Kennedy 1991; Ostroff et al. 2001; and Monahan 2020). A large number of unmodified and modified limestone pits have been identified in the Barbers Point area (e.g., Belluomini et al. 2017; Davis 1988, 1989, 1990; Hammatt and Folk 1981; Sinoto 1979; Sinoto and Titchenal 2002a), and have been found to contain cultural and paleoenvironmental data and/or Hawaiian burials. Other pre-Contact historic properties include *ahu*, walls, platforms, mounds, a petroglyph, enclosures, and other sites with habitation, agricultural, and burial functions (e.g., Davis 1988, 1989, 1990; Hammatt and Folk 1981; Lewis 1970; Medina and Hammatt 2015; Ostroff et al. 2001; Sinoto 1979). Most post-Contact historic properties in the vicinity are associated with agricultural, transportation, or military activities (e.g., Hammatt et al. 1991; Nakamura et al. 1998; O'Hare et al. 2005, 2006; Rasmussen 2006; and Yucha et al. 2014).

Eleven of the previous archaeological studies (Clark 1979; Groza and Hammatt 2010; Hammatt and Shideler 2001; Haun 1986a; Knecht et al. 2020; Magnuson 1999; O'Hare et al. 2005a, 2005b; Oshima 1975; Rasmussen and Tomonari-Tuggle 2006; Spear 1996) included a portion of the current project area. Only one of these (Knecht et al. 2020) identified historic properties within the current project area.

Portions of two historic properties have been documented within the current project area: SIHP 50-80-1207387/50-80-12-09714, the OR&L Railroad right-of-way, which was placed on the NRHP in 1975, and a portion of SIHP 50-80-12-08933, a crushed limestone gravel road (Knecht et al. 2020). The OR&L ROW was described as follows in the 2012 NRHP Registration Form for the OR&L ROW and Rail Yard:

> The ROW contains the longest stretch of narrow-gauge railroad track in Hawaii. It consists of 15 miles of narrow-gauge steel rails (36") on a raised roadbed of mixed materials running from Honouliuli to Nanakuli. Width of the ROW is 40 feet along its entire length. (Rewick 2012)

SIHP 50-80-12-08933 was described by Knecht et al. (2020; on file at SHPD) as "a remnant compacted crushed limestone gravel road that is present sporadically along much of the southeast length of the project area" (HICRIS Resource Overview).

A Literature Review and Field Inspection (LRFI) was completed for the Proposed Oʻahu Subsea Cable Telecommunications Project by Pacific Legacy in 2025. The LRFI documented the previously identified OR&L ROW (SIHP -07387/-09174) and crushed limestone gravel road (SIHP -08933) in the project area, as well as 15 additional potential historic properties which included post-Contact bridges, canals and/or storm drains, culverts and/or ditches, a berm, a road, and a push pile. In addition, two isolated metal blade implement artifacts, potentially associated with post-Contact commercial agriculture, were identified within the project area. The LRFI recommended that an architectural reconnaissance level survey (RLS) and archaeological inventory survey (AIS) be completed to fully identify and document all potential historic properties and provide significance assessments and recommendations in accordance with HRS Chapter 6E.

Table 2. Previous Archaeological Studies Within 0.5 Miles of the Oʻahu Subsea Cable Telecommunications Project Area

Reference	Type of Study	Findings
McAllister 1933	Island-wide Survey	Identified Puʻu o Kapolei Heiau, later designated as SIHP 50-80-12-00138.
Lewis 1970	Archaeological Reconnaissance	Identified 22 historic properties: housing complexes, cairns, mounds, *ahu*, pits, and walls of undetermined function. No SIHP numbers assigned.
Barrera 1975	Archaeological Reconnaissance	Identified 24 historic properties: pre- and post-Contact temporary and permanent habitations, mounds, fishing shrines, walls, and limestone pits. No SIHP numbers assigned.
Oshima 1975	Archaeological Reconnaissance	No historic properties identified.
Sinoto 1976	Cultural Resources Survey	Identified 68 historic properties: ranching walls, railroad grade, and agricultural features. No SIHP numbers assigned.
Clark 1977	Archaeological Reconnaissance	Reconnaissance of the previously identified site of Puʻu o Kapolei Heiau (McAllister 1933; SIHP 50-80-12-00138). Identified 20 military structures. SIHP number 50-80-12-05919/50-80-12-08924 assigned to Fort Barrette and Puʻu o Kapolei TCP.
Davis & Griffin 1978	Archaeological Inventory Survey	Identified 23 historic properties: pre- and post-Contact habitation, agricultural features, and boundary or burial marker features. No historic properties identified within the 0.5-mile project area buffer.
Clark 1979	Archaeological Reconnaissance	No historic properties identified.
Sinoto 1979	Cultural Resource Survey	Identified 40 historic properties including pre-Contact habitation, *ahu*, and modified and unmodified limestone pit features (SIHP 50-80-12-01700 through 50-80-12-01709, 50-80-12-09651 through 50-80-12-09699).
Hammatt & Folk 1981	Archaeological and Paleontological Investigation	Located 88 previously identified temporary and permanent habitation features and conducted test excavations at 26 historic properties. A total of 12 historic properties were located inside the 0.5 mile project area buffer: unmodified and modified limestone pit features (SIHP 50-80-12-02623, 50-80-12-02624, 50-80-12-09669, 50-80-12-09670); rectangular enclosure (SIHP 50-80-12-09661); agricultural complex (SIHP 50-80-12-09664); platform (SIHP 50-80-12-09665); rectangular platform (SIHP 50-80-12-09676); C-shape and attached wall (SIHP 50-80-12-09679); circular enclosure (SIHP 50-80-12-09682); U-shape (SIHP 50-80-12-09683); and C-shape with limestone pit (SIHP 50-80-12-09684).
Ahlo & Hommon 1983	Archaeological Reconnaissance	Identified eight potential historic properties. No historic properties identified within 0.5 miles of the project area.

Reference	Type of Study	Findings
Hommon & Ahlo 1984	Test Excavations	Conducted testing at eight historic properties previously identified by Ahlo and Hommon (1983).
Haun 1986a	Archaeological Reconnaissance	Documented a single irrigation ditch and noted the presence of a WWII-era structure. No historic properties identified within 0.5 miles of the project area.
Haun 1986b	Archaeological Reconnaissance	Identified a single historic property (irrigation ditch). No historic properties identified within 0.5 miles of the project area.
Rosendahl 1987a	Archaeological Reconnaissance	No historic properties identified.
Rosendahl 1987b	Archaeological Reconnaissance	No historic properties identified.
Davis 1988	Archaeological Reconnaissance	Identified at least 15 limestone pits with data recovery potential including one within 0.5 miles of the project area (SIHP 50-80-12-04099).
Sinoto 1988	Archaeological Reconnaissance	Identified a single historic property (wall segment). No historic properties identified within 0.5 miles of the project area.
Burgett and Rosendahl 1989	Subsurface Testing	No historic properties identified.
Davis 1989	Archaeological Inventory Survey	Determined that four limestone pits previously identified by Davis (1988) had been destroyed by bulldozing activities.
Carlson & Rosendahl 1990	Archaeological Inventory Survey	No historic properties identified. An Archaeological Assessment Report was submitted to SHPD.
Davis 1990	Archaeological Inventory Survey	Excavated four of 13 limestone pits previously documented by Davis (1988). Identified a human burial at SIHP 50-80-12-04099.
Folk 1991	Archaeological Reconnaissance	Identified three areas for further study: a Kuleana lot, the Camp Malakole parcel, and a beach berm with an overlying dune. No historic properties identified within 0.5 miles of the project area.
Hammatt et al. 1991	Archaeological Inventory Survey	Identified 34 sites, including permanent and temporary habitation, agriculture, rock shelter, petroglyphs, *ahu*, and sugarcane cultivation features. Two historic properties identified within 0.5 miles of the project area: a ditch (SIHP 50-80-12-04341) and a complex of water control features (SIHP 50-80-12-04342).
Haun 1991	Archaeological Reconnaissance	Documented 43 historic properties, including pre-Contact habitation, agriculture, burial, ceremony, and water sources in limestone pits, and post-Contact ranching, agriculture, and U.S. military training structures. No historic properties identified within 0.5 miles of the project area.
Kennedy 1991	Subsurface Testing	Identified 14 military structures associated with Fort Barrette. No historic properties identified within 0.5 miles of the project area.
Jones 1993	Archaeological Inventory Survey-Phase I	Documented five sites previously identified by Haun (1991), including pre-Contact habitation and agriculture, and historic and U.S. military sites. No historic properties identified within 0.5 miles of the project area.
Schilz & Landrum 1996	Test Excavation	No historic properties identified.
Spear 1996	Archaeological Reconnaissance	No historic properties identified.

Reference	Type of Study	Findings
Tuggle & Tomonari-Tuggle 1997	Archaeological Inventory Survey	Identified 92 sites, including 57 previously identified and 35 newly identified historic properties. Sites included habitation, agriculture, and burial sites, limestone pit complexes, twentieth century homesteads and ranching features, and military structures. No historic properties identified within 0.5 miles of the project area.
Wickler & Tuggle 1997	Archaeological Inventory Survey as part of a Cultural Resource Inventory	Conducted further documentation and excavation of 28 previously identified sites. No historic properties identified within 0.5 miles of the project area.
Nakamura et al. 1998	Archaeological Inventory Survey	Identified a single historic property: an irrigation system constructed by the Ewa Plantation Company. No historic properties identified within 0.5 miles of the project area.
Magnuson 1999	Archaeological Reconnaissance	No historic properties identified.
Beardsley 2001	Survey and Testing	Conducted documentation and excavation of 63 sites. No historic properties identified within 0.5 miles of the project area.
Hammatt & Shideler 2001	Archaeological Assessment	No historic properties identified.
Ostroff et al. 2001	Archaeological Inventory Survey	Identified a stone mound (SIHP 50-80-12-05918), a petroglyph (SIHP 50-80-12-05918), and 40 features associated with Fort Barrette (SIHP 50-80-12-05919/50-80-12-08924).
Sinoto & Titchenal 2002a	Archaeological Inventory Survey	Identified 3 historic properties: a pre-Contact habitation complex, a limestone kiln, and a complex of unmodified limestone pits. No historic properties identified within 0.5 miles of the project area.
Sinoto & Titchenal 2002b	Archaeological Monitoring Report	No new historic properties identified.
O'Hare et al. 2004	Documentation of Plantation Infrastructure	Identified two post-Contact historic properties associated with the Ewa Plantation Company. SIHP 50-80-12-06679 is an irrigation feature located within 0.5 miles of the project area.
Hoffman et al. 2005	Archaeological Inventory Survey	Documented 13 previously identified and six newly identified historic properties including modified limestone sinkholes, agricultural clearing mounds, temporary habitation, agricultural and ranching walls, a plantation flood control canal, enclosures, geographic marker, a concrete flume, a cist mound, a burial cave, and the OR&L Railroad right-of-way (SIHP 50-80-12-07387 / 50-80-12-09174). A single historic property is located within 0.5 miles of the project area (SIHP 50-80-12-06684, a temporary habitation pavement with uprights).
O'Hare et al. 2005a	Literature Review and Field Inspection	Identified four additional features of a previously documented plantation-era irrigation site (SIHP 50-80-12-06678).
O'Hare et al. 2005b	Archaeological Inventory Survey and Cultural Impact Evaluation	Located three previously identified historic properties within 0.5-miles of the current project area: a ditch/flume (SIHP 50-80-12-04341), a reservoir (SIHP 50-80-12-04342), and a drainage ditch (SIHP 50-80-12-06679). No new historic properties were identified and an Archaeological Assessment and Cultural Impact Evaluation was submitted to SHPD.
McDermott et al. 2006	Archaeological Inventory Survey	Documented three previously identified historic properties, two of which are located inside the current project area buffer (the OR&L

Reference	Type of Study	Findings
		Railroad right-of-way, SIHP 50-80-12-07387 / 50-80-12-09174 and a plantation-era drainage channel, SIHP 50-80-12-06679), and the Barbers Point Archaeological District. Three newly identified historic properties consisted of habitation features and unmodified limestone pits.
Rasmussen 2006	Archaeological Assessment	Identified a single historic property (SIHP 50-80-12-04664), consisting of features associated with sugarcane cultivation.
Rasmussen & Tomonari-Tuggle 2006	Archaeological Monitoring Report	No historic properties identified.
O'Leary et al. 2007	Archaeological Inventory Survey Addendum	Identified two historic properties, one related to animal husbandry (SIHP 50-80-12-06870) and one of undetermined function (SIHP 50-80-12-06871).
Tulchin et al. 2007	Archaeological Inventory Survey	No historic properties identified. An Archaeological Assessment Report was submitted to SHPD.
Groza et al. 2008	Archaeological Inventory Survey	No historic properties identified. An Archaeological Assessment Report was submitted to SHPD.
McCoy & Clark 2008	Archaeological and Cultural Impact Assessment	No new historic properties identified; assigned a SIHP number (SIHP 50-80-12-06684) to the previously documented burial preserve.
Groza & Hammatt 2010	Archaeological Monitoring Report	No historic properties identified.
Condit & Allen 2011	Archaeological Monitoring Report	No historic properties identified.
Gosser et al. 2011	Archaeological Inventory Survey	Identified four previously documented historic properties and 13 new historic properties, including one within the proposed 0.5 mi buffer (SIHP 50-80-12-07176, a military complex).
Runyon et al. 2012	Archaeological Assessment	No historic properties identified.
Gosser et al. 2013	Archaeological Monitoring Report	Conducted archaeological monitoring at six previously identified historic properties, including pre-Contact habitation and agricultural sites, and features related to Naval Air Station Barbers Point. No historic properties identified within the 0.5 mi project area buffer.
McElroy & Elison 2013	Archaeological Inventory Survey	Identified 10 new features associated with pre- to early post-Contact habitation/agricultural/burial/ranching complex. No historic properties identified within the 0.5 mi project area buffer.
Yucha et al. 2014	Archaeological Inventory Survey	Identified two previously identified historic properties, both within 0.5 miles of current project area (water control features, SIHP 50-80-12-04341 and 50-80-12-04342). One newly identified historic property: a quarry remnant (SIHP 50-80-12-07669).
Medina & Hammatt 2015	Archaeological Monitoring Report	Identified a pre-Contact cultural deposit (SIHP 50-80-12-07402) during archaeological monitoring.
Hazlett & Spear 2016	Archaeological Inventory Survey	No historic properties identified. An Archaeological Assessment Report was submitted to SHPD.
Belluomini et al. 2017	Archaeological Inventory Survey	Identified two historic properties consisting of military features (SIHP 50-80-12-06866) and unmodified limestone pits with faunal remains (SIHP 50-80-12-07835).

Reference	Type of Study	Findings
Fechner & Cleghorn 2017	Archaeological Monitoring Report	No historic properties identified.
Knecht et al. 2020	Intensive Survey	Data from HICRIS; full report for this survey was not located. Identified 4 historic properties related to the Ewa Plantation (SIHP 50-80-12-08928, agricultural complex; SIHP 50-80-12-08931, transportation and water control complex; SIHP 50-80-12-08932, concrete culvert; SIHP 50-80-12-08933, a gravel road).
Spangler et al. 2020	Archaeological Monitoring Report	Identified one additional feature of SIHP 50-80-12-06866 (WWII-era military features).
Yarbrough 2020	Architectural Reconnaissance Survey	Identified one historic property: a wastewater treatment facility (SIHP 50-80-12-09129).
Belluomini et al. 2022	Archaeological Monitoring Report	Identified two historic properties: the Gilbert Triangulation Station and a portion of the OR&L Railroad right-of-way (SIHP 50-80-12-07387/50-80-12-09714).
Swift et al. 2025	Archaeological Literature Review and Field Inspection	Identified 17 potential historic property features and artifacts, including two previously identified historic properties (a portion of the OR&L Railroad right-of-way, SIHP 50-80-12-07387 50-80-12-09174, and a portion of a crushed limestone gravel road, SIHP 50-80-12-08933). Additional potential historic properties include bridges, canals, culverts, ditches, berms, drainage features, a road, and push piles.

Note: Previous studies that include the current project area are highlighted in gray.

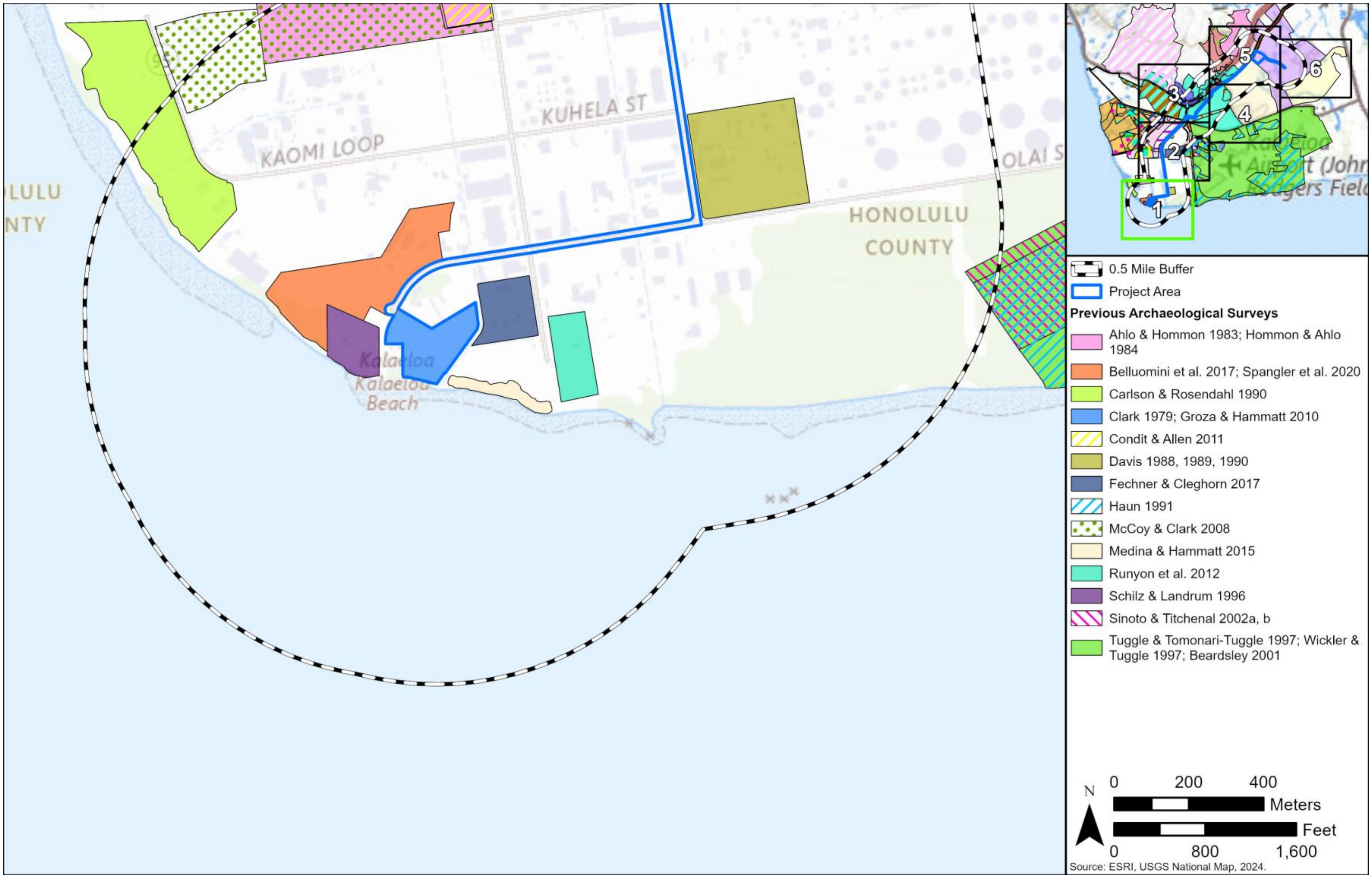


Figure 34. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu Subsea Cable Telecommunications Project Area, Tile 1 (base map: Esri USGS National Map 2024).

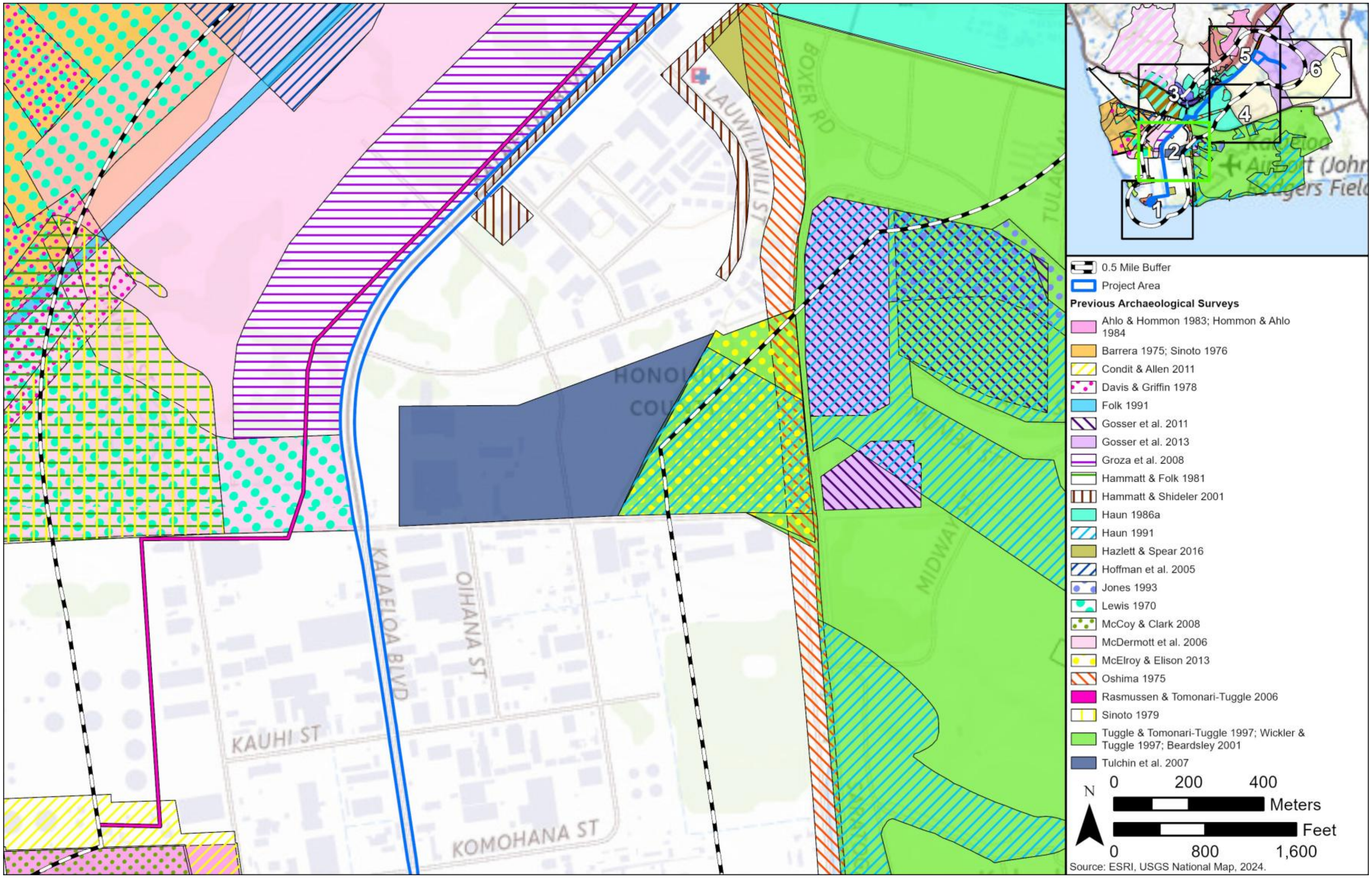


Figure 35. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu Subsea Cable Telecommunications Project Area, Tile 2 (base map: Esri USGS National Map 2024).

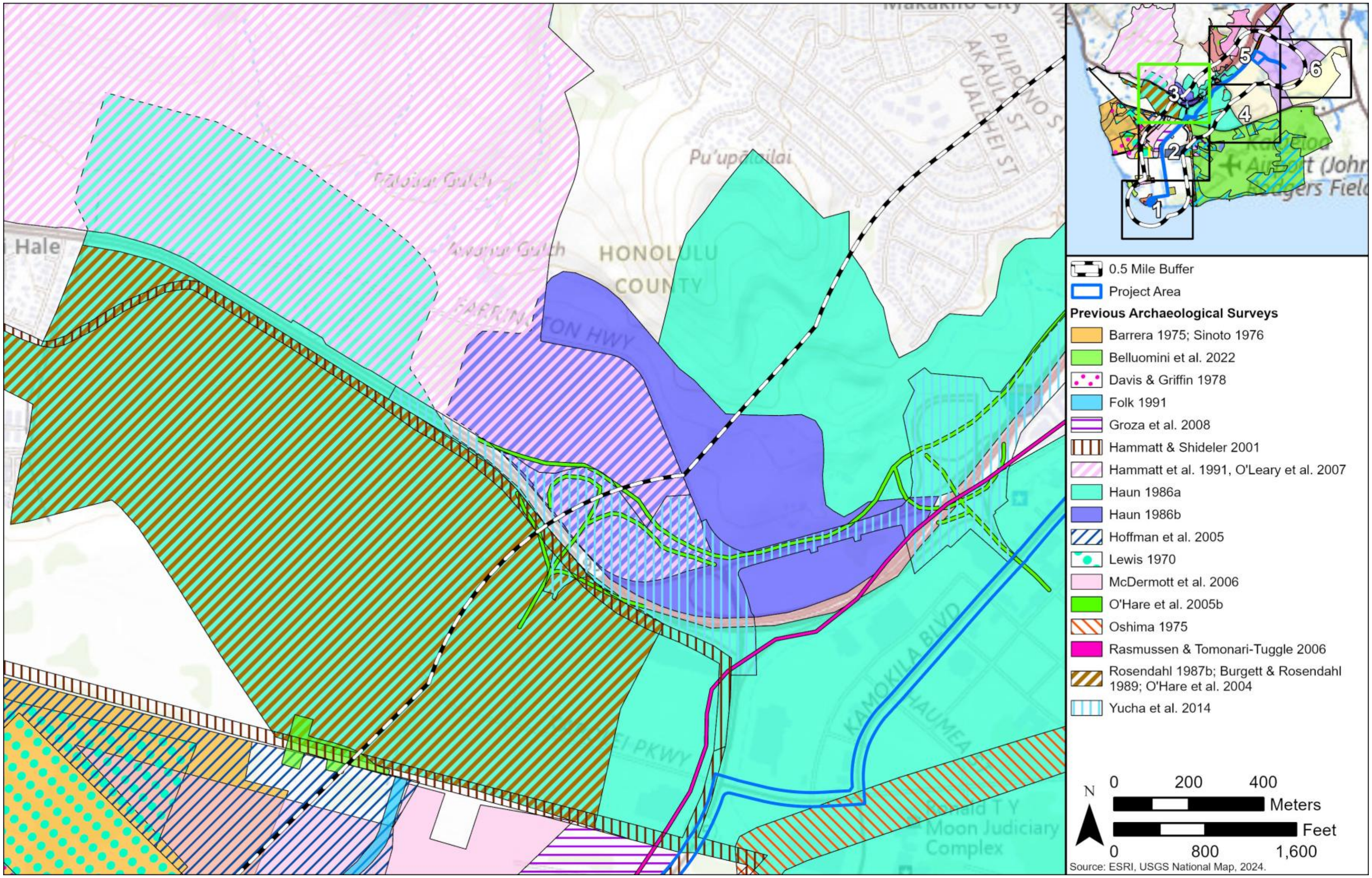


Figure 36. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu Subsea Cable Telecommunications Project Area, Tile 3 (base map: Esri USGS National Map 2024).

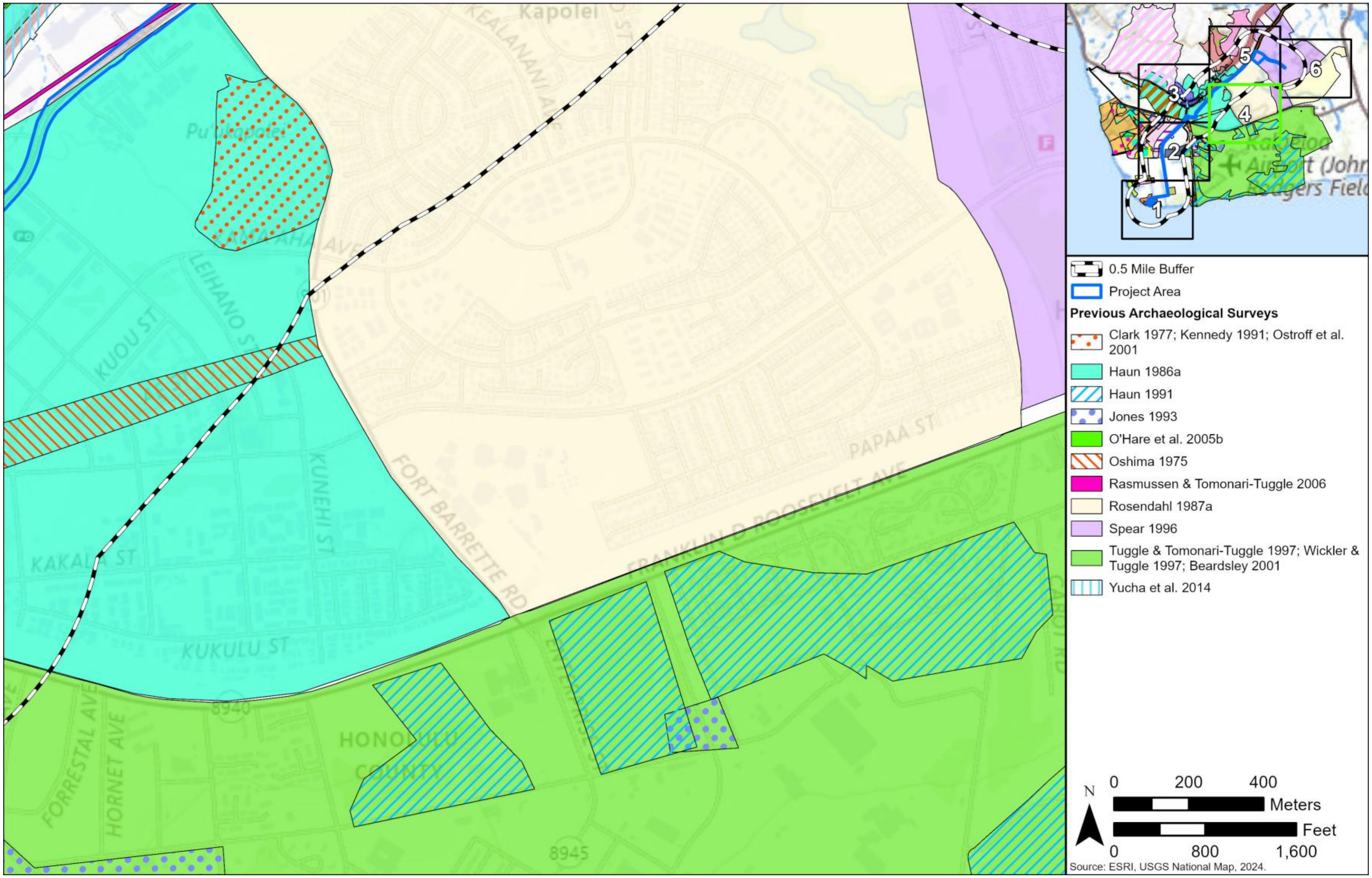


Figure 37. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu Subsea Cable Telecommunications Project Area, Tile 4 (base map: Esri USGS National Map 2024).

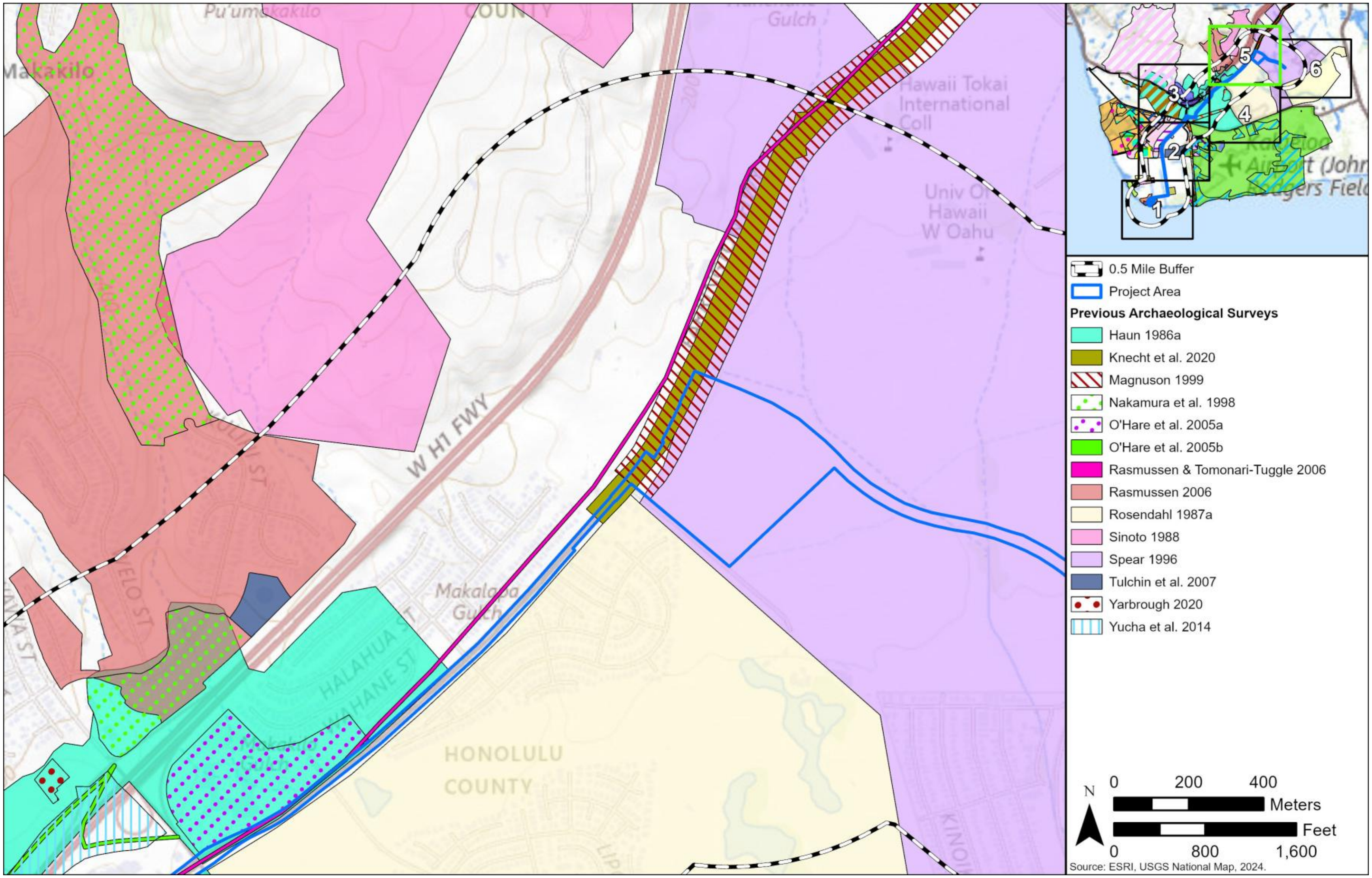


Figure 38. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu Subsea Cable Telecommunications Project Area, Tile 5 (base map: Esri USGS National Map 2024).

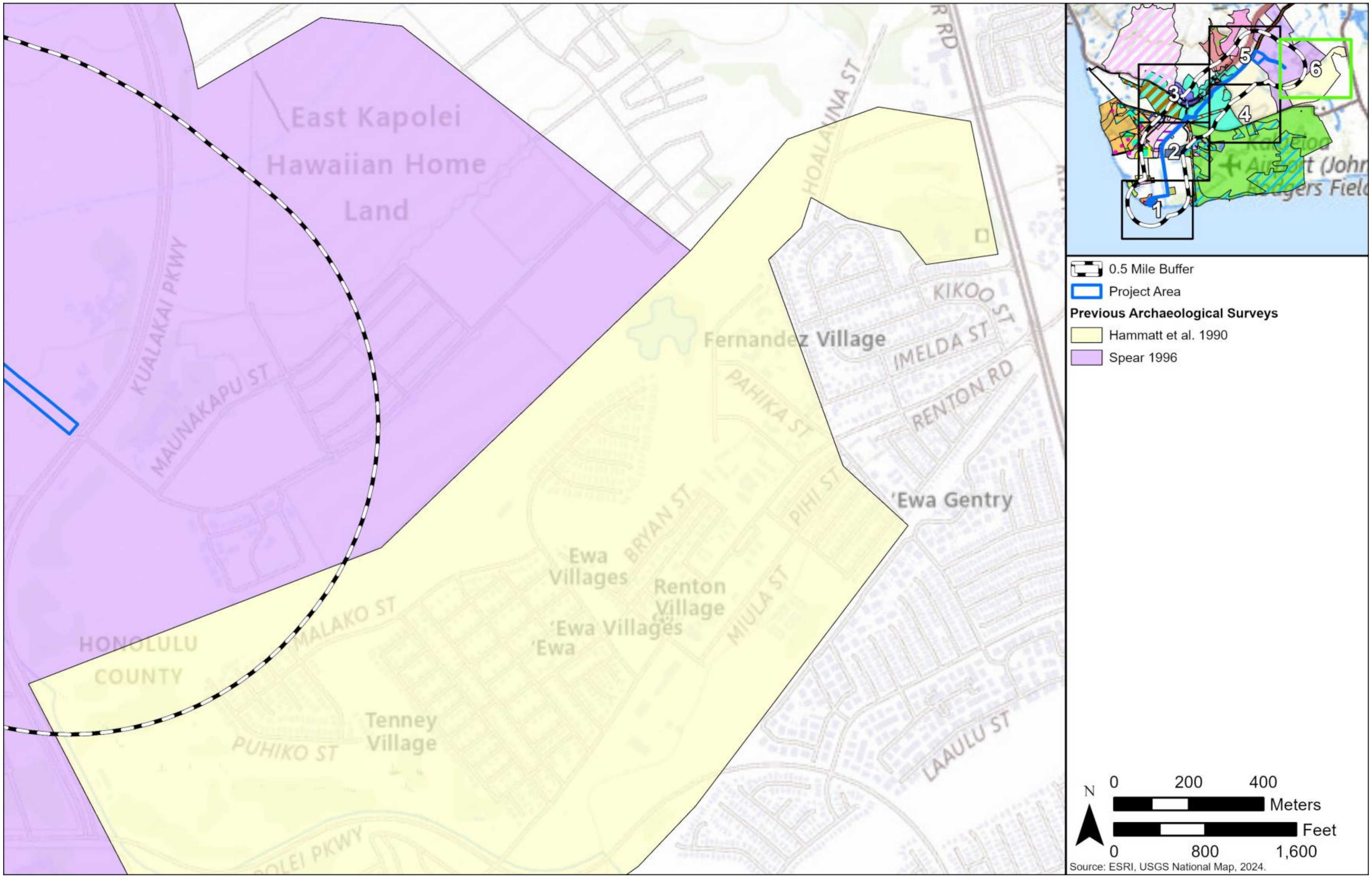


Figure 39. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu Subsea Cable Telecommunications Project Area, Tile 6 (base map: Esri USGS National Map 2024).

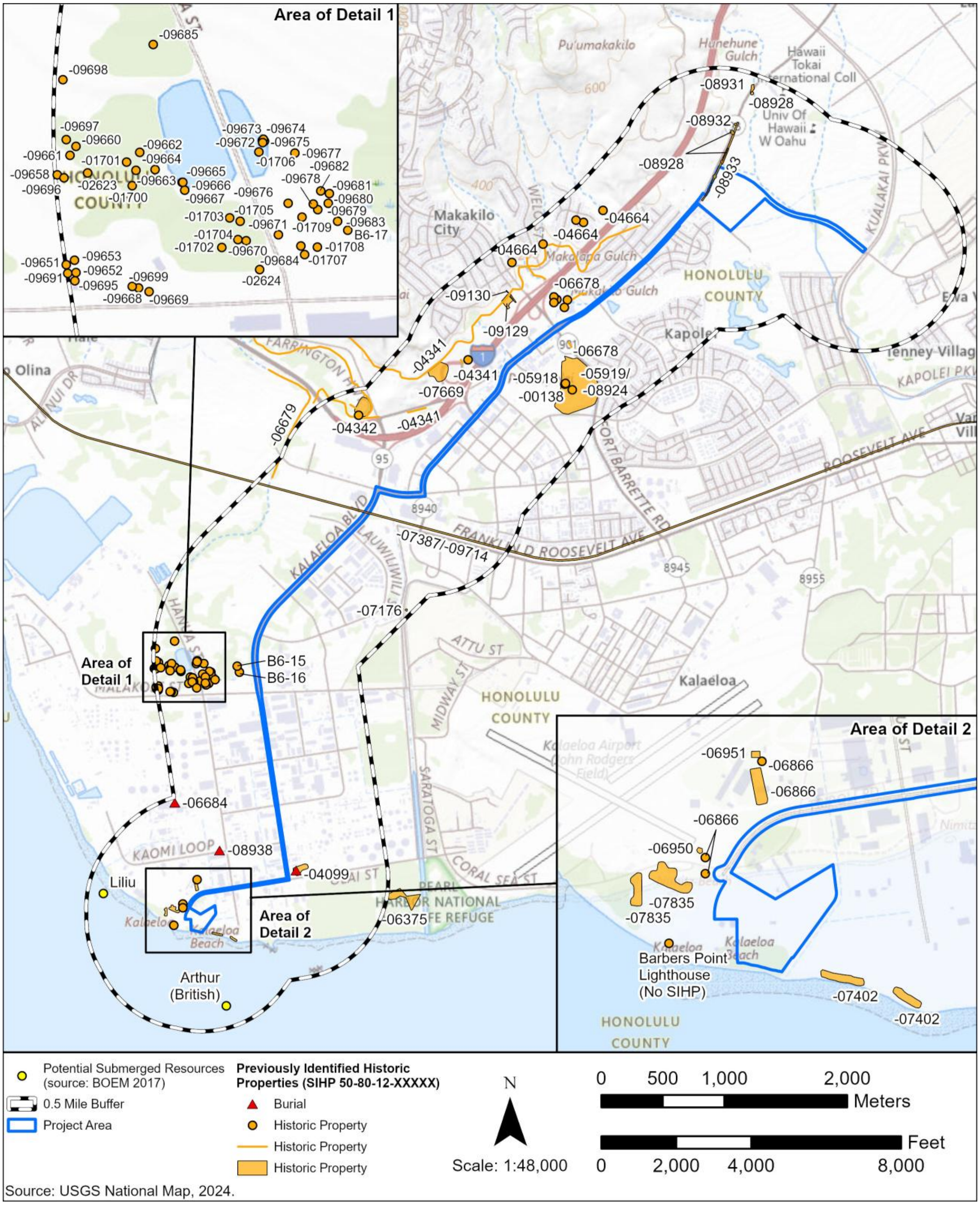


Figure 40. Previously identified historic properties within 0.5 miles of the Oʻahu Subsea Cable Telecommunications Project Area.

Table 3. Archaeological Historic Properties within a 0.5-Mile Radius of the Oʻahu Subsea Cable Telecommunications Project Area

Site Number (50-80-12)	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
-00138	Pu'u o Kapolei Heiau	Ceremonial	Pre-Contact	None provided	None provided	McAllister 1933
-01700	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-01701	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-01702	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-01703	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	None	No further work	Sinoto 1979
-01704	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-01705	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-01706	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	None	No further work	Sinoto 1979
-01707	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-01708	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-01709	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	None	No further work	Sinoto 1979
-02623	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	None provided	None provided	Hammatt & Folk 1981
-02624	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	None provided	None provided	Hammatt & Folk 1981
-04099	Limestone pit complex, burial	Paleoenvironmental data, burial	Pre-Contact	d	No further work	Davis 1988, 1989, 1990
-04341	Ditch	Plantation irrigation	Post-Contact	d	No further work	Hammatt et al. 1991; O'Hare et al. 2006; Yucha et al. 2014
-04342	Water control valve, overflow	Ewa Plantation Co. Reservoir 7 feature	Post-Contact	NLS	None	Hammatt et al. 1991; Yucha et al. 2014

Site Number (50-80-12)	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
	channel, ditch, reservoir					
-04664	Irrigation system	Plantation infrastructure, Ewa Plantation Co.	Post-Contact	No Longer Significant	No further work	Nakamura et al. 1998
-05918	Rock mound, petroglyph	Unknown, art	Pre-Contact, unknown	d (mound); petroglyph no longer present at site	Preservation	Ostroff et al. 2001; Monahan 2020
-05919 / -08924	Fort Barrette / Puʻu o Kapolei	Military structure complex / Ceremonial	Post-Contact / Pre-Contact	d / D	Preservation	Clark 1977; Kennedy 1991; Ostroff et al. 2001; Monahan 2020
-06375	Complex of 13 unmodified limestone pits	Paleoenvironmental data	Unknown	No Longer Significant	No further work	Sinoto and Titchenal 2002a
-06678	Channel, irrigation pipe, concrete ditch, flume	Plantation infrastructure	Post-Contact	d	No further work	O'Hare et al. 2004
-06679	Ditch	Drainage	Post-Contact	d	No further work	O'Hare et al. 2004; Yucha et al. 2014
-06684	Burial	Burial	Unknown	None provided	Preserved in place	McCoy and Clark 2008
-06866	Complex (gun emplacement and concrete slab)	Coastal defense	WWII	a, d	Preservation	Belluomini et al. 2017; Spangler et al. 2020
-06950	Irrigation ditch	Agriculture - intense mechanized	Post-Contact	d	None provided	On File, SHPD
-06951	Irrigation ditch	Agriculture - intense mechanized	Post-Contact	d	None provided	On File, SHPD
-07176	Military complex	Military	Post-Contact	Not Eligible	None	Gosser et al. 2011
-07387/ -09714	OR&L Railroad right-of-way	Transportation	1889 - 1947	a	SHPD consultation	NRHP Registration Form 1975

Site Number (50-80-12)	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
-07402	Cultural deposit	Temporary habitation	Pre-Contact	D	Archaeological monitoring	Medina and Hammatt 2015
-07669	Quarry remnant	Quarry	Post-Contact	d	No further work	Yucha et al. 2014
-07835	Pit cave complex	Potential activity area	Unknown	d. e	Preservation, archaeological monitoring	Belluomini et al. 2017
-08928	Complex of plantation-era agricultural features	Agriculture	Post-Contact	None provided	None provided	Knecht et al. 2020 (On File, SHPD)
-08932	Concrete culvert	Transportation	Post-Contact	None provided	None provided	Knecht et al. 2020 (On File, SHPD)
-08933	Crushed limestone gravel road	Transportation	Post-Contact	None provided	None provided	Knecht et al. 2020 (On File, SHPD)
-08938	Burial	Burial	Pre-Contact	None provided	None provided	On File, SHPD
-09129	Wastewater treatment facility	Wastewater treatment	Post-Contact	None provided	None provided	Yarbrough 2020
-09130	Concrete bridge and culvert	Water control	Post-Contact	None provided	None provided	On File, SHPD
-09651	Modified limestone pit	None provided	Pre-Contact	d	Salvage	Sinoto 1979
-09652	Remnant wall	None provided	Pre-Contact	d	Test	Sinoto 1979
-09653	Filled, paved area	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09658	Modified limestone pit	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09660	Modified limestone pit	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09661	Rectangular enclosure	None provided	Pre-Contact	d	Salvage/Preserve	Sinoto 1979; Hammatt & Folk 1981
-09662	Wall remnant	None provided	Pre-Contact	None	No further work	Sinoto 1979
-09663	Ahu with limestone pit	None provided	Pre-Contact	d	Salvage	Sinoto 1979

Site Number (50-80-12)	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
-09664	Large complex	Agriculture	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09665	Platform	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09666	Ahu	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09667	Filled, paved area	None provided	Pre-Contact	d	Salvage	Sinoto 1979
-09668	Remnant wall	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09669	Modified limestone pit	Possible habitation	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09670	Modified limestone pit	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09671	Ahu	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09672	Ahu	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09673	Ahu	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09674	Ahu	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09675	Modified limestone pit	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09676	Rectangular platform	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09677	C-Shape	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09678	Ahu	None provided	Pre-Contact	d	Salvage	Sinoto 1979
-09679	C-shape with attached wall	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09680	C-Shape	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979
-09681	Remnant wall	None provided	Pre-Contact	d	Test	Sinoto 1979
-09682	Circular enclosure	Habitation	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09683	U-Shape	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09684	C-Shape with limestone pit	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979; Hammatt & Folk 1981
-09685	Modified depression	None provided	Pre-Contact	d	Test/Salvage	Sinoto 1979

Site Number (50-80-12)	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
-09691	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-09695	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	None	No further work	Sinoto 1979
-09696	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-09697	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-09698	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
-09699	Unmodified limestone pit	Paleoenvironmental data	Pre-Contact	d	Salvage	Sinoto 1979
B6-15	House site	Habitation	Unknown	None provided	Data recovery	Lewis 1970
B6-16	House site	Habitation	Unknown	None provided	None provided	Lewis 1970
B6-17	Mound	None provided	Unknown	None provided	None provided	Lewis 1970
No SIHP	Barbers Point Lighthouse	Communication	Post-Contact	Maritime history; transportation	None provided	NRHP 2024

Note: historic properties located within the current project area are denoted by a gray highlight.

3.4 SUMMARY OF ARCHIVAL AND BACKGROUND RESEARCH

The Oʻahu Subsea Cable Telecommunications Project Area, which includes cable manholes at the shoreline of Barbers Point Beach Park and a corridor along a series of rights-of-way, including Farrington Highway, and ending at a landing station at the UHWO campus, stretches across a significant portion of southwestern Honouliuli. It is in close proximity to Puhilele and the Barbers Point Lighthouse, and the cable corridor lies between Puʻu o Kapolei, Puʻu Pālailai, and Puʻu Makakilo. This area has associations with Pele and her sisters, notably in the *moʻolelo* of Hiʻiakaikapoliopele, and Puʻu o Kapolei, named for "beloved Kapo" and home to Kamapuaʻa's grandmother, Kamaunuaniho. The *ʻōlelo noʻeau* which make reference to Honouliuli or ʻEwa describe the area's characteristic red earth and abundant marine resources, particularly around the Puʻuloa (West Loch/Pearl Harbor) area.

The area around Barbers Point Beach Park, traditionally known as Kalaeloa, lies within the uplifted coral reef of the ʻEwa Plain, characterized by abundant limestone pit features. These limestone pits are known to have been used for agricultural activities, and have also been found to house paleontological remains, cultural midden deposits, as well as burials in some instances. Paleoenvironmental data recovered from limestone pits and sediment cores recovered from Ordy Pond have provided important data for understanding past landscapes and environmental transformations shortly after people first arrived on Oʻahu. This includes avifaunal and terrestrial mollusk remains, including of some now-extinct or extirpated species, and transitions from native forest cover to open canopy. While *kalo* was grown in abundance in the lowlands of Puʻuloa, the drier interior of Honouliuli was referred to as sweet potato land, with mid-nineteenth-century descriptions of planting in hollows of rocks and near the brackish water ponds scattered throughout this landscape.

During the Māhele, Honouliuli Ahupuaʻa was awarded to Miriam Keʻahikuni Kekauʻōnohi. Most of the LCAs awarded were located near Honouliuli Stream in the Puʻuloa/West Loch area. Archival research did not identify any LCAs in the vicinity of the project area.

The post-Contact name Barbers Point, as well as the lighthouse that was eventually built there, both trace their origins to Captain Henry Barber's ship, the *Arthur*, running ground at Kalaeloa in 1796. After ships continued to run aground in this area, a lighthouse was built in the 1880s. Other post-Contact land use in the area was largely focused on commercial ranching and agriculture. Honouliuli Ranch, established by James Campbell in 1881, occupied 41,000 acres. Some of these lands were subsequently devoted to other ventures including rice, sugarcane, and sisal agriculture, bee-keeping, fishing, and limestone quarrying. By the early 1900s, *kiawe* forests stretched along a large portion of Oʻahu's southwestern coast. In 1890, the Ewa Plantation Company was established and became one of the largest and most prosperous sugarcane operations in Hawaiʻi. On November 16, 1889, the OR&L Railroad began operations, and subsequently experienced a surge in popularity during WWII. Land use in Honouliuli shifted considerably during the war, as Puʻuloa and the adjacent ʻEwa Plain became a key site of military development. The residential boom of the 1960s included plans for the "Giant New Oahu City" of Makakilo, to be established in the Campbell Estate. Over time, residential and commercial development in the areas of Makakilo, Kapolei, and Campbell Industrial Park have gradually replaced the previous ranching, sugar cultivation, and military activities. In 1976, West Oʻahu College opened in Kapolei, becoming the University of Hawaiʻi – West Oʻahu in 1989.

Previous archaeological studies in the immediate vicinity of the project area identified historic properties with both pre- and post-Contact associations. Pre-Contact historic properties include modified and unmodified limestone pits, which are ubiquitous across the ʻEwa Plain, Puʻu o Kapolei Heiau, and other sites including *ahu*, walls, platforms, mounds, a petroglyph, enclosures, and other site types with habitation, agricultural, and burial functions. Most post-Contact historic properties in the vicinity are associated with agricultural, transportation, or military activities.

Portions of two historic properties were previously documented within the project area: SIHP 50-80-12-07387/ 50-80-12-09714, the OR&L right-of-way, which was placed on the NRHP in 1975, and a portion of SIHP 50-80-12-08933, a crushed limestone gravel road. An LRFI completed by Pacific Legacy in 2025 recorded portions of the previously identified OR&L Railroad ROW (SIHP 50-80-12-07387/ 50-80-12-09714) and crushed limestone gravel road (SIHP 50-80-12-08933) in the project area, as well as 15 additional potential historic properties associated with post-Contact commercial agriculture, water management, and transportation functions within the project area.

4.0 CONSULTATION METHODS AND RESULTS

4.1 PREVIOUS CONSULTATION EFFORTS IN HONOULIULI AHUPUAʻA

A number of consultation efforts have previously been undertaken in Honouliuli Ahupuaʻa in connection with previous CIAs and AISs. Given the size of Honouliuli and the wide variety of location-dependent resources and practices, results from a selection of previous consultations with particular relevance to the current project area are summarized here.

Many previous CIA participants highlighted the abundant marine resources available along the entire coast of Honouliuli, though perhaps most concentrated in the area around Puʻuloa. This included fishing along the coast for species which included *manini* (*Acanthurus triostegus*), *weke* (*Mullidae*), *kala* (Surgeonfish, unicorn fish, *Teuthidae; Naso hexacanthus, N. unicornis, N. brevirostris*), *maiko* (surgeonfish; *Acanthurus nigroris*), *heʻe* (octopus, *Octopus cyanea, Callistoctopus ornatus*), and *ʻōʻio* (ladyfish/bonefish; *Albula vulpes*) (Kaʻapana et al. 2024; Mitchell and Hammatt 2004). Salt pans used to line the shores at Puʻuloa, with a few extending as far west as Kalaeloa. The availability of freshwater on the coast was beneficial for *limu* growth, and many species of *limu* would be gathered in Honouliuli, perhaps especially *ʻeleʻele* (Souza and Hammatt 2006).

Further *mauka*, the area around Makakilo was described as verdant, with exceptional soils for cultivation, and home to many native or Polynesian-introduced plant and animal species, including *milo* (*Thespesia populnea*), *neheleau* (*Lipochaeta spp.*), *kamani* (*Calophyllum inophyllum*), and ʻ*iʻiwi* (*Drepanis coccinea*). The importance of Makakilo in daily life and politics was also highlighted due to its role as a place for priests and *kahuna* to gather and make observations on the sky, stars, and planets, and to interpret the will of the gods and make predictions. The storied significance of Makaīwa, Makaʻike, Makaloa, Maka-Io, and Makakilo as the five brothers who watch over Oʻahu was also noted (Swift and Mulrooney 2023). Puʻu o Kapolei, now recognized as a Traditional Cultural Property (SIHP 50-80-12-08924), was mentioned as a significant place across multiple previous CIAs (e.g., Mitchell and Hammatt 2004; Souza and Hammatt 2005).

Observations of otherworldly or supernatural events were remarked upon in numerous interviews, particularly around the Kaupeʻa Plain. It was noted that there were abundant *wiliwili* trees in this area, and that the *ʻuhane* (spirits) would reside in the *wiliwili* and eat moths (Cruz and Hammatt 2008). Others observed *akualele* ('flying god') flying down from Pālehua, and on *Pō Kāne* nights, paddlers in a canoe could be seen traveling from Pālehua to the ocean, and resembled Night Marchers, except paddling a canoe (Swift and Mulrooney 2023).

Other important features identified within Honouliuli included the network of pre-Contact trails, the paths of which now often intersect with modern roads, including one where Farrington Highway is today (Mitchell and Hammatt 2004; Souza and Hammatt 2006; also see ʻĪʻī 1995:97-98), and natural coral and rock coves which were used for shelter, including during the bombing on December 7, 1941 (Cruz and Hammatt 2008). The presence of limestone pit features, and in particular their potential to contain burials, was also raised (Kaʻapana et al. 2024; Souza and Hammatt 2006). It was observed that the soils taken from the limestone pits in the area were nutrient-rich, and were used both for burials and for agricultural purposes (Souza and Hammatt 2006). The spiritual strength of the burial areas in Honouliuli was stressed, as well as the need to protect oneself and others while disturbing the ground, and to handle *iwi kūpuna* and other culturally significant materials with care, not only with regard to the law, but also in accordance with Native Hawaiian tradition (Kaʻapana et al. 2024).

Several previous reports also highlighted the present and past capabilities of Native Hawaiian communities to make the most out of limited resources, in part through collaboration and the *ahupuaʻa* system (Cruz and Hammatt 2008). A recent CIA for The Cove Redevelopment Project also stressed the importance of integrating Native Hawaiians into the economy of contemporary economic development at operational and administrative levels, and not just within low-level service positions. It highlighted the need to integrate Native Hawaiian culture and well-being into an ever-evolving landscape, and to ensure that cultural practices, resources, and beliefs are maintained in a meaningful way as the area continues to be developed. As one participant noted, this is not just about "putting on one plaque about Hawaiian culture" or describing "what used to be," but giving Hawaiian communities the agency and opportunity to maintain a sense of place and create stories that are "real and authentic to Hawaiʻi" today (Kaʻapana et al. 2024:86).

A CIA conducted for the Hawaiki Submarine Cable Landing Project near Kahe Point also proposed to bring a fiber optic cable onshore using HDD boring (O'Day 2017). While this report also emphasized the importance of beaches, reefs, and rich marine resources in Honouliuli, it argued that the HDD boring would extend below the popular activity areas and was therefore not anticipated to impact cultural practices or valued resources.

4.2 Scoping and Community Outreach

To initiate consultation for the CIA and Ka Paʻakai Analysis for the proposed Oʻahu Subsea Cable Telecommunications Project, contact was made with a range of government agencies, advisory councils, local community organizations, and individuals with generational ties to Honouliuli Ahupuaʻa.

Letters and project area maps were sent via email to a total of 40 individuals and organizations on December 3, 2024. Letters requested that recipients respond with their interest in participating by December 20, 2024. Follow-up reminders were sent to all letter recipients on December 16, 2025.

Letters contained the following text:

> Pacific Legacy, Inc. is conducting a Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis for the proposed Oʻahu Subsea Cable Telecommunications Project in Honouliuli Ahupuaʻa, ʻEwa Moku, Island of Oʻahu [TMKs: (1) 9-1-026:027 (por.); (1) 9-1-016:179 (por.); Olai St ROW; Kalaeloa Blvd ROW; Kamokila Blvd ROW; Farrington Hwy ROW]. The project area extends from the state marine waters seaward of Barbers Point Beach Park mauka along public road rights-of-way and Farrington Highway to a parcel at the University of Hawaiʻi – West Oʻahu Campus (Figure 1).
>
> The Oʻahu Subsea Cable Telecommunications Project proposed by Humuhumu Services LLC and Starfish Infrastructure, Inc. in Honouliuli, includes subsea fiber optic cable installation in state marine waters and state submerged lands, a cable landing site at Barbers Point Beach Park, and an underground conduit system to be installed in public road rights-of-way between the cable landing site and a telecommunication facility to be located at the University of Hawaiʻi – West Oʻahu Campus. The overall purpose of the project is to provide

affordable, reliable, and diverse internet connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan.

Onshore components of the project include a cable landing site at Barbers Point Beach Park where four beach manholes, three vaults, four ocean ground beds, and the onshore extent of six landing pipes would be installed. An underground conduit system for fiber optic and power cables would be constructed within public road rights-of-way between the cable landing site and the telecommunication facility. The marine portion of the project includes the offshore extent of six landing pipes that would be directionally drilled between the shoreline and an exit point on submerged lands, and three subsea fiber optic cables that would be installed in state marine waters seaward of the cable landing site. Subsea cables would be surface laid directly on the ocean floor without burial to the end of the landing pipe, and then pulled through the landing pipe to the beach manhole. No trenching or plowing would be involved with cable installation. Three subsea cables would be permitted and installed as part of the proposed project and up to three additional subsea cables would be installed by cable suppliers at a later date.

Pacific Legacy completed a Literature Review and Field Inspection (LRFI) of the proposed project area in 2024. The survey identified a total of 15 potential historic properties, and two isolated artifacts (metal blades likely associated with post-Contact agriculture). This included re-locating one previously identified historic property within the project area: a portion of the OR&L Railroad ROW (SIHP 50-80-12-07387 and 50-80-12-09714). Additional potential historic properties identified during the field inspection were largely related to post-Contact agriculture and/or water management and included ditches, canals, storm drains, culverts, bridges, berms, and push piles.

Pacific Legacy also completed a desktop review of offshore resources, which identified three potential submerged cultural resources in the vicinity of the project area: the Arthur, a British brig belonging to Captain Barber which was reported lost near Barbers Point in 1796; Liliu, a schooner reported lost in 1877; and an "unknown" potential submerged cultural resource identified during the Pearl Harbor Deepwater Maritime Heritage Resources Survey in 2005.

Dive surveys completed for the project characterized the physical structure of the offshore project area as generally consisting of flat fossil limestone reef surface that terminates in a steep sloping face and then extends seaward to flat plains of white calcareous sand. Slope faces support a low density of solitary or smaller colonies of coral. Sand plains are populated by patches of seagrass interspersed with expanses of an alien invasive green alga commonly called "mudweed".

The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawaiʻi Environmental Council on Nov. 19, 1997. For the CIA, the ahupuaʻa of Honouliuli is considered the overall study area. The project area is defined as the highlighted parcels and ROWs shown in Figure 1.

The CIA will also include a Ka Paʻakai Analysis. The purpose of the Ka Paʻakai Analysis is to assist the State of Hawaiʻi in fulfilling its obligation to protect "all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" (Article XI, Section 7 of the Constitution of the State of Hawaiʻi). It requires that the following specific findings and conclusions be addressed:

(1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
(2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

We are reaching out to you for this assessment because you have been identified as a source of knowledge in Honouliuli, or may have recommendations for other individuals that we should contact for this study. We are seeking your kōkua regarding any information related to the following components of our study:

-Cultural associations of Honouliuli such as moʻolelo or connections to legendary accounts.
-Knowledge of past and present land use within and near the project area.
-Knowledge of past and present traditional gathering practices in Honouliuli.
-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional Hawaiian or other cultural practices within or near the proposed project area.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Honouliuli Ahupuaʻa.

In addition, an invitation to participate in the CIA and Ka Paʻakai Analysis was posted to the Public Notice Board for *Ka Wai Ola* for the month of January 2025 (Figure 41). Pacific Legacy received no responses to this public notice.

Cultural Impact Assessment and Ka Paʻakai Analysis: Oʻahu Subsea Cable Telecommunications Project, ʻEwa Moku, Oʻahu Island

Pacific Legacy, Inc., on behalf of Humuhumu Services LLC and Starfish Infrastructure, Inc., is conducting a Cultural Impact Assessment (CIA) and Ka Pa'akai Analysis for the O'ahu Subsea Cable Telecommunications Project, located in Honouliuli Ahupua'a, 'Ewa Moku, O'ahu Island [TMKs: (1) 9-1-026:027 (por.); (1) 9-1-016:179 (por.); Olai St ROW; Kalaeloa Blvd ROW; Kamokila Blvd ROW; Farrington Hwy ROW]. The project includes subsea cable installation, a cable landing site at Barbers Point Beach Park, and an underground conduit system to be installed in public road rights-of-way between the cable landing site and a telecommunication facility to be located at the University of Hawai'i – West O'ahu Campus.

Pacific Legacy, Inc. seeks to consult with individuals and organizations who possess knowledge regarding:

- Cultural associations, mo'olelo, or legendary accounts associated with Honouliuli Ahupua'a.
- Past and present land use or traditional gathering practices within and near the project area.
- Cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, wahi pana, and/or burials.
- Any other cultural concerns related to traditional Hawaiian or other cultural practices within or near the proposed project area.
- Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Honouliuli Ahupua'a.

Those interested in participating are invited to contact Dr. Jillian Swift at 808-263-4800 or swift@pacificlegacy.com.

Figure 41. Screenshot of the public notice posted to *Ka Wai Ola* in January 2025.

Table 4. Outreach Summary for the CIA and Ka Paʻakai Analysis for the Proposed Oʻahu Subsea Cable Telecommunications Project

Name	Affiliation	Initial Contact Date	Comments
Scott Abrigo	Kapolei Heritage Center	12/3/2024	No response
Jacob Aki	Ke One O Kākuhihewa	12/3/2024	No response
Thomas Anuhealii	Community Member	12/3/2024	No response
John Bond	Community Member	12/3/2024	Shared information; inquired about project
Mana Cáceres	Hui Iwi Kuamoʻo	12/3/2024	Shared feedback letter
Ross Cordy	University of Hawaiʻi – West Oʻahu	12/3/2024	Shared information
Kamakana Ferreira	Office of Hawaiian Affairs	12/3/2024	No response
Noah Gomes	State Historic Preservation Division	12/3/2024	No response
Piʻikea Hardy-Kahaleoumi	Leeward Community College	12/3/2024	No comments on project
Regina Hilo	State Historic Preservation Division	12/3/2024	No response
Victoria Holt Takamine	PAʻI Foundation	12/3/2024	No response
Lesley Iaukea	State Historic Preservation Division	12/3/2024	No response
Bonnie Kahapea-Tanner	Kānehūnāmoku Voyaging Academy	12/3/2024	No response
Kimberly Kalama	Hoakalei Cultural Foundation	12/3/2024	No response
Momiala Kamahele	Leeward Community College	12/3/2024	No comments on project
Shad Kane	Aha Moku Council	12/3/2024	Shared information
J. Kepoʻo Keliʻipaʻakaua	ʻOhana Keaweamahi	12/3/2024	No response
Manuel Kuloloio	Kuloloiʻa Lineage	12/3/2024	No response
Leināʻala Kuloloio Vedder	Kuloloiʻa Lineage	12/3/2024	No response
Lani Maʻa Lapilio	Maʻa ʻOhana	12/3/2024	No comments on project; offered to distribute to interested parties
Mikiʻala Lidstone	Ulu Aʻe Learning Center	12/3/2024	No response
Saʻiliemanu Lilomaiava-Doktor	University of Hawaiʻi – West Oʻahu	12/3/2024	No response
Nanea Lo	ʻOhana Lo	12/3/2024	No response
Karen Luke	Community Member	12/3/2024	No response
Zachary Lum	Kāhuli Leo Leʻa	12/3/2024	No response
Keona Mark	Mahu Ohana	12/3/2024	No response
Kawika McKeague	Community Member	12/3/2024	No response
Kaimana Namihira	Leeward Community College	12/3/2024	No response
Keala Norman	ʻOhana Keaweamahi	12/3/2024	No response
William O'Brien	Kaʻuikiokapō	12/3/2024	No response
Kaleo Patterson	Native Hawaiian Church	12/3/2024	No response
McD Philpotts	Community Member	12/3/2024	No objections to project
Rona Rodenhurst	ʻAhahui Siwila Hawaiʻi O Kapolei (Hawaiian Civic Club of Kapolei)	12/3/2024	No response
Homelani Schaedel	Maluʻōhai Residents Association	12/3/2024	No response
Clinton Schultz	Oahu Canoe Racing Association	12/3/2024	No response

Name	Affiliation	Initial Contact Date	Comments
Kawika Shook	Kalaeloa Heritage and Legacy Foundation	12/3/2024	No response
Kaʻāhiki Solis	State Historic Preservation Division	12/3/2024	Provided information; offered to review draft CIA
Nettie Tiffany	Community Member	12/3/2024	No response
Steve Vendt	Hawaiian Railway Society	12/3/2024	No objection to project as long as cable does not disturb the OR&L ROW
Dwight Victor	Ewa Puʻuloa Hawaiian Civic Club	12/3/2024	No response

4.3 Community Outreach Interviews and Results

A total of ten people responded to our consultation letter via email, the majority of whom either had no comment on or no objections to the project. Six people shared additional information and insights into Honouliuli Ahupuaʻa. This information has been summarized below and incorporated into the background research section of this report where appropriate. One individual offered substantial feedback in letter form. Feedback and recommendations provided during the consultation process included the potential presence of *iwi kūpuna* (burials) in the project area, the need for careful documentation and preservation efforts for the potential historic properties and submerged resources located within and near the project area, the potential for traditional gathering sites or access trails which may intersect with the project area, potential impacts to offshore habitats which include resources of relevance to traditional cultural practices, and the desire to see close collaboration with community members, cultural practitioners, and descendants of Honouliuli, including public access to findings and open dialog with the community.

4.3.1 John Bond, Kānehili Cultural Hui

John Bond responded via email on December 4, 2024 and email correspondence continued through December 6, 2024. Mr. Bond expressed support for the project overall, and noted that the cable might have impacts to the coastal ecosystem, and possibly also to *pueo* (short-eared owl; *Asio flammeus sandwichensis*) nesting and foraging habitat areas, particularly in the area around the UH West Oʻahu campus. He also emphasized the importance of Ordy Pond to the cultural history of Kanehili (Kalaeloa), and expressed a desire to see it placed on the state and federal registers. He observed that Ordy Pond has not been thoroughly researched and likely still has the potential to yield significant information on Hawaiian cultural and environmental history. Bond also expressed the hope that the project would be built to survive major tsunami and hurricane disasters.

4.3.2 Mana Cáceres, Hui Iwi Kuamoʻo

Mana Cáceres provided feedback in the form of a letter response dated January 27, 2025. A summary of this feedback is presented here.

Mr. Cáceres was concerned about the potential for *iwi kūpuna* (burials) to be present within the project area, and the importance of ensuring any *iwi kūpuna* encountered be protected and treated with respect. To this end, he recommended that cultural monitors be present during ground disturbing activities, and that there be protocols in place for handling inadvertent burial discoveries in alignment with state and federal guidelines.

Mr. Cáceres noted that traditional gathering sites or access trails may intersect with the project area, and that community input would be helpful in identifying these. The letter recognized the late Uncle Mike Lee as an expert on *limu* and suggested that his *ʻike* be recognized in this report, for example through incorporating information from his videos on YouTube. In his letter, Mr. Cáceres also noted that offshore habitats include many elements that are important to traditional practices (e.g., *limu* and coral), and impacts to these resources should be minimized. In addition, the offshore cultural resources identified by the desktop review, the *Arthur* and the *Liliu*, should also be treated with sensitivity and carefully documented and preserved.

Mr. Cáceres also recommended that the project team collaborate closely with community members, cultural practitioners, and descendants of Honouliuli to protect traditional and customary Native Hawaiian rights, and that the project provide public access to findings and facilitate open dialogue with community members.

Mr. Cáceres' recommendations and information from videorecorded interviews with Michael Kumukauoha Lee have been incorporated into this report. We have added Wallace K. Ito and Kuaʻāina Ulu ʻAuamo to our potential consultation participants and followed up with Mr. Cáceres on March 17, 2025 for additional referrals for individuals and organizations related to *limu* cultivation or other cultural practices in Honouliuli.

4.3.3 Ross Cordy, University of Hawaiʻi – West Oʻahu

Dr. Ross Cordy is a Professor of Hawaiian-Pacific Studies at the University of Hawaiʻi – West Oʻahu. Due to existing commitments, Dr. Cordy was unable to provide substantial feedback during the consultation period. However, he sent a brief email response noting that the Barbers Point area generally had temporary habitations, with a few permanent house sites primarily located in the corner near Puʻuloa, and that most permanent settlement was concentrated along West Loch, an area that contained the largest irrigated *kalo* floodplain and highest population density. He noted the presence and importance of limestone sinkholes [pits]. He also highlighted the contemporary *limu* growing beds which are currently cared for and harvested by members of the Hawaiian community, and recommended that we consult with *limu* growers. Dr. Cordy did not respond to our follow-up request for referrals.

4.3.4 Shad Kane, Kalaeloa Heritage Park

Shad Kane responded to our letter invitation on December 16, 2024, but stated that he did not know enough about the project to submit a comment. He added that he was familiar with the cultural sites within the valley on the town side of the Makakilo Quarry, and that they were all in excellent condition. He hoped the project would not damage the cultural sites.

4.3.5 Kaʻāhiki Solis, State Historic Preservation Division

Kaʻāhiki Solis is a Cultural Historian (Oʻahu, Kauaʻi, and Niʻihau) in the History & Culture Branch of SHPD. Solis recommended that the project reference the Honouliuli Ahupuaʻa story map (Wahl 2021) for additional information on Honouliuli, and offered to review a draft version of the CIA and Ka Paʻakai Analysis.

Information from Wahl's (2021) story map has been incorporated into the background section of this report. A draft copy of the report will be sent to Ms. Solis once consultation is complete.

4.3.6 Steve Vendt, Hawaiian Railway Society

Steve Vendt responded via email on behalf of the Hawaiian Railway Society on December 5, 2024 and stated that as long as the cable runs underground and does not disturb the OR&L Railroad right-of-way (SIHP 50-80-12-07387/50-80-12-09714), then the Hawaiian Railway Society had no issue with the project.

5.0 SUMMARY AND RECOMMENDATIONS

In keeping with the guidelines provided by the Office of Environmental Quality Control (OEQC 1997), as well as subsequent Supreme Court decisions including *Kalipi*, *Pele Defense Fund v. Paty*, *Public Access Shoreline Haw. Cnty. Planning Comm'n* (commonly known as PASH), and *Ka Paʻakai O Ka ʻĀina v. Land Use Comm'n, State of Hawaiʻi,* the purpose of this CIA and Ka Paʻakai Analysis was to identify and describe cultural resources, practices, and beliefs within the project area and the broader Honouliuli Ahupuaʻa; to determine any impacts the project may have on these resource, practices, and beliefs; and to identify alternative actions or mitigation measures to protect any resources, practices, or beliefs which may be impacted.

The following sections provide a <u>preliminary</u> analysis of potential effects to known traditional cultural resources, practices, and beliefs within the Oʻahu Subsea Cable Telecommunications Project Area and broader Honouliuli Ahupuaʻa, as well as potential mitigation strategies for managing possible impacts. Consultation for the project was initiated in December 2024. Participants expressed no objections to the project, but identified a number of cultural resources and practices which could be impacted by project activities. Following initial consultation, the project area at the University of Hawaiʻi – West Oʻahu Campus was expanded in order to provide additional flexibility in siting the location of the 4-acre telecommunication facility and to include additional options for road access and utility connections.

On March 17, 2025, consultation participants received an update letter explaining changes to the project area and inviting further consultation. This included additional potential participants who were referred during the initial round of consultation. This second consultation phase is ongoing, and results will be incorporated into the final CIA and Ka Paʻakai Analysis, which will be incorporated into the Final Environmental Assessment (FEA). The traditional resources, practices, and beliefs, potential impacts, and proposed mitigation measures presented in this report should therefore be treated as preliminary findings, with a complete analysis forthcoming in the FEA.

5.1 TRADITIONAL CULTURAL RESOURCES, PRACTICES, AND BELIEFS WITHIN THE STUDY AREA

The project area is in close proximity to a number of significant places in Honouliuli, including Puhilele, the Barbers Point Lighthouse, Puʻu o Kapolei, Puʻu Pālailai, and Puʻu Makakilo. The area around these *puʻu* has association with Pele and her sisters, notably in the *moʻolelo* of Hiʻiakaikapoliopele, and Puʻu o Kapolei, named for "beloved Kapo" and home to Kamapuaʻa's grandmother, Kamaunuaniho. The *ʻōlelo noʻeau* which make reference to Honouliuli or ʻEwa describe the area's characteristic red earth and abundant marine resources, though these are generally referencing the West Loch/Puʻuloa area further to the east of the project area. Barbers Point Beach Park lies within the uplifted coral reef of the ʻEwa Plain in the area known as Kalaeloa. The limestone pits that characterize this area have been found to contain significant cultural deposits, paleoenvironmental data, as well as burials in some instances.

During the Māhele, Honouliuli Ahupuaʻa was awarded to Miriam Keʻahikuni Kekauʻōnohi. Archival research did not identify LCAs in the vicinity of the project area, and the majority of LCAs in the *ahupuaʻa* are concentrated near Honouliuli Stream in the Puʻuloa/West Loch area. Post-Contact land use was largely focused on commercial ranching and agricultural ventures, including Honouliuli Ranch and the Ewa Plantation Company. The OR&L Railroad began operations in 1889, and a portion of the railway crosses through the project area. The ʻEwa Plain and Puʻuloa became key sites for military development during WWII. A residential and industrial boom following the war led to the development of Makakilo, Kapolei, and Campbell Industrial Park. In 1976, West Oʻahu College opened in Kapolei, and became the University of Hawaiʻi – West Oʻahu in 1989.

An LRFI completed by Pacific Legacy identified portions of the OR&L ROW (SIHP 50-80-12-07387/50-80-12-09714) and crushed limestone gravel road (SIHP 50-80-12-08933) in the project area, as well as 15 additional potential historic properties and two isolated metal blade implements. All of the potential historic properties identified are likely related to post-Contact land use, including commercial agriculture, transportation, and water management.

Previous consultation efforts for projects in Honouliuli have identified a range of cultural resources, practices, and beliefs in Honouliuli, many of which are concentrated in the area around Puʻuloa. This included rich marine fisheries, salt pans, coastal freshwater sources, and *limu*. Further *mauka*, the area around Makakilo was known to have been exceptionally verdant, with rich soils for cultivation, and home to a number of native or Polynesian-introduced plant and animal species. Makakilo also held great spiritual significance. Observations of otherworldy or supernatural events were remarked upon by numerous participants in previous consultations, particularly in the area around the Kaupeʻa Plain. Other important features identified included the network of pre-Contact trails crosscutting the *ahupuaʻa*, many of which either intersect with or have been developed into modern roads, including Farrington Highway; natural coral and rock coves used for shelter; limestone pit features, and in particular their potential to contain *iwi kūpuna*; and the spiritual strength of burial areas in Honouliuli.

Participants in the consultation process for this project spoke to the following cultural resources, practices, and beliefs specifically: the potential for *iwi kūpuna* to be present in the project area; the potential presence of access trails or resource gathering sites in or near the project area; valued offshore resources including those identified during the desktop review (the *Arthur* and the *Liliu*) and marine resources including fisheries, *limu*, and coral; the possible presence of limestone pit features, which may contain cultural deposits, environmental data, and/or burials; and other resources and places which are located further away from the project area but still hold significant value, including Ordy Pond and the permanent settlements and expansive irrigated *kalo* floodplains near Puʻuloa.

5.2 Potential Impacts to Resources and Traditional and Customary Native Hawaiian Rights

The potential for the project to encounter *iwi kūpuna* was a primary concern for consultation participants, who stressed the importance of treating burials and other culturally significant resources with care and respect. Participants observed that nearshore resources, especially coral and *limu*, have been impacted by previous projects whose activities included water diversion, pollution, and/or runoff, and that any impacts on these baseline resources would likely carry up into broader negative consequences for entire marine ecosystems. They noted that offshore resources also warranted careful documentation and preservation, and should be protected from potential impacts from the project. Participants also wanted to ensure the portion of the OR&L Railroad right-of-way that intersects with the project area was not impacted.

5.3 Recommendations: Feasible Actions to be Taken to Reasonably Protect Native Hawaiian Rights

Consultation participants in this and previous reports emphasized the necessity of treating *iwi kūpuna* and other culturally significant materials with care, not only with regard to the law, but also in accordance with Native Hawaiian traditions. Recommendations to this end included that a cultural monitor be present during all ground disturbing activities, and that the project follow state and federal guidelines for handling inadvertent burial discoveries and have protocol in place to ensure any *iwi kūpuna* encountered during the project be protected and treated with respect.

The importance of offshore resources, including cultural resources like the *Arthur* and the *Liliu*, as well as biocultural resources like *limu*, coral, and marine ecosystems, was also emphasized. Recommendations to protect these resources included additional survey to identify potential pre-Contact cultural properties in the project area, and employing mitigation strategies to ensure the project avoids impacts on marine ecosystems. This includes avoiding the introduction of pollutants to the nearshore environment and preventing runoff from construction activities from entering the water system.

Consultation participants also stressed the importance of ongoing consultation and collaboration with community members, cultural practitioners, and descendants of Honouliuli, and recommended the project team ensures public access to findings and facilitates open dialogue with community members. These recommendations were made to ensure that the full range of traditional gathering rights, access trails, offshore resources, and other traditional and customary Native Hawaiian resources and rights which may be impacted by the project could be identified, and to build trust and respect across all parties invested in the project and its potential impacts.

The LRFI completed for this project recommended that an architectural reconnaissance level survey and archaeological inventory survey be completed to fully identify and document all potential historic properties and provide significance assessments and recommendations in accordance with HRS Chapter 6E. It is also recommended that the project consult with SHPD and the Hawaiian Railway Society to determine how to mitigate any potential impacts to the portion of the OR&L ROW that needs to be crossed by the proposed project.

6.0 CONCLUSION

Background and archival research combined with community consultation identified a number of Native Hawaiian cultural practices and culturally-significant resources in Honouliuli Ahupuaʻa. This included the limestone pits on the ʻEwa Plain which may contain cultural and paleoenvironmental deposits and/or burials; the potential for *iwi kūpuna* to be present within the project area; abundant marine resources, with a particular focus on potential impacts to corals, *limu*, and nearshore fisheries; offshore resources including submerged resources identified during desktop review (e.g., the *Arthur* and *Liliu*); the portion of the OR&L ROW that crosses through the project area; and access trails or gathering sites located in or around the project area.

Potential impacts to these resources that were of particular concern to consultation participants included the potential for the project to encounter *iwi kūpuna*; impacts to nearshore resources, which had been previously observed from activities including water diversion, pollution, and runoff; and potential for project activities to impact submerged resources or the OR&L ROW. Recommended feasible actions that could be taken to reasonably protect these resources include (1) cultural monitoring during all ground disturbing activities; (2) ensuring legal and respectful protocols are in place in the event that *iwi kūpuna* are encountered during project activities; (3) additional survey to identify pre-Contact historic properties in the project area; (4) employing mitigation strategies to ensure the project avoids impacts on marine ecosystems; (5) ongoing consultation and collaboration with community members throughout the project; and (6) consultation with SHPD and the Hawaiian Railway Society to mitigate any potential impacts to the OR&L ROW.

This CIA and Ka Paʻakai Analysis has not yet been finalized, and the identification of traditional cultural resources, practices, beliefs, potential impacts from the project, and recommended feasible actions presented in this draft report should be taken as a preliminary assessment. Additional consultation is underway, which has included requesting further consultation from all current and potential participants on the expanded project area and inviting consultation from additional individuals and organizations who were referred to the project. A final CIA and Ka Paʻakai Analysis incorporating any additional feedback received from these further consultation efforts will be prepared for inclusion in the Final Environmental Assessment for the project.

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Appendix C
Visual Impact Assessment

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O‘ahu Subsea Cable Telecommunications Facility

Visual Impact Assessment

Prepared for:

Humuhumu Services LLC

February 2025

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Introduction

Humuhumu Services LLC proposes to construct, operate, and maintain the O‘ahu Subsea Cable Telecommunications Facility (Facility) on land owned by University of Hawai‘i West O‘ahu (UHWO) on Tax Map Key (TMK) [1] 9-1-016:179. The Facility would connect to the O‘ahu Subsea Cable Telecommunications Project, proposed by Humuhumu and Starfish Infrastructure, Inc., which would include subsea fiber optic cable installation, a cable landing site at Barbers Point Beach Park, and an underground conduit system to be installed in public road rights-of-way between the cable landing site and the Facility. The Facility would be located near the corner of Farrington Highway (which bounds the Facility to the north) and Kapolei Golf Course Road (which bounds the Facility to the west; see Figure 1).

Tetra Tech, Inc. (Tetra Tech) was retained by the Humuhumu Services LLC to perform a Visual Impact Assessment (Assessment) for the Facility. The purpose of preparing this Assessment is to provide baseline information to support future permitting and approvals (to be pursued prior to construction) in compliance with applicable environmental regulations.

Facility Description

2.1 Facility Components

The Facility would consist of a warehouse building (inclusive of adjoined condenser units, lighting, windows/doors, electrical connections, ventilation, bollards, disconnect meter, and underground pipe trenching), an external mechanical yard (inclusive of six generators, a storage tank, three air cooled chillers, two light fixtures, concrete sidewalks, screening wall, and underground pipe trenching), and a roadway adjacent to the Facility infrastructure. All infrastructure would be designed and constructed in accordance with UHWO-approved site plans. The total maximum footprint for all Facility components is assumed to be the entire 1.25 acres, defined as the Facility Area. The preliminary site layout evaluated in this Assessment is what is currently envisioned based on current design and is consistent with other technical studies completed to date; proposed activity within the Facility Area is subject to change.

The warehouse building would be within the northwest portion of the Facility Area, constructed on a concrete slab. The building is anticipated to be metal (colored off-white to be consistent with UHWO campus buildings; see Section 3.2.4) and may include various internal offices, a kitchen area, restrooms, storage areas, pump room, electrical gear, and security; external aboveground components may include attached condenser units, lighting, windows/doors, electrical connections, ventilation, bollards, and a disconnect meter. The warehouse building (including external components as applicable) is projected to be approximately 264 feet long, 131 feet wide, and 33 feet tall.

The external mechanical yard would be adjacent/southeast of the warehouse building, spanning approximately 100 feet by 129 feet. All infrastructure within the mechanical yard except the two light fixtures and storage tank would be concealed by the surrounding metal, hurricane louver screening wall, which would be approximately 20 feet tall. The light fixtures and storage tank are estimated to be 30 and 27 feet tall, respectively.

The Facility would likely be accessed from the north off Farrington Highway via an existing gravel road (outside of the Facility Area); however, finalized site access and exit locations have not yet been determined. The roadway within the Facility Area would be located adjacent to Facility infrastructure and would contain parking spaces.

2.2 Construction Schedule and Activities

Facility construction would be temporary and is estimated to take about nine months. Construction is estimated to begin in the second quarter of 2026 and end in the second quarter of 2027. An average of 26 workers would be present on site at one time during construction. An average of 10 deliveries and 36 vehicle trips are anticipated per day during construction. Construction would occur during typical working hours (i.e., 7 a.m. to 5 p.m.).

2.3 Operations and Maintenance Activities

Minimal on-site maintenance would be required over the life of the Facility. Generator testing would occur monthly during daytime hours. A maximum of three operations workers would be present on site at one time and would rotate shifts to ensure 24/7 coverage of the site. An average of three deliveries and two vehicle trips are anticipated per day during operations.

Regulatory Setting

Land use in Hawai'i is generally controlled by state land use and local zoning designations. Under Hawai'i Revised Statues (HRS) Chapter 205-2, the State Land Use Commission has the authority to designate all land within the state as one of four districts—urban, rural, agricultural, or conservation—based on the general activities and uses of the land. Land use is also regulated by the various counties through zoning districts, within which standards are specified for various activities. In addition to these land use designations, there are additional classifications that are subject to further regulation. For example, the Special Management Area is a designated area that extends inland from the shoreline (ranging from 100 yards to several miles in width) and is regulated by the counties under the Hawai'i Coastal Zone Management program. The entire Facility Area is located outside of the Special Management Area.

3.1 State Regulations

The entire Facility Area lies within the state Urban Land Use District (City of County of Honolulu 2025). Per HRS Chapter 205-2(b), the state Urban District shall include activities or uses as provided by ordinances or regulations of the county within which the urban district is situated. As further discussed below, the Facility Area is within and managed by the City and County of Honolulu, the 'Ewa region, and UHWO; pursuant to HRS Chapter 206E-7, the Hawai'i Community Development Authority is responsible for establishing rules related to planning, zoning, and land use, which upon adoption of a community development plan, supersede all other ordinances and rules related to use, zoning, planning, and development. Further discussion is provided below regarding the City and County of Honolulu, 'Ewa region, and UHWO regulations as they relate to the Facility and scenic preservation.

3.2 Local Regulations

3.2.1 City and County of Honolulu Land Use Ordinance

The Facility Area is located within the City and County of Honolulu A-2 Apartment Medium-density Zoning District. However, the Facility Area directly abuts the R-5 Residential Zoning District to the southeast. Thus, the Department of Planning and Permitting, City and County of Honolulu, Land Use Ordinance was reviewed to identify scenic resources or associated development standards relevant to the A-2 Apartment Medium-density or R-5 Residential zoning districts. Per Section 21-3.80-1 (Apartment district uses and development standards), the following development standards shall be implemented to minimize visual impacts (DPP 2024):

> *(c) Additional development standards.*
>
> *(1) Except for necessary access drives and walkways, all yards must be landscaped.*
>
> *(2) Height setbacks. In the A-2 and A-3 districts, for any portion of a structure over 40 feet in height, additional side and rear setbacks must be provided as follows:*
>
> > *(A) For each 10 feet of additional height or portion thereof, an additional one-foot setback must be provide; and*
> >
> > *(B) The additional setback pursuant to paragraph (A) must be a continuous plane from the top of the structure to the height of 40 feet above grade (see Figure 21-3.3).*

Similarly, per Section 21-3.70-1 (Residential uses and development standards), the following development standards shall be implemented to minimize visual impacts (DPP 2024):

> *(c) Additional development standards.*
>
> *(1) Maximum Height. The maximum height of structures is determined by the building envelope created as the result of the intersection of two planes. The first plane is measured horizontally across the parcel at 25 feet above the high point of the buildable area boundary line. The second plane runs parallel to grade, as described in Section 21-4.60(b), measured at a height of 30 feet. If the two planes do not intersect, then the building envelope is determined by the first plane (see Figure 21-3.10).*
>
> *(2) Height Setbacks.*
>
> > *(A) Any portion of a structure exceeding 15 feet must be set back from every side and rear buildable area boundary line one foot for each two feet of additional height over 15 feet (see Figure 21-3.10); and*

> *(B) Any portion of a structure exceeding 20 feet must be set back from the front buildable area boundary line one foot for every two feet of additional height over 20 feet.*

Additionally, per Table 21-3.3 of the Land Use Ordinance, the maximum height requirement for structures within the A-2 Apartment Medium-density Zoning District is based on the City and County of Honolulu zoning mapping, i.e., 65 feet; likewise, Table 21-3.2 defines the maximum height for structures within the R-5 Residential Zoning District as 30 feet (City and County of Honolulu 2024). Further development standards applicable to all zoning districts (unless otherwise specified) are included in Section 21-4 (e.g., height, yard and street setback exceptions; fencing/retaining walls, landscaping, screening, and lighting requirements) and Section 21-7 (i.e., sign regulations; Section 21-7.4(c) and (d) are specific to Residential or Apartment districts); As currently proposed, the Facility screening wall would exceed maximum heights listed in Section 2.

3.2.2 City and County of Honolulu O'ahu General Plan

Policies and objectives for the City and County of Honolulu are outlined in the O'ahu General Plan, which was reviewed to identify scenic resources recognized in the plan as significant or important as well as goals related to scenic preservation. Goals and policies addressing significance of visual resources in the O'ahu General Plan (DPP 2021) are as follows:

- Natural Environment and Resource Stewardship
  - Objective A, Policy 3: Preserve, protect, and restore stream flows and stream habitats to support aquatic and environmental processes and riparian, scenic, recreational, and Native Hawaiian cultural resources.
  - Objective B: To preserve and enhance natural landmarks and scenic views of O'ahu for the benefit of both residents and visitors as well as future generations.
    - Policy 2: Protect O'ahu's scenic views, especially those seen from highly developed and heavily traveled areas
    - Policy 3: Locate and design public facilities, infrastructure and utilities to minimize the obstruction of scenic views.
- Balanced Economy
  - Objective B, Policy 9: Preserve scenic qualities of O'ahu for residents and visitors alike.
  - Objective C, Policy 17: Recognize the scenic value of agricultural lands as an open-space resource and amenity.
- 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.

3.2.3 'Ewa Development Plan

The Facility Area is also within the 'Ewa sustainable community plan area, specifically classified as Urban - Fringe, which is regulated by the 'Ewa Development Plan (DPP 2020). Scenic resources are identified in Exhibit 3.2 and Table 3-2 (i.e., significant views and vistas), which include the following:

- Distant vistas of the shoreline from the H-1 Freeway above the 'Ewa Plain;
- Views of the ocean from Farrington Highway between Kahe Point and the boundary of the Wai'anae Development Plan Area;
- Views of the Wai'anae Range from H-1 Freeway between Kunia Road and Kalo'i Gulch and from Kunia Road;
- Views of Nā Pu'u at Kapolei, Pālailai, and Makakilo;
- Mauka and makai views; and
- Views of central Honolulu and Diamond Head, particularly from Pu'u O Kapolei, Pu'u Pālailai, and Pu'u Makakilo.

Significant historic features and landmarks, and Native Hawaiian cultural and archaeological sites, are also identified in the 'Ewa Development Plan, which could also be interpreted as potential scenic resources:

- 'Ewa Plantation Villages;
- OR&L Historic Railway & Railway Stock;
- 'Ewa Marine Corps Air Field;
- Pearl Harbor National Historic Landmark;
- Honouliuli Internment Camp;
- Pu'u Makakilo;
- Lanikūhonua;
- Pu'u O Kapolei/Fort Barrette;
- Barbers Point Archaeological District;
- 'Oki'okiolepe Pond;
- 'Ewa Beach Midden Site; and
- One'ula Archaeological District.

The 'Ewa Development Plan also includes a general policy of protecting scenic views and natural, cultural, and historic resources. Section 3.15 contains general policies for development within the UHWO property (e.g., general architecture/design, landscaping, and transportation requirements).

Scenic resources potentially affected by the Facility are identified in Section 4.3 and potential effects will be assessed as part of the impact analysis in Section 6.0.

3.2.4 University of Hawaiʻi – West Oʻahu Non-Campus Lands Urban Design Plan

As stated previously, the Facility Area is located on a 1.25-acre site owned by UHWO. The University implements policies via the UHWO Non-Campus Lands Urban Design Plan (PBR Hawaii & Associates, Inc. 2011). The Facility Area is within the Residential Neighborhood portion of the non-campus lands, and the Transit-Oriented Development Transition and Residential District.

Per Section 2.2.3, the UHWO Non-Campus Lands do not contain any landforms that could serve as a regional visual landmark or scenic resource (PBR Hawaii & Associates, Inc. 2011). Section 4 contains general standards for development within all districts of non-campus lands (e.g., general building/design, walls/fencing, signage, lighting, transportation, and landscaping requirements), including a maximum height of 65 feet within the A-2 Apartment Medium-density Zoning District and maximum height of 30 feet within the R-5 Residential Zoning District; Per Section 4.11.2, a building setback of 20 feet from the UHWO campus property line is required for residential zones areas adjacent to the UHWO campus. Additionally, whites, off-whites, and neutral and moderate earth tone color palettes are to be utilized, amongst other general policies for development within the non-campus lands. Provisions applicable to the Transit-Oriented Development Transition and Residential District are outlined in Section 6 (e.g., transportation, screening, buildings/roofs, and perimeter walls/fencing policies), also including a maximum height of 65 feet within the A-2 Apartment Medium-density Zoning District and maximum height of 30 feet within the R-5 Residential Zoning District.

Existing Conditions

4.1 Regional Setting

The southwestern region of Oʻahu in which the Facility Area is located is predominately the Urban State Land Use District with interspersed small areas of the Agricultural State Land Use District (City of County of Honolulu 2025). The southwestern region of Oʻahu makes up the urban areas of Kapolei, Makakilo, ʻEwa, and West Loch, most of which are classified as Urban – Fringe or Secondary Urban Center (DPP 2020). The Waiʻanae Mountain Range bounds the region to the north, with elevations sloping generally south from these mountains to the southwestern coastline of Oʻahu and southeast to Pearl Harbor. Otherwise, the southwestern region of Oʻahu is bounded by the Pacific Ocean to the west and south, and Pearl Harbor to the east. Land cover generally consists of shrub and brush rangeland at the base of the Waiʻanae Mountain Range, becoming cropland and pasture moving southward within the region, prior to transitioning to developed urban areas (i.e., residential, commercial, and industrial uses; Hawaii Statewide GIS Program 2024).

4.2 Local Setting

The Facility Area is located near the intersection of Farrington Highway and Kapolei Golf Course Road on UHWO-owned land within the city of Kapolei. The UHWO campus is located within parcel TMK (1) 9-1-016:220 to the northeast of the Facility Area. UHWO non-campus lands occur within TMK (1) 9-1-016:179 in which the Facility Area is located. The UHWO non-campus lands are predominately flat and composed of agricultural lands that are either fallowed or actively cultivated. The UHWO parcel is otherwise bordered by highly-developed areas, including Kualakaʻi Parkway (i.e., principal arterial road), UHWO Transit Station, and the Kualakaʻi East Kapolei Transit Station to the east (both located along the Kualakaʻi Parkway), and dense residential areas to the south. North of the Facility Area is also mostly vacant agricultural land, which encompasses portions of Farrington Highway and H-1 Freeway (i.e., both major collector roads), and the entire 150-acre Grace Pacific Makakilo Quarry, located at the base of Puʻu Makakilo. Concentrated residential areas otherwise border the Facility Area to the west, southwest, and southeast, with the exception of the Kapolei Golf Course Road corridor and Kapolei Golf Club, an 18-hole course located on over 190 acres (Kapolei Golf Club 2025).

Per Section 4.1, elevation slopes generally south/southeast from the Waiʻanae Mountain Range to the Pacific Ocean and Pearl Harbor. At the base of the mountain range, the Puʻu Makakilo overlooks the adjacent Grace Pacific Makakilo Quarry, H-1 Freeway and Farrington Highway, and is 1.1 miles northwest above the Facility Area. Other areas of higher elevation located in the general vicinity include Puʻu O Kapolei and Pālailai Puʻu, located 1.2 miles southwest and 1.8 miles southwest above the Facility Area, respectively. Puʻu O Kapolei is located within the Kapolei Regional Park, which offers typical day-use park amenities such as a playground, picnic areas, and sport fields (LookIntoHawaii.com 2024).

In addition to topographical features, vegetative corridors/screening occur throughout agricultural fields of the UHWO parcel, along portions of Farrington Highway and the H-1 Freeway, and along Kapolei Golf Course Road traveling southeast toward the Kapolei Golf Club. Continuous grasses and shrubs are present, with small to medium size trees bordering roads and residential properties. Otherwise, the immediate surroundings of the Facility Area mostly consist of agricultural or residential land, and distant views of Puʻu Makakilo to the northwest.

4.3 Scenic Resources

The scenic resources identified earlier in Section 3 that could potentially be affected by the Facility are listed here and mapped in Figure 1, predominantly located at middleground viewing distances:

- Distant vistas of the shoreline from the H-1 Freeway above the ʻEwa Plain (relevant section/scenic portion of H-1 Freeway is 0.3 miles northwest of the Facility Area, with the closest shoreline being 3 miles from the scenic portion of the H-1 Freeway);
- Views of Nā Puʻu at Kapolei, Pālailai, and Makakilo (i.e., Nā Puʻu translates to “the hills”; the three Puʻu are 1.2 miles southwest, 1.8 miles southwest, and 1.1 miles northwest of the Facility Area, respectively);
- Mauka and makai views; and
- Views of central Honolulu and Diamond Head from Puʻu Makakilo (Puʻu Makakilo is 1.1 miles northwest of the Facility Area).

Other notable places identified in the ʻEwa Development Plan include significant historic features and landmarks and Native Hawaiian cultural and archaeological sites,. However, none are anticipated to have views of the Facility Area due to distant proximity and existing conditions (e.g., vegetation/

topographical screening, and/or located lower in elevation than the Facility Area; see Sections 4.1 and 4.2).

Additional resources that are anticipated to have potential views of the Facility Area and warrant consideration as scenic resources due to public usage, and/or proximity include the following:

- Kapolei Regional Park (encompasses Pu‘u O Kapolei, thus will be analyzed together for this Assessment); and
- Kapolei Golf Club (150 feet south of the Facility Area).

Methodology

5.1 Visual Impact Criteria

Visual impacts are generally defined by a project’s physical characteristics and potential visibility, as well as the extent to which the project’s presence would change the perceived visual character and quality of the environment in which it would be located. Tetra Tech applied elements of the contrast rating system used by the U.S. Bureau of Land Management (BLM) to objectively measure potential changes to the visual environment (BLM 1986). The BLM’s contrast rating system is commonly used by federal agencies to assess potential visual resource impacts from proposed projects and is widely accepted as a standard approach for analyzing potential changes to the visual environment for non-federal projects.

Potential visual impacts were characterized by determining the level of visual contrast introduced by the Facility based upon comparing existing conditions and photo simulations. Visual contrast is a means to evaluate the level of modification to existing landscape features. Existing landscape is defined by the visual characteristics (form, line, color, and texture) associated with the landform (including water), vegetation, and existing development. The level of visual contrast introduced by a project can be measured by changes in the visual characteristics that would occur as a result of project implementation. The greater the difference between the character elements found within the existing landscape and with a proposed project, the more apparent the level of visual contrast. The following general criteria were used when evaluating the degree of contrast:

- None—The contrast is not visible or perceived.
- Weak—The contrast can be seen but does not attract attention.
- Moderate—The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- Strong—The element contrast demands attention, would not be overlooked, and is dominant in the landscape.

5.2 Viewpoints

A set of viewpoints (VPs) from publicly accessible locations was selected to represent the range of viewer sensitivity (typically nearby residents and travelers along roadways) and types of views based on distance and view angle. Nine VPs for potential use in this Assessment of impacts were identified based on locations from which the Facility infrastructure would potentially be visible and noticeable to the casual observer. The "casual observer" is considered an observer who is not actively looking or searching for the Facility, but who is engaged in activities at locations with potential views of the Facility.

Viewer distance is a key factor in determining the level of visual effect, with perceived contrast generally diminishing as distance between the viewer and the affected area increases (BLM 1986). Distance zones—foreground, middleground, and background—provide a frame of reference for classifying the degree to which details of the viewed Facility would affect visual resources. The zones are defined as: foreground zone occurring from zero to 0.5 miles, middleground zone occurring from 0.5 to 5 miles, and background zone occurring from more than 5 miles from the Facility Area. The VPs identified for this Facility are within one mile of the Facility Area. Note that the coastlines/ocean located west and south of the Facility Area are less than five miles away, thus background viewing distances are not applicable in these directions.

Photographs were taken from the VP locations shown on Figure 1 to support the discussion of existing visual setting and the analysis of potential visual impacts associated with the Facility. At each of the viewpoint locations, a Tetra Tech photographer documented GPS coordinates, collected a series of photographs to capture the existing views, and recorded field notes (e.g., date/time photographs were taken, weather, direction of photograph). Photographs of existing conditions were taken on October 9, 2024, using a high-resolution, digital single-lens reflex full-frame camera with a fixed 50-millimeter lens. A photolog with representative photographs of existing conditions from all VP locations is provided in Appendix A.

5.3 Key Observation Points

KOPs are a subset of VPs selected for use in the production of visual simulations (single frame) and assessment of visual contrast and impacts. Two foreground VPs were selected as KOPs (specifically VP 1 and VP 4) based on field documentation of existing conditions and their vantage points, which were considered to best represent where most viewers/casual observers could notice a change in the existing landscape setting due to the presence of Facility components. The KOPs are positioned near the western and southern corners of the Facility Area (Figure 1) and their corresponding existing visual character are described below. Representative photographs of KOPs 1 and 2 are presented in Figure 2; note that KOP 2 has a total of two views/frames, i.e., KOP 2A and KOP 2B, to more fully represent the views of typical viewers in this location (i.e., travelers along Kapolei Golf Course Road and nearby residents), given the proximity of the Facility to KOP 2.

5.3.1 Key Observation Point 1

KOP 1 is on the northern side of the Farrington Highway, 0.07 miles (394 feet) northwest of the Facility Area. Generally, views from KOP 1 toward the Facility location are of a broad, panoramic scene, with flat agricultural lands backdropped by the Ko'olau Mountain Range visible beyond low-lying shoreline and harbor areas. Such views are partially obstructed within developed areas by foreground vegetation/manmade features and middleground development. The view of the existing landscape setting northwest from this location is characterized by southern sloping vacant agricultural land, bordered by the H-1 Freeway and Farrington Highway, with some undulating topography in the foreground. In the distance, Puʻu Makakilo is visible to the northwest and a residential area is visible to the southwest. Farrington Highway and residential areas to the south are in the immediate foreground. Existing built features include UHWO campus infrastructure (in the background), roadways, sidewalks, light posts, fencing, signage, transmission structures and lines, and several residential properties to the south and southwest. Vegetation includes grasses and sparse shrubs with small to medium sized trees bordering Farrington Highway (planted within the sidewalks on both sides of the highway) and across the highway along Kapolei Golf Course Road and around the southern residential area. Dominant colors for the landscape are shades of brown and green, while the structures are shades of brown and gray. The vegetation consists of irregular, organic forms: grasses are continuous with irregular shaped shrubs and the trees are individually placed, each irregularly shaped. The vertical and horizontal lines associated with the structures are both prominent from this location. This KOP provides a typical view for drivers traveling along Farrington Highway and is representative of nearby residential areas; for both west and eastbound traffic, this is the location where viewers would first have direct, if somewhat obstructed, views of the Facility Area.

5.3.2 Key Observation Point 2

KOP 2 is on the southern side of Kapolei Golf Course Road, southeast of the intersection with Farrington Highway, 0.03 miles (130 feet) southwest of the Facility Area. Generally, views from KOP 2 are panoramic where not punctuated by intermittent vegetation and manmade features in the foreground and middleground; a varied geographic landscape (i.e., ranging from hilly to flat), is observable beyond the Facility site. The view of the existing landscape setting northeast and east from this location is characterized by vacant agricultural land (including associated vegetation and fence screening) with northwest bound and southeast bound lanes of Kapolei Golf Course Road in the foreground; Residences are also immediately in the foreground to the west. In the far distance, low rolling terrain and Puʻu Makakilo are faintly visible to the north. The current built elements consist of roadways, sidewalks, light posts, fencing, signage, transmission structures and lines, and several residential properties situated to the west. Vegetation consists of grasses, scattered shrubs, and small to medium sized trees bordering Kapolei Golf Course Road (planted adjacent to the sidewalk/lanes on both sides of the road) and around the western residential area. The landscape colors are various shades of brown and green, while the structures primarily display shades of brown and gray. Grasses and shrubs have natural, irregular forms, blending into each other across the landscape; trees on the other hand are individually placed, each irregularly shaped. The structures exhibit prominent vertical and horizontal lines from this location. This KOP provides a typical view for drivers traveling northwest along Kapolei Golf Course Road as they emerge from the canopied portion of the road to the southeast; This KOP also provides a representative view for the residences near this viewpoint to the west and southwest.

Impact Analysis

6.1 Potential Visual Effects

During construction and operation, the Facility, where visible and noticeable, would introduce visual contrast and create visual effects within the surrounding areas. The potential visual effects and contrast anticipated as a result of construction and operation of the Facility are discussed below, and are anticipated to range from negligible (from scenic resources) to strong (from nearby residences, as shown from representative KOP 2).

Development of the Facility Area would entail construction activities that would include, but not be limited to, the clearing and grubbing of existing vegetation, grading, and installation of Facility components. Construction of the Facility is expected to occur over approximately nine months; thus these visual changes are anticipated to be transient and short term in nature.

Completion of the operational Facility would introduce new visual elements into the Facility Area as described in Section 2.1. The most prominent structure would be the warehouse building, which is most visible around the perimeter of the Facility Area. The tallest components of the mechanical yard and associated screening wall, on the other hand, would be prominent only in views from adjacent locations along Kapolei Golf Course Road (i.e., predominately residents or travelers along Kapolei Golf Course Road). Visual simulations of the Facility (i.e., KOP 1 and 2) were rendered to approximate the visual conditions resulting with Facility implementation. The majority of casual observers in this area range from travelers and workers using local routes to occupants of nearby residences. Thus, viewer sensitivity would generally vary, ranging from low to high.

6.1.1 Scenic Resources

In the relatively flat landscape setting of the Facility Area, details of Facility elements would be visually clear in the foreground (as represented by KOP 1 and 2; see Sections 6.1.2 and 6.1.3 below); viewers would have lower potential to distinguish individual forms, and texture and color may still be identifiable but increasingly muted and less detailed in the middleground and may not be identifiable beyond two miles due to topographic/vegetation screening and elevation differences (see Section 4). Therefore, the Facility Area is anticipated to have negligible visual impacts at background viewing distances (i.e., over 5 miles), and if visible, texture would mostly disappear, color would flatten (making objects appear "washed out"), and Facility infrastructure would not appear as prominent or identifiable features in the landscape setting. The greater view angles from elevations higher than the Facility Area (i.e., north and northwest of the Facility Area and from Pu`u locations) allow for views from greater distances. However, as the distance increases, Facility components (e.g., the warehouse building and mechanical yard components) would blend into the surrounding developed residential, commercial, and industrial land uses and vegetation landscaping patterns.

The identified scenic resources are predominately located within middleground viewing distances. Views of the distant shoreline vistas and ocean (i.e., makai views) from the defined scenic portion of the H-1

Freeway (i.e., the single scenic resource located within a foreground viewing distance) would include the Facility Area, however, the Facility components would offer weak contrast due to existing urban development (namely residential in the foreground, otherwise commercial, and industrial land use at middleground distances); This would be a short-term visual experience for travelers on the H-1 Freeway and the Facility would remain visually subordinate to the broader developed landscape. Similarly, although the Facility Area would be visible from all three Puʻu locations, the Facility components would be seen in the context of the existing urban, highly-modified environment; Any views of central Honolulu and Diamond head from Puʻu Makakilo, specifically, already include a highly developed landscape (including Grace Pacific Makakilo Quarry in the foreground), one of which the Facility Area is anticipated to create weak contrast. Most mauka views are not anticipated to be impacted due to both topographic and vegetation screening, and the Facility Area being located at a higher elevation than the southern coastline. The Facility Area is anticipated to be mostly screened from view by existing vegetation at the Kapolei Golf Club (see Section 6.1.3). Because the Facility would introduce minimal to no visual contrast, visual impacts are anticipated to be negligible at the identified scenic resources.

6.1.2 Key Observation Point 1

Figure 3.1 presents a simulated view of Facility components from KOP 1.

The Facility, particularly the warehouse building, would be highly visible from this location along Farrington Highway to a casual observer. The Facility would introduce off-white colors, large/uniform geometric shapes, and vertical and horizontal lines into the landscape setting. The colors, regular geometric forms, and vertical/horizontal lines associated with the warehouse building would result in a visual contrast with the irregular, organic forms and colors of the existing vegetation in its immediate surroundings. In broader, more distant views, the warehouse building would appear in context and share similar physical characteristics with existing developed features such as the UHWO campus infrastructure (i.e., follow the same color palette; see Section 3.2.4), roads/highways, sidewalks, light posts, fencing, signage, transmission facilities, and residences in the surrounding area. These existing structures generally have horizontal and vertical lines with shades of off-white, gray, and neutral/earth tone colors. In the view from KOP 1, the warehouse building has a dominant, opaque presence but would be relatively low in the horizon (i.e., anticipated maximum height of 33 feet; see Section 2.1). Existing foreground features – namely landscaping/vegetation, signage, and a large water fountain at the intersection of Farrington Highway and Kapolei Golf Course Road —would partially screen the Facility so as to reduce its appearance as a monolithic form in close-in views.

The Facility would be seen by casual observers, including viewers traveling along Farrington Highway, and would begin to dominate the landscape setting as travelers approach the Facility Area, temporarily blocking long-distance views, including agricultural UHWO land east of the Facility. However, this would be a short-term visual experience for travelers, and the Facility components would be generally consistent with other developed features in form, if not in scale, horizontal and vertical lines, and geometric shapes visible within the landscape and would ultimately not block views of scenic resources.

Because the Facility would introduce medium contrast and viewer experience would be brief, visual impacts are anticipated to be moderate at the KOP 1 location.

6.1.3 Key Observation Point 2

Figure 3.2 and 3.3 present simulated views of Facility components in two directions from KOP 2.

The warehouse building and the mechanical yard screening wall would be prominently visible from KOP 2, and the tallest components of the mechanical yard (i.e., the two lighting fixtures) would visibly extend above the screening wall (KOP 2B). Shades of off-white and neutral/earth tone colors, large/uniform geometric shapes, and horizontal and vertical lines would be introduced into the landscape setting. These characteristics associated with the warehouse building, the tallest components of the mechanical yard, and screening wall would result in a visual contrast with the natural forms and colors of the existing vegetation mainly by obscuring most other landscape features in view from KOP 2. In the views from KOP 2, the warehouse building, the tallest components of the mechanical yard, and the screening wall form a dominant, opaque presence but would be relatively low in the horizon (i.e., anticipated maximum height of 33 feet; see Section 2.1).

For drivers traveling along Kapolei Golf Course Road, views of the Facility would attract the attention of the casual observer as the Facility would begin to dominate the landscape setting, temporarily blocking views of agricultural UHWO land east of the Facility. Facility components would be generally compatible in form, if not in scale, with other developed features, visible throughout the landscape and would not block views of scenic resources, and the observable prominence of the Facility and its related contrast would be a short-term visual experience for travelers. For the residential viewers, however, who are assumed to be more likely to take more notice of the visual contrast introduced by the Facility, there would be static views of the Facility and views of the agricultural UHWO land east of the Facility would be permanently blocked. Therefore, it is anticipated that visual impacts would be strong from KOP 2.

6.2 Conclusion

The constructed Facility would introduce new visual elements into the Facility Area, resulting in moderate to strong contrast in representative views. However, the Facility is not located on or near the scenic resources identified in the ‘Ewa Development Plan. It would introduce minimal to no contrast to the existing visual character from viewpoints at Pu‘u O Kapolei, Pu‘u Pālailai, Pu‘u Makakilo and other scenic resources and would not block views of these resources.

The Facility would introduce moderate to strong contrast with the existing visual character near adjacent roads. While the Facility would appear relatively low in the horizon from some views, it would have a dominant, opaque presence in close-in views. The duration of the viewing experience would range from brief to extended for the limited number of residents within 0.5 miles of the Facility Area, whereas travelers along these roads would have a temporary viewing experience. For travelers, the Facility would temporarily block views of the surrounding UHWO agricultural land. However, for nearby residents, these views would be permanently blocked. In addition, the Facility components, while appearing as new features, would be generally consistent in form, if not in scale, with other horizontal and vertical lines and geometric shapes associated with existing roads/highways, sidewalks, light posts, fencing, signage, transmission facilities, residences, and the built environment visible throughout the landscape. Some existing foreground features are present, both natural and manmade, which would help reduce the Facility's appearance for close-up viewers, namely from Farrington Highway.

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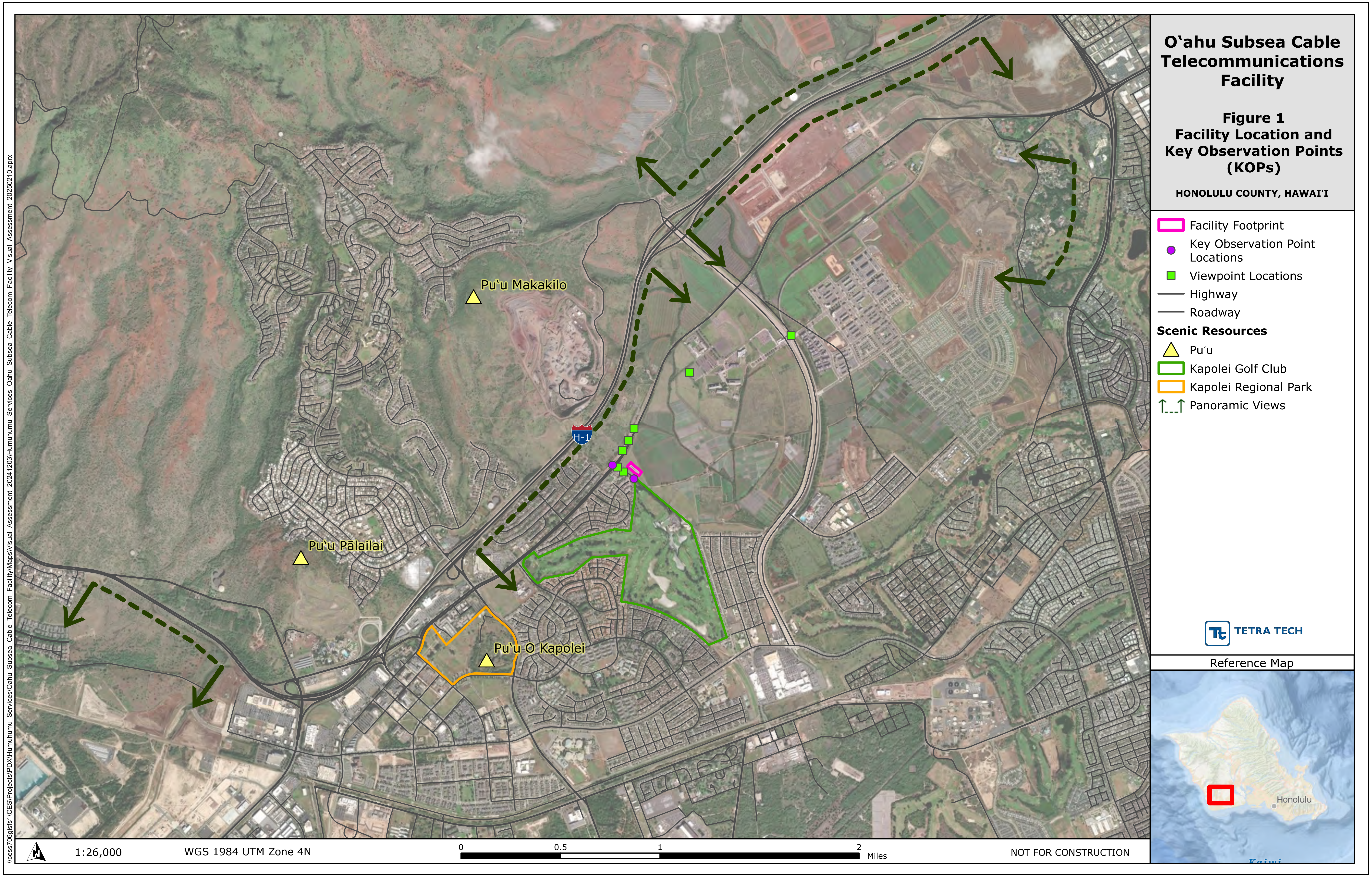
Figures



O‘ahu Subsea Cable Telecommunications Facility
Figure 1
Facility Location and Key Observation Points (KOPs)
HONOLULU COUNTY, HAWAI‘I
Facility Footprint
Key Observation Point Locations
Viewpoint Locations
Highway
Roadway
Scenic Resources
Pu‘u
Kapolei Golf Club
Kapolei Regional Park
Panoramic Views
TETRA TECH
Reference Map
Honolulu
Pu‘u Makakilo
Pu‘u Pālailai
Pu‘u O Kapolei
H-1
1:26,000
WGS 1984 UTM Zone 4N
0
0.5
1
2
Miles
NOT FOR CONSTRUCTION
\\cess706gisfs1\CES\Projects\PDX\Humuhumu_Services\Oahu_Subsea_Cable_Telecom_Facility\Maps\Visual_Assessment_20241203\Humuhumu_Services_Oahu_Subsea_Cable_Telecom_Facility_Visual_Assessment_20250210.aprx

KOP 1: Farrington Highway looking southeast toward the Facility Area.

KOP 2A: Kapolei Golf Course Road looking northwest toward the Facility Area.

KOP 2B: Kapolei Golf Course Road looking north toward the Facility Area.

O'AHU SUBSEA CABLE TELECOMMUNICATIONS FACILITY

O'AHU, HI

VISUAL SIMULATIONS

FIGURE 3. **KEY OBSERVATION POINT LOCATION MAP**

LEGEND

FACILITY AREA

KEY OBSERVATION POINT (KOP)

DISCLAIMER: PRELIMINARY VISUALIZATIONS ARE FOR REFERENCE ONLY; PROJECT LAYOUT IS IN DEVELOPMENT AND SUBJECT TO CHANGE.

EXISTING CONDITION

SIMULATED CONDITION

O'AHU SUBSEA CABLE TELECOMMUNICATIONS FACILITY

O'AHU, HI

FIGURE 3.1 - **KOP 1**

VISUAL SIMULATION

VICINITY MAP

LEGEND

PHOTO SIMULATION / DIRECTION

FACILITY AREA

PHOTOGRAPH INFORMATION

TIME:	1:06 PM
DATE:	10/9/2024
WEATHER CONDITION:	PARTLY CLOUDY
VIEWING DIRECTION:	EAST
LATITUDE:	21.349094°
LONGITUDE:	-158.065183°
DISTANCE FROM BUILDING:	380 FT

DISCLAIMER: PRELIMINARY VISUALIZATIONS ARE FOR REFERENCE ONLY; PROJECT LAYOUT IS IN DEVELOPMENT AND SUBJECT TO CHANGE.

O'AHU SUBSEA CABLE TELECOMMUNICATIONS FACILITY

O'AHU, HI

FIGURE 3.2 - **KOP 2A**

VISUAL SIMULATION

VICINITY MAP

LEGEND

PHOTO SIMULATION / DIRECTION

FACILITY AREA

PHOTOGRAPH INFORMATION

TIME:	11:12 AM
DATE:	10/9/2024
WEATHER CONDITION:	PARTLY CLOUDY
VIEWING DIRECTION:	NORTHWEST
LATITUDE:	21.348081°
LONGITUDE:	-158.063518°
DISTANCE FROM BUILDING:	130 FT

DISCLAIMER: PRELIMINARY VISUALIZATIONS ARE FOR REFERENCE ONLY; PROJECT LAYOUT IS IN DEVELOPMENT AND SUBJECT TO CHANGE.

O'AHU SUBSEA CABLE TELECOMMUNICATIONS FACILITY

O'AHU, HI

FIGURE 3.3 - **KOP 2B**

VISUAL SIMULATION

VICINITY MAP

LEGEND

PHOTO SIMULATION / DIRECTION

FACILITY AREA

PHOTOGRAPH INFORMATION

TIME:	10:59 AM
DATE:	10/9/2024
WEATHER CONDITION:	PARTLY CLOUDY
VIEWING DIRECTION:	NORTHEAST
LATITUDE:	21.348082°
LONGITUDE:	-158.063527°
DISTANCE FROM BUILDING:	130 FT

DISCLAIMER: PRELIMINARY VISUALIZATIONS ARE FOR REFERENCE ONLY; PROJECT LAYOUT IS IN DEVELOPMENT AND SUBJECT TO CHANGE.

Appendix A
Photolog of Facility Viewpoints

Viewpoint 1/KOP 1: Farrington Highway looking southeast toward the Facility Area.

Viewpoint 2: Kapolei Golf Course Road looking east toward the Facility Area.

Viewpoint 3: Kapolei Golf Course Road looking northeast toward the Facility Area.

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Appendix D
Biological Resources Survey Report – Telecommunication Facility

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O‘ahu Subsea Cable
Telecommunications Facility

Biological Resources Survey Report

Prepared for:

Humuhumu Services LLC

March 2025

TETRA TECH

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Introduction

Humuhumu Services LLC (Humuhumu Services) is proposing to construct a telecommunications facility located within approximately 46.4 acres of land owned by University of Hawai'i (UH) on Tax Map Key (TMK) [1] 9-1-016:179 and [1] 9-1-016:222 (the Facility). The proposed Facility would connect to the O'ahu Subsea Cable Telecommunications Project, which is a proposed subsea fiber optic cable system landing at Barbers Point Beach Park that would provide enhanced internet connectivity between Hawai'i, the continental United States, other Pacific Islands, Australia, and Japan. The proposed Facility would consist of a parking lot, warehouse, office building, small mechanical yard, and other associated infrastructure needed to house the fiber optic cable system components and on-site staff. Access for construction would be via existing dirt roads off Farrington Highway. The location of a permanent, new access road for operations is being finalized through discussions with UH.

Tetra Tech, Inc. (Tetra Tech) was contracted by Humuhumu Services to conduct a general biological survey within an approximately 46.4-acre Study Area, which would include the Facility's future lease area as well as areas for temporary laydown yards, utility corridors, and access roads. The purpose of the survey was to characterize the species and habitats present, and to determine whether state or federally-listed threatened or endangered species (pursuant to the federal Endangered Species Act or Hawai'i Revised Statutes [HRS] Chapter 195D), or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Facility. This report summarizes the results of the biological surveys conducted within the Study Area by Tetra Tech over several dates in October 2024, November 2024, and February 2025.

Description of the Study Area

The Study Area is located on the southwest side of O'ahu, on the leeward side of the Wai'anae Mountain Range in Kapolei. As shown in Figures 1 and 3, the Study Area primarily consists of fallow and active agricultural land with a small portion of the Study Area transecting tributaries of Kalo'i Gulch. Dirt access roads run through portions of the Study Area and several small agricultural buildings are present. The Study Area is bordered on the northwest by Farrington Highway; on the southwest by Kapolei Golf Course Road, a housing development, and the Kapolei Golf Course; on the north and south by Kalo'i Gulch and agricultural fields; and on the southeast by Kualaka'i Parkway.

2.1 Climate

The climate in the Study Area is characterized as arid (Price et al. 2012). The closest functioning National Weather Service rainfall gauge to the Study Area is at Honouliuli, located approximately 2 miles east-northeast of the Study Area. The monthly rainfall totals recorded at the gauge prior to and during the surveys are shown in Table 1. The year-to-date total for this gauge through the end of September 2024 was 100 percent of the average due to above average rainfall during the months of April and May prior to the 2024 surveys (NWS 2025a). However, moderate drought conditions were reported in early

October in leeward O‘ahu where the Study Area is situated (NWS 2024). Hence, conditions were generally dry during the 2024 surveys (NWS 2024, NWS 2025a). Worsening drought conditions across the entire state due to a dry December affected leeward O‘ahu and the Study Area, where severe drought conditions were reported as of mid-January 2025 (NWS 2025b). However, due to brief heavy rains toward the end of January and drought conditions in the area being downgraded to moderate drought as of mid-February (NWS 2025c), site conditions were relatively wetter during the February 2025 surveys.

Table 1. Monthly Rainfall at Nearby Honouliuli Gauge Prior to the Surveys

Date	**Rainfall Total; Percentage of Average**
July 2024	0.07 inches; 13%
August 2024	0.45 inches; 43%
September 2024	0.03 inches; 3%
October 2024	0.86 inches; 37%
November 2024	0.66 inches; 23%
December 2024	0.00 inches; 0%
January 2025	1.57 inches; 42%
February 2025	0.00 inches; 0%

Source: NWS 2025a

2.2 Topography and Soils

The Study Area is relatively flat with elevations ranging from approximately 75 to 125 feet above mean sea level, gradually sloping from northwest to southeast (Figure 2). The topography varies where an embankment parallels the Study Area’s northwestern and northeastern boundaries and where Kalo‘i Gulch intersects the Study Area.

The Natural Resources Conservation Service characterizes the soils within the Study Area as consisting primarily of Ewa silty clay loam, 3 to 6 percent slopes, and Honouliuli clay, 0 to 2 percent slopes (Figure 2; NRCS 2025). Smaller portions of the Study Area are comprised of Waialua silty clay, 0 to 3 percent slopes, and Ewa stony silty clay, 6 to 12 percent slopes (Figure 2). ‘Ewa silty clay loam consists of well-drained soil formed on foot slopes with low runoff. Honouliuli clay is comprised of well-drained soil formed on alluvial flats with negligible runoff. Waialua silty clay is comprised of moderately well drained soil formed from alluvial fans on foot slopes with low runoff. ‘Ewa stony silty clay also formed on foot slopes and is comprised of a top layer of stony silty clay underlain with silty clay loam characterized as well-drained with medium runoff (NRCS 2025).

2.3 Surface Waters

The Study Area is situated within the Kalo‘i watershed which encompasses roughly 11 square miles (Parham et al. 2008, CWRM 2022). Water resources identified by the U.S. Fish and Wildlife Service

(USFWS) National Wetlands Inventory (NWI) data (USFWS 2024), the U.S. Geological Survey (USGS) topographic and National Hydrography Dataset (NHD; USGS 2023), the State of Hawaiʻi Division of Aquatic Resources dataset (DAR 2008), and the Commission on Water Resource Management (CWRM 2019) in the Study Area and immediate vicinity are shown in Figure 3. These datasets identify two tributaries of the non-perennial Kaloʻi Gulch and a ditch within the Study Area.

The Kaloʻi Gulch stream system consists of numerous tributaries that originate in the Waiʻanae Mountain Range near Palikea Ridge and the Makakilo Quarry. A western tributary of Kaloʻi Gulch runs along the northern boundary of the Study Area, roughly 100 feet north of the Study Area (Figure 3). Kaloʻi Gulch and Hunehune Gulch (another tributary of Kaloʻi) join roughly 200 feet northeast of the Study Area. This branch of Kaloʻi Gulch and the eastern branch of Kaloʻi Gulch intersect with the southeastern portion of the Study Area (Figure 2). The portions of Kaloʻi Gulch within the Study Area are classified as non-perennial streams by DAR (DAR 2008), intermittent streams by NHD (USGS 2023), and Freshwater Forested/Shrub Wetland by NWI (USFWS 2024). An unnamed ditch is shown in the southwestern corner of the Study Area, and continues east crossing through the eastern portion of the Study Area near Kaloʻi Gulch (Figure 3). This feature is identified by NHD as a canal/ditch (USGS 2023), by CWRM as a ditch (CWRM 2019), and by NWI as Riverine (USFWS 2024).

The non-perennial tributary of Makakilo Gulch is identified 250 feet to the northwest outside the Study Area (Figure 3; DAR 2008). Several freshwater ponds and wetlands are also mapped to the northwest, and a freshwater pond is mapped further to the south outside of the Study Area (Figure 3; USGS 2023, USFWS 2024).

2.4 Listed Species and Critical Habitat

No critical habitat for plants or wildlife has been designated by the USFWS within the Study Area or immediate vicinity. The closest designated critical habitat are two units located approximately 2.5 miles to the southwest and south of the Study Area, Lowland Dry – Unit 10 and Lowland Dry – Unit 11, respectively (Figure 4). These units are critical habitat for 16 endangered plant species (USFWS 2012, USFWS 2025). Only the endangered ʻakoko (*Euphorbia skottsbergii* var. *skottsbergii*) occupied Lowland Dry – Unit 11 at the time the unit was designated (USFWS 2012).

Methods

Prior to the field surveys, Tetra Tech conducted a review of relevant publicly available literature and data with respect to biological resources in and near the Study Area. This review included environmental assessments and environmental impact statements, NWI and NHD data, scientific journals and reports, and available, unpublished data relevant to the natural history and ecology of the area. In addition, Tetra Tech reviewed available geospatial data, aerial photographs, and topographic maps of the area to identify occurrences of state or federally-listed species, or habitats that could harbor these species. Biological field surveys were conducted by Tetra Tech on October 9, 2024, and February 4 and 28, 2025. Surveys for Hawaiian short-eared owl/pueo (*Asio flammeus sandwichensis*) were conducted on October

10, 2024, October 25, 2024, and November 8, 2024. Details regarding the field survey methodologies are provided below.

3.1 Plants

Pedestrian surveys were conducted to identify and record common plant species and dominant vegetation types, as well as rare or listed plant species within the Study Area. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. Plant identifications were made in the field; plants that could not be positively identified were photo-documented for comparison with the recent taxonomic literature.

Plants recorded during these surveys are indicative of the season and environmental conditions at the time of the surveys. The presence and location of plants can be influenced by seasonal and temporal changes; therefore, it is possible additional species may occur within the Study Area but were not present during the surveys.

The taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023). Common and Hawaiian names are provided first, followed by scientific names in parentheses. If no common or Hawaiian name is known, only the scientific name is provided.

3.2 Wildlife

Wildlife surveys consisted of observations and identification of birds, terrestrial mammals, and conspicuous invertebrate species encountered while searching the Study Area. Tetra Tech recorded all wildlife seen or heard while walking within the Study Area visually surveyed for scat, tracks, and other animal sign. Habitats or plants that could support listed wildlife species were also identified if present (such as host plants for listed invertebrates or water features as potential habitat for listed Hawaiian waterbirds). Specific survey methods of each wildlife group are provided below.

3.2.1 Birds

All birds seen or heard while walking within the Study Area were recorded. Habitats or plants that could support listed birds were also identified if present (e.g., water features as potential habitat for listed Hawaiian waterbirds). Scientific nomenclature for birds follows *Birds of the World* (Billerman et al. 2022).

Surveys specifically to detect pueo were conducted on three dates: October 10, 2024, October 25, 2024, and November 8, 2024. This species is listed as endangered by the State of Hawaiʻi on the island of Oʻahu; it is not a federally listed species. The survey methods followed the Pueo Project Survey Protocol (Price and Cotín 2018). Surveys were conducted at twilight and began approximately 70 to 75 minutes before sunset and finished at civil twilight. A single survey location (Figure 5) was chosen to provide the best vantage point of the majority of the Study Area, particularly potential nesting habitat. One biologist was present at the survey point for the duration of each survey, and the ground and sky within the viewshed were scanned with binoculars and the naked eye throughout the survey period. The following general information was collected during each survey: date, observer, GPS coordinates, start time, and end time. Environmental information was recorded, including cloud cover, wind speed, temperature, precipitation, extent of surveyed area (i.e., maximum length of viewshed surveyed in cardinal directions), and habitat classification. For any pueo observations, the following information would be collected: detection start time, detection end time, detection type, owl behavior classification, owl vocalization description, distance from observer, direction from observer, habitat where owl was observed, and courtship behavior description. All surveys were conducted in suitable weather with light to moderate winds, clear to partly or mostly cloudy skies, and no precipitation.

3.2.2 Mammals

The mammal surveys were limited to visual and auditory detection, coupled with visual surveys for scat, tracks, and other animal sign while walking and driving within the Study Area. Scientific names for mammals follow Tomich (1986).

Ultrasonic bat recorders were not deployed for the endangered Hawaiian hoary bat/ʻōpeʻapeʻa (*Lasiurus semotus*) as part of the surveys. Rather, as USFWS and State of Hawaiʻi Division of Forestry and Wildlife (DOFAW) recognize all woody vegetation greater than 15 feet tall as potential bat roosting habitat (DOFAW 2015, USFWS 2023), the presence/absence of suitable bat foraging and roosting habitat within the Study Area was noted.

3.2.3 Invertebrates

Observations of large and conspicuous insects and invertebrates were recorded incidentally to wildlife surveys while walking through the Study Area. Invertebrates were identified through visual observations and were not collected as specimens in the field. Scientific nomenclature for invertebrates follows Nishida (2002).

Results and Discussion

The biological resources in the Study Area have been highly modified by historic and current land uses and the introduction of invasive species, which has greatly reduced the number and abundance of native species and habitats suitable for native species. The majority of the Study Area is comprised of active agricultural fields, fallow land, and dirt roads. Representative photographs from the surveys are presented in Appendix A.

No federally or state-listed species were observed within the Study Area during the surveys. Although not observed in the Study Area, several listed animal species, including listed waterbirds, listed seabirds, and the Hawaiian hoary bat, may occasionally occur in or traverse the Study Area. Listed species are discussed in further detail below.

4.1 Plants

No federal or state listed threatened, endangered, proposed listed, or candidate plant species were observed in the Study Area during the biological surveys. The Study Area is dominated by non-native plants. Three native plant species were observed in the Study Area — kou (*Cordia subcordata*), ʻuhaloa (*Waltheria indica*), and hairy abutilon (*Abutilon incanum*). These species are indigenous to and common throughout the Hawaiian Islands (Wagner et al. 2023). The three native plant species observed during the surveys are rare within the Study Area.

The primary vegetation type within the Study Area is active agricultural fields which are intersected by multiple dirt roads. Buffelgrass (*Cenchrus ciliaris*) Grassland occurs in the westernmost and easternmost portions of the Study Area. Narrow bands of Koa Haole Scrub occur on along the northwestern boundary, along the southwestern perimeter, and in the eastern portion of the Study Area. These vegetation types are described in more detail below.

<u>Agricultural Fields:</u> The majority of the Study Area is comprised of actively cultivated fields of basil (*Ocimum basilicum*) (Appendix A, Photo 1 - 3). Weed mat covers most of the fields, within which basil plants are growing in rows. Various weedy plant species grow along the edges of the fields and dirt access roads, including wire grass (*Eleusine indica*), sandbur (*Cenchrus echinatus*), swollen fingergrass (*Chloris radiata*), jungle-rice (*Echinochloa colona*), *Sida rhombifolia,* spiny amaranth (*Amaranthus spinosus*), cheese weed (*Malva parviflora*), pigweed (*Portulaca oleracea*), *Crassocephalum crepidioides*, ivy gourd (*Coccinia grandis*), little bell (*Ipomoea triloba*), sow thistle (*Sonchus oleraceus*), hairy honohono (*Commelina benghalensis*), comb hyptis (*Mesosphaerum pectinatum*), horse purslane (*Trianthema portulacastrum*), false mallow (*Malvastrum coromandelianum* subsp. *coromandelianum*), and castor bean (*Ricinus communis*). In the eastern portion of the Study Area there is an agricultural ditch associated with the fields that is vegetated with duckweed (*Lemna* sp.) and false daisy (*Eclipta prostrata*) (Appendix A, Photo 4).

<u>Buffelgrass Grassland:</u> This vegetation type is present in the western and southeasternmost portions of the Study Area and is dominated by non-native buffelgrass (Appendix A, Photos 5 – 6). Where this vegetation type occurs in the western portion, non-native weedy plants scattered within the Buffelgrass Grassland include Guinea grass (*Megathyrsus maximus*), *Boerhavia coccinea*, coat buttons (*Tridax procumbens*), creeping indigo (*Indigofera spicata*), red-flowered sida (*Sida ciliaris*), love-in-a-mist (*Passiflora foetida*), *Sida rhombifolia*, smooth rattlepod (*Crotalaria pallida*), obscure morning glory (*Ipomoea obscura*), vining cow pea (*Macroptilium atropurpureum*), and slender mimosa (*Desmanthus pernambucanus*). Small-statured sprouts of koa haole (*Leucaena leucocephala* subsp. *leucocephala*) and ʻopiuma (*Pithecellobium dulce*) occur as scattered individuals in this vegetation type. The native kou tree occurs as a few planted individuals (approximately 15 feet tall) on the western edge of the grassland at the corner of Farrington Highway and Kapolei Golf Course Road. The native species ʻuhaloa and hoary abutilon are rare in occurrence along the edges of or among more open vegetation within the Buffelgrass Grassland. In the southeasternmost portion of the Study Area, this vegetation type is

comprised of a monotypic stand of dense buffelgrass occupying a narrow strip parallel to the sidewalk along Kualaka'i Parkway (Appendix A, Photo 6).

Koa Haole Scrub: This vegetation type occurs in a few discrete areas: along an embankment on the northern boundary of the Study Area along Farrington Highway, along the southwestern perimeter, along the tributaries of Kalo'i Gulch, and along the central and southeastern boundaries of the Study Area. Koa Haole Scrub is characterized by open to dense stands of koa haole trees up to 18 feet tall with a dense understory of buffelgrass or Guinea grass (Appendix A, Photos 7 – 9). A few individuals of kiawe (*Neltuma pallida*) trees up to 24 feet tall and castor bean up to 15 feet tall variously occur within portions of this vegetation type. Where this vegetation type occurs in a narrow, linear depression near Kualaka'i Parkway (possibly a former, but now overgrown ditch), the koa haole trees are covered by vining cow pea, and a few individuals of comb hyptis and sourbush (*Pluchea carolinensis*) are present in the understory. One native species, hoary abutilon, occurs rarely where this vegetation type is present near the northeastern and southeastern boundaries of the Study Area.

4.2 Wildlife

4.2.1 Birds

Twenty-one bird species were recorded in the Study Area and immediate vicinity during the surveys (Table 2). All of these bird species, with the exception of the migratory Pacific golden-plover/kōlea (*Pluvialis fulva*), are non-native to the Hawaiian Islands, and are species commonly found in rural or agricultural areas. The most common bird species recorded during the surveys were common myna (*Acridotheres tristis*), warbling white-eye (*Zosterops japonicus*), and red-vented bulbul (*Pycnonotus cafer*). Six of the bird species observed are protected by the Migratory Bird Treaty Act (Table 1). No state or federally listed birds were recorded during the surveys, but several listed bird species have the potential be present in or traverse the Study Area, as discussed below.

Table 2. Bird Species Recorded in the Study Area and Immediate Vicinity

Common Name	Scientific Name	Status
African silverbill	*Euodice cantans*	NN
Barn owl	*Tyto alba*[1]	NN
Common myna	*Acridotheres tristis*	NN
Common waxbill	*Estrilda astrild*	NN
Gray francolin	*Ortygornis pondicerianus*	NN
House finch	*Haemorhous mexicanus*[1]	NN
House sparrow	*Passer domesticus*	NN
Java sparrow	*Padda oryzivora*	NN
Northern cardinal	*Cardinalis cardinalis*[1]	NN
Northern mockingbird	*Mimus polyglottos*[1]	NN
Pacific-golden plover/kōlea	*Pluvialis fulva*[1]	M

Common Name	Scientific Name	Status
Red-crested cardinal	*Paroaria coronata*	NN
Red-vented bulbul	*Pycnonotus cafer*	NN
Red-whiskered bulbul	*Pycnonotus jocosus*	NN
Rose-ringed parakeet	*Psittacula krameri*	NN
Saffron finch	*Sicalis flaveola*	NN
Scaly-breasted munia	*Lonchura punctulata*	NN
Spotted dove	*Spilopelia chinensis*	NN
Warbling white-eye	*Zosterops japonicus*	NN
Western cattle egret	*Bubulcus ibis*[1]	NN
Zebra dove	*Geopelia striata*	NN
Status: NN = non-native established species, M = Migrant. 1. MBTA = Protected by the Migratory Bird Treaty Act.		

Hawaiian Short-eared Owl/Pueo: The pueo (*Asio flammeus sandwichensis*) is a culturally significant endemic subspecies of the widespread short-eared owl (*Asio flammeus*). The State of Hawai'i lists pueo as endangered on O'ahu. Pueo have been observed in similar vegetation types and have been reported to use the surrounding areas (Price and Cotín 2018). On O'ahu, they occupy a variety of habitats, including agricultural lands, grasslands, wetlands, shrublands, and native forests. It is suggested their habitat use may be influenced by food availability (Price and Cotín 2018). Pueo are active during the day, with increased activity levels at dawn and dusk, and are commonly seen hovering or soaring over open areas. On O'ahu, nests have been found on the ground in non-native buffelgrass and pickleweed (*Batis maritima*), and recent data suggest a preference by pueo for areas with denser vegetation approximately 16 inches tall, such as non-native grasses or the native uluhe (*Dicranopteris linearis*) fern (Price and Cotín 2018, Price and Wang 2023).

No pueo were observed in the Study Area during the general biological surveys or during the three pueo specific surveys conducted in 2024 (Appendix A, Photos 10 – 11; Appendix B). However, pueo have been reported in nearby areas immediately north and roughly 0.7 miles to the northeast of the Study Area (Price and Cotín 2018, Cotín et. al 2018, eBird 2024). Given their occurrence in the vicinity, the grassland habitat present, and that pueo use a variety of habitats, pueo could potentially traverse, hunt, roost, or nest in and around the Study Area.

Listed Seabirds: The endangered Hawaiian petrel/'ua'u (*Pterodroma sandwichensis*), threatened Newell's shearwater/'a'o (*Puffinus newelli*), and endangered band-rumped storm-petrel/'akē'akē (*Hydrobates castro*) (collectively referred to as listed seabirds), have not been documented in the Study Area, and suitable nesting habitat does not occur in the Study Area. However, Hawaiian petrels and Newell's shearwaters have been detected in high elevation areas in the Wai'anae and Ko'olau Mountains where suitable nesting habitat exists (Young et al. 2019), suggesting these birds have the potential to fly over the Study Area at night between March and December while transiting between potential nest sites and the ocean. These listed seabirds may be attracted to construction lights or other outdoor lighting at night. Disorientation and fallout as a result of light attraction could occur for individuals attracted to unshielded nighttime facility lighting. Juvenile birds are particularly vulnerable to light attraction, and grounded birds are vulnerable to mammalian predators or vehicle strikes (Rodríguez et al. 2017).

Listed Waterbirds: The endangered Hawaiian stilt/ae'o (*Himantopus mexicanus knudseni*), Hawaiian common gallinule/'alae 'ula (*Gallinula chloropus sandvicensis*), and Hawaiian coot/'alae ke'oke'o (*Fulica alai*), collectively referred to as listed waterbirds, were not observed during the surveys and their preferred habitats (e.g., wetlands, streams, ponds, mudflats, reservoirs) are not present in the Study Area or immediate vicinity. No surface water was observed within the Study Area during the surveys; however, these listed waterbirds could fly over or near the Study Area while traveling between suitable habitat found adjacent to the Study Area. This includes the ponds at Kapolei Golf Club located roughly 900 feet to the southwest of the Study Area. Hawaiian stilts and Hawaiian coots have both been recorded at Kapolei Golf Club (eBird 2024).

4.2.2 Mammals

Multiple small Indian mongoose (*Herpestes auropunctatus*) and a small domestic dog were seen in the Study Area. These non-native species were the only terrestrial mammals detected during the surveys. Although not directly observed, other introduced mammals such as feral cats (*Felis catus*), dogs (*Canis familiaris*), house mice (*Mus musculus*), and rats (*Rattus* spp.) are likely to occur within the Study Area.

Hawaiian Hoary Bat: Recent studies have found that Hawai'i's only native, extant terrestrial mammal—the endangered Hawaiian hoary bat—is more abundant across the Hawaiian Islands than previously understood (Gorresen et al. 2013, Bonaccorso et al. 2015, USGS 2019). This species will forage in open and semi-cluttered landscapes in a wide range of habitats and vegetation types including open areas, at forest edges or within gaps, above forest canopies, and over open bodies of water, including streams and ponds (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023). Only a few trees within the Study Area (e.g., kou, koa haole, and kiawe) are over 15 feet tall and have the potential to function as bat roost trees (DOFAW 2015, USFWS 2023); these trees are primarily along the boundary of Farrington Highway and Kapolei Golf Course Road and along the Kalo'i Gulch tributaries. However, detections at an acoustic recorder deployed roughly 0.3 miles east of the Study Area (Site-036), as part of an island-wide study, documented low bat activity in the vicinity. From June 2017 through October 2021, bats were detected on 14 out of the 1,341 nights sampled at this detector (WEST 2022). Regardless, Hawaiian hoary bats may transit, roost, or forage in portions of the Study Area.

4.2.3 Invertebrates

Large and conspicuous invertebrates incidentally observed during the surveys are listed in Table 3. Of these, only the two dragonflies—globe skimmer (*Pantala flavescens*) and green darner (*Anax junis*)—are native to the Hawaiian Islands. In addition, damage from the invasive coconut rhinoceros beetle (*Oryctes rhinoceros*) was observed on coconut palms adjacent to the Study Area at Kapolei Golf Club; this species is now widespread on O'ahu (CRBRH 2024).

Table 3. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity

Common Name	Scientific Name	Status
African giant snail	*Lissachatina fulica*	NN
Cabbage white	*Pieris rapae*	NN
Coconut rhinoceros beetle	*Oryctes rhinoceros*	NN
Common green darner	*Anax junius*	I
Fly	Muscidae[1]	NN
Gulf fritillary	*Agraulis vanillae*	NN
Hawaiian garden spider	*Argiope appensa*	NN
Large orange sulphur	*Phoebis agarithe*	NN
Lesser grass blue	*Zizina otis*	NN
Monarch	*Danaus plexippus*	NN
Pea blue	*Lampides boeticus*	NN
Roseate skimmer	*Orthemis ferruginea*	NN
Valley carpenter bee	*Xylocopa sonorina*	NN
Wandering glider	*Pantala flavescens*	I
Yellow crazy ant	*Anoplolepis gracilipes*	NN
Status: NN = non-native established species, I = Indigenous.		
1. Identification to family because lower taxonomic identification could not be made in the field.		

Conclusions and Recommendations

As described in Section 4, the majority of the plants and animals observed in the Study Area are non-native to the Hawaiian Islands. No federal and state listed species were observed during the biological surveys. Although not observed, several listed wildlife species have the potential to occasionally occur in or transit through the Study Area, particularly pueo, listed seabirds, listed waterbirds, and the Hawaiian hoary bat. Recommended measures to avoid and minimize impacts to these species are outlined below.

5.1 General

In addition to the species-specific measures detailed below, Tetra Tech recommends the following general measures to avoid and minimize impacts to biological resources:

- Although non-native weedy species are common in the Study Area, invasive species minimization measures for both plants and animals should be implemented to avoid unintentional introduction or transport of new invasive species to the area. This includes utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; and washing construction equipment and/or visually inspecting equipment for excessive debris, plant materials, and invasive or harmful non-native species as appropriate.
- If downed listed wildlife species are observed at the Project, notify USFWS and DOFAW as soon as possible.

5.2 Plants

No listed or rare native plant species were observed during the surveys. Overall, the vegetation in the Study Area is highly disturbed from previous land use activities, and non-native invasive plants dominate. Only three native plant species were observed, all of which commonly occur throughout Hawai'i. Tetra Tech recommends the following with regards to plants:

- If landscaping is installed as part of the Project, use non-invasive plants and incorporate native plant species to the extent practicable.

5.3 Wildlife

Nearly all the animal species recorded in the Study Area are not native to the Hawaiian Islands. Only one native bird and two native dragonflies were recorded, and the habitat present is generally not suitable for listed wildlife. However, several listed animal species have the potential to occasionally occur in or transit the Study Area.

5.3.1 Pueo

The state-listed pueo was not observed in the Study Area during the general biological surveys or the pueo specific surveys. However, pueo have been reported from nearby areas (Price and Cotín 2018, Cotín et. al 2018), and it is possible that they could traverse, hunt, roost, or nest within the Study Area. If pueo are nesting within the Study Area, it could be impacted by construction activities. Tetra Tech recommends the following avoidance and minimization measures for this species, which are based on previous input from DOFAW:

- Prior to clearing vegetation or ground-disturbing activities with heavy machinery, qualified biologists should conduct pre-construction pueo surveys in areas of suitable nesting habitat within one week of ground disturbance to confirm pueo are not nesting in the area. Generally, DOFAW has recommended three evening vantage point surveys within one week before construction using the Pueo Project Survey Protocol (Price and Cotín 2018). DOFAW also recommends vegetation clearing and grading should occur as soon as possible following pueo surveys and should be completed within 14 days of surveys.

- Implement a wildlife education and observation program for all construction and regular on-site staff to identify pueo and to take appropriate steps if pueo or a pueo nest are observed.
- If a pueo is observed in the Project area at any time (prior to construction, during construction, or during operation), all activities in the immediate vicinity should stop immediately. The location of the bird should be reported to a designated representative (including a UH representative), and a qualified biologist should check the area for the presence of a pueo nest.
- If a pueo nest or breeding displays are observed at any time (prior to construction, during construction, or during operation), DOFAW should be notified immediately to determine a buffer zone and next steps. Recommended buffers have ranged from 50 feet to 656 feet around a nest. The buffer should be marked in the field by a qualified biologist. No work should occur in the buffer until pueo nesting is complete.

5.3.2 Listed Seabirds

The Study Area does not provide suitable nesting or foraging habitat for the three listed seabirds. However, individuals may fly over the area during the breeding, nesting, and fledging seasons (March 1 - December 15) and may be attracted to nighttime lighting. Tetra Tech recommends the following measures to avoid and minimize potential impacts to listed seabirds:

- If operational on-site lighting is required, it should consist of fixtures that will be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Restrict construction activity to daylight hours during the seabird peak fallout period (September 15 - December 15) to avoid the use of nighttime lighting that could attract seabirds.
- If a grounded seabird is found at the Project, notify USFWS and DOFAW immediately. These agencies may recommend contacting a wildlife rehabilitation facility such as Feather and Fur Animal Hospital at (808) 254-1548.
- Minimize construction of overhead lines to reduce the collision risk for seabird species.

5.3.3 Listed Waterbirds

No listed waterbirds were detected during the surveys, and no suitable habitat for listed waterbirds was observed within the Study Area; however, suitable habitat is present in the vicinity. To avoid impacts to listed waterbirds during Project construction and operation, Tetra Tech recommends the following based on avoidance and minimization measures provided by USFWS (2023):

- Avoid creating areas with standing water.

- If listed waterbirds are found in the Study Area during active construction, cease all activities within 100 feet of the birds, and do not approach the birds. Work may continue after the listed waterbird leaves the area of its own accord.

5.3.4 Hawaiian Hoary Bat

Direct impacts to bats could occur if roost trees are disturbed or through the use of barbed wire. Tetra Tech recommends the following avoidance measures provided by USFWS (2023):

- To prevent entanglement, do not use barbed wire for fencing.
- Do not trim, disturb, or remove woody vegetation taller than 15 feet between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

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Figures

O'ahu Subsea Cable Telecommunications Facility

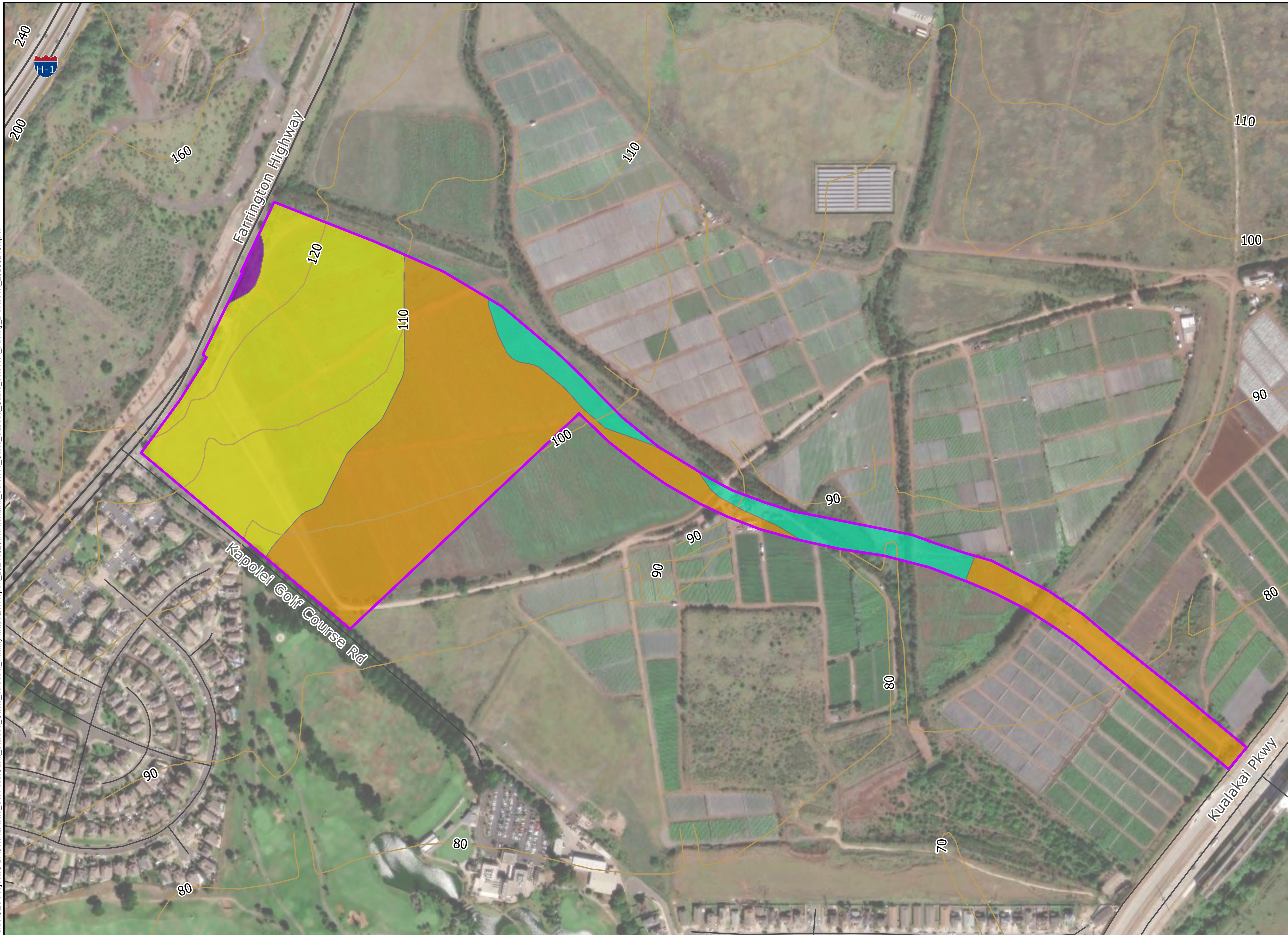
Figure 1
Study Area and Vicinity

HONOLULU COUNTY, HAWAIʻI

O'ahu Subsea Cable Telecommunications Facility

Figure 2
Topography and Soils

HONOLULU COUNTY, HAWAIʻI



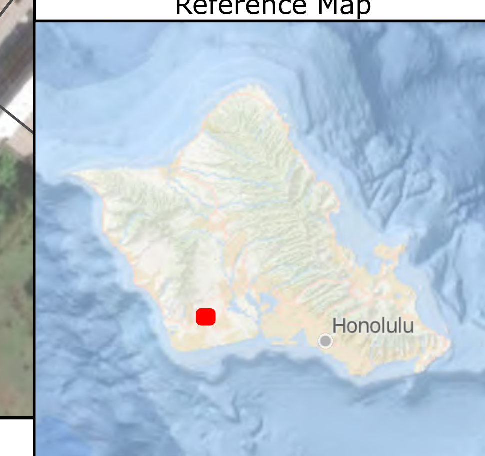
- Study Area
- 10-ft Elevation Contour
- Highway
- Roadway

NRCS Soil Symbol

- EaB - Ewa silty clay loam, 3 to 6 percent slopes
- EwC - Ewa stony silty clay, 6 to 12 percent slopes
- HxA - Honouliuli clay, 0 to 2 percent slopes
- WkA - Waialua silty clay, 0 to 3 percent slopes

TETRA TECH

Reference Map



1:4,500 WGS 1984 UTM Zone 4N

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O'ahu Subsea Cable Telecommunications Facility

Figure 3
Water Resources Identified by NWI, NHD, DAR, and CWRM Datasets

HONOLULU COUNTY, HAWAI'I

Study Area
Highway
Roadway

National Wetlands Inventory

Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine

National Hydrography Dataset

Canal/Ditch
Intermittent Stream
Perennial Stream
Waterbody

Division of Aquatic Resources

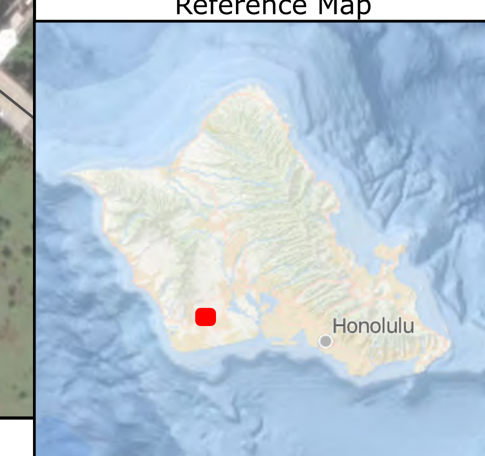
Stream

Commission on Water Resource Management

Ditch

TETRA TECH

Reference Map



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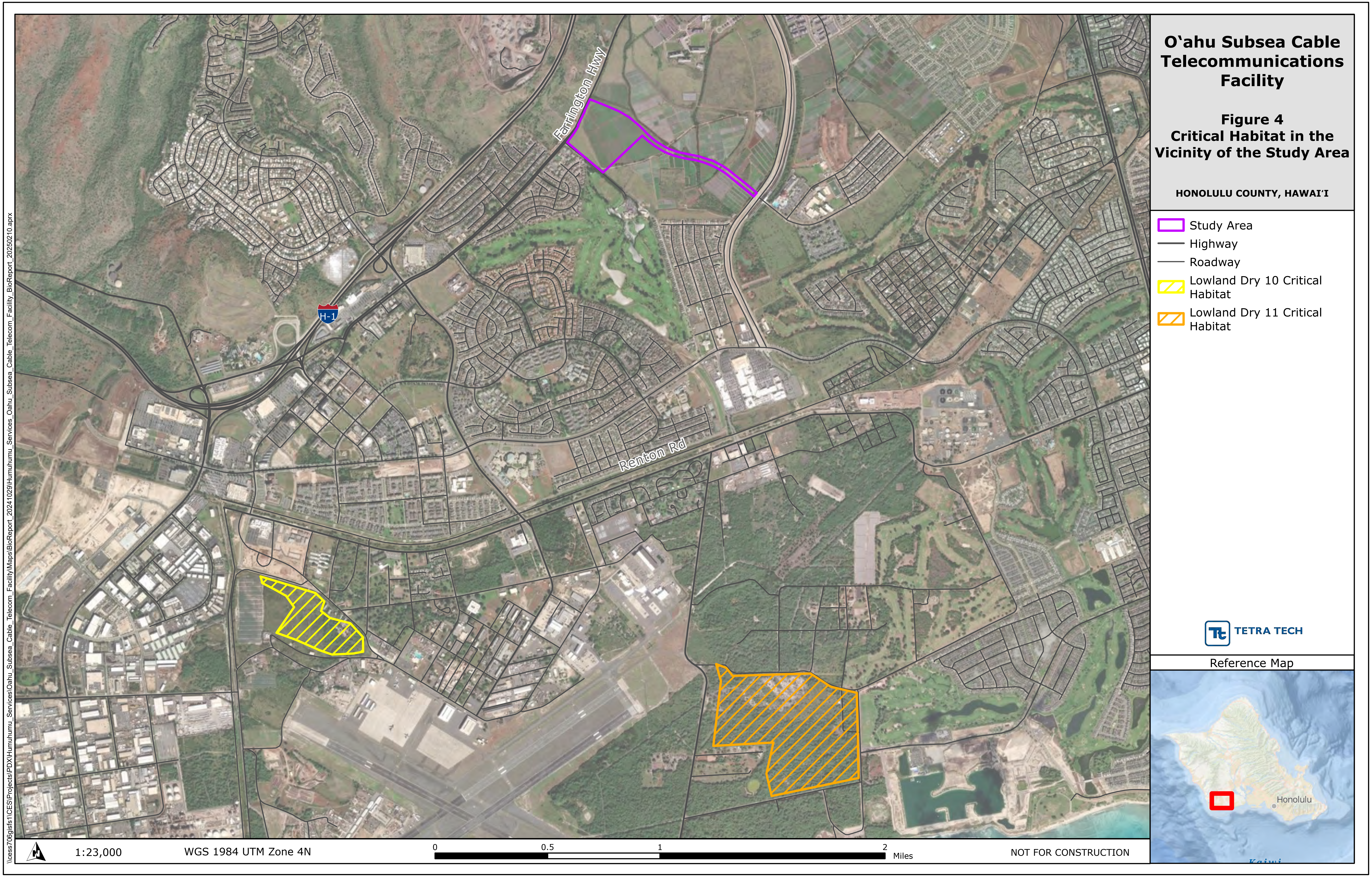
O'ahu Subsea Cable Telecommunications Facility
Figure 4
Critical Habitat in the Vicinity of the Study Area
HONOLULU COUNTY, HAWAI'I
Study Area
Highway
Roadway
Lowland Dry 10 Critical Habitat
Lowland Dry 11 Critical Habitat
TETRA TECH
Reference Map
Honolulu
Farrington Hwy
H-1
Renton Rd
1:23,000
WGS 1984 UTM Zone 4N
0
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1
2
Miles
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O'ahu Subsea Cable Telecommunications Facility

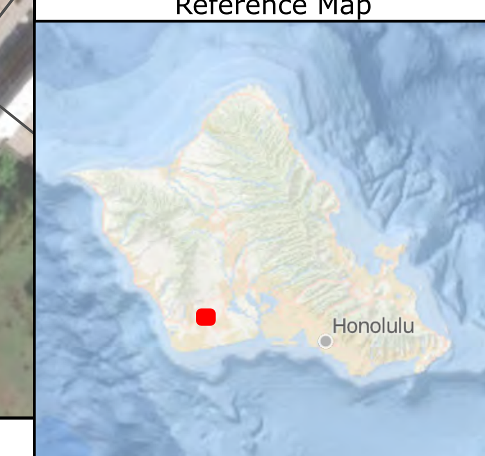
Figure 5
Pueo Survey Point Location

HONOLULU COUNTY, HAWAIʻI

Study Area
Highway
Roadway
Pueo Survey Point

TETRA TECH

Reference Map



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Appendix A

Representative Photographs of the Study Area

Photo 1. Looking south into the Study Area from the northern portion, depicting active agricultural fields with cultivated basil plants. Lat/Long: 21.351265, -158.062649. (February 4, 2025).

Photo 2. Looking north from the central portion of the Study Area, depicting active agricultural fields with cultivated basil plants. Lat/Long: 21.34788, -158.060406. (February 4, 2025).

Photo 3. Looking northwest from the southeastern portion of the Study Area, depicting active agricultural fields with cultivated basil plants (foreground) and Koa Haole Scrub to the northwest and north (background). Lat/Long: 21.345848, -158.05196. (February 28, 2025).

Photo 4. Looking southwest in the southeastern portion of the Study Area, depicting a ditch associated with the agricultural fields. Lat/Long: 21.347535, -158.054187. (February 4, 2025).

Photo 5. Looking southeast into the Study Area from the northwestern portion, depicting recently mowed Buffelgrass Grassland. Lat/Long: 21.349475, -158.064510. (October 9, 2024)

Photo 6. Looking northeast from the southeastern boundary of the Study Area, depicting monotypic Buffelgrass Grassland bordered by Kualaka‘i Parkway (right) and Koa Haole Scrub (left). Lat/Long: 21.345643, -158.051934. (February 28, 2025).

Photo 7. Looking northwest from the northern portion of the Study Area, depicting Koa Haole Scrub on the embankment (left) and the dirt entry road with trash along edge. Lat/Long: 21.350297, -158.063802. (October 9, 2024).

Photo 8. Looking southeast from the eastern portion of the Study Area, depicting Koa Haole Scrub with Guinea grass understory. Lat/Long: 21.348099, -158.056176. (February 4, 2025)

Photo 9. Looking southeast along a tributary of Kalo'i Gulch, depicting Koa Haole Scrub with Guinea grass understory. Lat/Long: 21.34816, -158.056432. (February 4, 2025)

Photo 10. View from Pueo Evening Survey Point, looking south. Lat/Long: 21.350079, -158.063903. (October 10, 2024).

Photo 11. View from Pueo Evening Survey Point, looking northeast. Lat/Long: 21.350079, -158.063903. (October 10, 2024).

Appendix B

Pueo Survey Protocol Data Sheets

Pueo Project Survey Datasheet 2017

21.350079° N -158.063983° E

Site: Google/UH Study Area GPS point: Survey Rd pt GPS coordinates: (D.dddddd, -D.dddddd)

Date: 10/10/24 Visit # (1, 2 or 3): 1 Survey Start Time: 1624 Survey Stop Time: 1833 Observers: Theresa Geelhoed

Temperature: 83 Cloud cover (Clear, PC, MC, Cloudy): PC Rain: none Wind (0-7): 2

Detection start time	Detection end time	Number	Initial distance	Initial direction	Sounds	Behavior	Habitat

% Habitat w/in 400 m or surveyed area (must be 100%):

Developed	Wetland	Agricultural Crops	Agricultural Dirt	Grasslshort Grazed	Grasslshort Golf	Grasslshort Mowed
		25	50			15
Grassland Fallow	**Grasslands Tall >75cm**	**Shrublands**	**Non Native Forest**	**Native Forest**	**Other**	**Total**
	10					100

Surveyed area (max visible meters):

N: 50	S: 100
NE: 400	SW: 100
E: 300	W: 50
SE: 200	NW 50

N W E S

Observations: No pueo Sightings

Pueo Project Survey Datasheet 2017

Site : Google/UH StudyArea GPS point: Survey Rd pt GPS coordinates: (D.dddddd, -D.dddddd) 21.350079°N -158.063903°E

Date: 10/25/24 Visit # (1, 2 or 3): 2 Survey Start Time: 1650 Survey Stop Time: 1811 Observers: Theresa Geelhoed

Temperature: 83 Cloud cover (Clear, PC, MC, Cloudy): PC Rain: None Wind (0-7): 3

Detection start time	Detection end time	Number	Initial distance	Initial direction	Sounds	Behavior	Habitat

% Habitat w/in 400 m or surveyed area (must be 100%):

Developed	Wetland	Agricultural Crops	Agricultural Dirt	Grasslshort Grazed	Grasslshort Golf	Grasslshort Mowed
		25	50			
Grassland Fallow	**Grasslands Tall >75cm**	**Shrublands**	**Non Native Forest**	**Native Forest**	**Other**	**Total**
15	10					100

Surveyed area (max visible meters):

N: 50	S: 100
NE: 400	SW: 100
E: 300	W: 50
SE: 200	NW 50

N

W E

S

Observations: No Pueo Sightings

Pueo Project Survey Datasheet 2017

Site : Google / UH West study area GPS point: Survey road pt GPS coordinates: (D.dddddd, -D.dddddd) 21.350079°N -158.063903° E

Date: 11/8/2024 Visit # (1, 2 or 3): 3 Survey Start Time: 1638 Survey Stop Time: 1814 Observers: Theresa Geelhoed

Temperature: 78° Cloud cover (Clear, PC, MC, Cloudy): MC Rain: none Wind (0-7): 2

Detection start time	Detection end time	Number	Initial distance	Initial direction	Sounds	Behavior	Habitat

% Habitat w/in 400 m or surveyed area (must be 100%):

Developed	Wetland	Agricultural Crops	Agricultural Dirt	Grasslshort Grazed	Grasslshort Golf	Grasslshort Mowed
		25	50			
Grassland Fallow	**Grasslands Tall >75cm**	**Shrublands**	**Non Native Forest**	**Native Forest**	**Other**	**Total**
15	10					100

Surveyed area (max visible meters):

N: 50	S: 100
NE: 400	SW: 100
E: 350	W: 50
SE: 200	NW 50

N W E S

Observations: No pueo Sightings

Appendix E
Terrestrial Biological Survey Report

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H. T. HARVEY & ASSOCIATES
Ecological Consultants
50 years of field notes, exploration, and excellence

O'ahu Subsea Cable Telecommunications Project – Barbers Point Landing Terrestrial Biological Survey Report

Project No. 4795-01

Prepared for:

ICF

Prepared by:

H. T. Harvey & Associates

March 2025

91-1020 Kai Loli Street • Ewa Beach HI 96706 • 808.499.9092 • www.harveyecology.com

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List of Preparers

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Greg Spencer, Senior Wildlife Ecologist

Ilana Nimz, Wildlife Biologist

Section 1.0 Introduction

1.1 Project Description

The Oʻahu Subsea Cable Telecommunications Project – Barbers Point Landing (henceforth referred to as the Project) proposed by Humuhumu Services LLC and Starfish Infrastructure, Inc. includes subsea fiber optic cable installation in state marine waters and state submerged lands, a cable landing site at Barbers Point Beach Park, and an underground conduit system to be installed in public road rights-of-way between the cable landing site and a telecommunication facility to be located at the University of Hawaiʻi – West Oʻahu Campus (Figure 1).

H. T. Harvey & Associates was contracted to conduct a terrestrial biological survey to support engineering design considerations and avoidance of resources and preparation of the Hawaiʻi Environmental Policy Act Environmental Assessment. The survey focused on the onshore components of the proposed Project, which include 1) a cable landing site at Barbers Point Beach Park where the onshore extent of the six landing pipes, four beach manholes, three vaults and four ocean ground beds would be installed; and, 2) an underground conduit system, known as a "fronthaul" system, which would be constructed within public road rights-of-way between the cable landing site and a 4-acre site for the telecommunication facility to be located at the University of Hawaiʻi – West Oʻahu campus, pending final negotiation of a lease agreement. This technical report summarizes the literature review and findings of the terrestrial biological survey conducted in September and November of 2024.

1.2 Biological Study Scope and Objectives

The biological study area (BSA) is depicted in Figure 2. The scope and the objectives of the terrestrial biological survey were:

- Conduct a reconnaissance-level botanical survey to detect and record plant species of concern, including the presence of any taxa that are state or federally listed as threatened or endangered, or candidate species for listing. The purpose of the reconnaissance-level botanical survey also included documenting existing conditions (e.g., disturbance) at the Project site and identifying the presence of potential suitable habitat for native plant species.

- Conduct a reconnaissance-level wildlife survey to detect and record wildlife species (birds and mammals) of concern, including the presence of any taxa that are state or federally listed as threatened or endangered, candidate species for listing, or sensitive habitats. Because Hawaiian hoary bats (*Lasiurus cinereus semotus*) are known to occur on Oʻahu (Tomich 1986, Bonaccorso et al. 2015), their presence cannot be ruled out at the Project site. Therefore, the scope of this study did not include specific surveys for Hawaiian hoary bats. Hawaiʻi's only two endemic seabirds, Newell's shearwater (*Puffinus auricularis newelli*) and Hawaiian petrel (*Pterodroma sandwichensis*), were thought to be extirpated from Oʻahu. In 2019, presence of Newell's shearwater and Hawaiian petrel were detected at two and one location respectively in the high elevation sites of Waiʻanae and Koʻolau Mountains (Young et al. 2019). They do not nest in low elevation areas, and it is not known if they traverse through the Project site. Limited number of downed Hawaiian seabird occurrences on Oʻahu also are not in the vicinity of the Project site (Young et al. 2019). Therefore, the scope of this study did not include specific surveys for Newell's shearwater and Hawaiian petrel. The Hawaiʻi Distinct Population Segment of the endangered band-rumped storm-petrel, (*Oceanodroma castro*) is highly pelagic and its current known breeding range does not include Oʻahu (U.S. Fish and Wildlife Service [USFWS] 2021a). Short-tailed albatrosses are also highly pelagic species and are not known to breed on Oʻahu (USFWS 2020).

- The scope of this study did not include surveys for invertebrate species (insects).
- Terrestrial reptiles and amphibians were not surveyed for as Hawaiʻi does not have native terrestrial reptiles and amphibians. However, the Barbers Point Beach Park was surveyed for the two endemic marine reptiles, Hawaiian green sea turtle or honu (*Chelonia mydas*) and the Hawksbill sea turtle (*Eretmochelys imbricata*).
- Identify areas that could qualify as waters of the U.S., including wetlands. A formal aquatic resource delineation was not conducted as part of this study; however, potential wetlands and non-wetland waters were identified based on observable characteristics (e.g., prevalence of hydrophytic vegetation, hydrology, and drainage features with evident ordinary high water mark).
- Identify sensitive biological resources that should be avoided as part of the Project design and provide the information to the engineers to support their design considerations.

N:\Projects4700\4795-01\Reports\Hard Rock Front Haul\Hard Rock Front Haul.aprx

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Project Vicinity Map

Front Haul (4795-01)
March 2025

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H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 2. Project Biological Survey Area
Front Haul (4795-01)
March 2025

Section 2.0 Methods

2.1 Literature Review

The BSA for the flora and fauna study is depicted in Figure 2. Prior to the field survey, H. T. Harvey & Associates' biologists reviewed aerial photographs and topographic maps of the BSA and conducted a literature review to identify any ecological concerns and biological resources present in the BSA and its vicinity. We reviewed the USFWS Information for Planning and Consultation (IPaC) resource list for the Project site which identified one endangered mammal, one threatened and seven endangered Hawaiian waterbird and seabird species, 13 endangered plant taxa, and two sea turtle species as potentially occurring within or near the Project site (USFWS 2024a). The federally listed taxa in USFWS' IPaC report for the Project site (Appendix A) are also state listed as threatened or endangered under the Hawai'i Endangered Species Law (Chapter 195D of the Hawai'i Revised Statutes). The BSA does not overlap either designated or proposed critical habitat for species listed as threatened or endangered under the federal Endangered Species Act. But a few designated critical habitat parcels are in the vicinity of the BSA with the closest parcel being less than 120 feet from the BSA.

2.2 Field Methods

2.2.1 Botanical Field Methods

A reconnaissance-level botanical survey of the BSA was conducted on September 24 and 25, and November 14, 2024. Weather conditions during the survey were hot and humid with less than 10% cloud cover. In general, the BSA overlapped undeveloped rural and developed suburban areas and was easily accessible on foot. The botanist walked the BSA and documented the plants and vegetation communities or habitat types (Figure 3). A handheld Global Positioning System device, preloaded with spatial data (e.g., BSA boundary) was used to navigate during the survey and record field observations. In general, rocky outcrops, shaded areas, and topographic depressions, which are more likely to support rare native plant species, were surveyed more extensively.

2.2.2 Wildlife Field Methods

A reconnaissance-level wildlife survey of the BSA was completed on November 14, 2024. The weather during the survey was overcast, with 70% cloud cover, and an occasional light mist. The wind was, on average, 18 mph from the northeast. The wildlife biologist recorded observations of birds and mammals in the BSA. Visual and auditory detection, as well as secondary indicators (e.g., nests) were used to identify the bird species present. To survey birds, 10-minute point counts were made from 12 locations in the BSA between 1200 and 1600 hours (Figure 3). These 12 locations were spread out to cover different representative habitats in the BSA and particularly included potentially sensitive habitat for Hawaiian waterbirds such as near waterways and drainage channels. Point count surveys included tallying all birds seen or heard by the wildlife biologist from a fixed point over a period of 10 minutes. Binoculars (e.g., Eagle Optics 10×50) were used to assist with visual identifications. In addition to these focused point-count surveys, incidental detections of birds were recorded throughout the duration of the survey. An avian species list was compiled, which included common and scientific names of the individual species, the legal regulatory status, the average number of individuals detected per count station, and how many count stations were occupied. The last two metrics were used to provide a qualitative relative abundance of observed bird species. The presence of non-native terrestrial mammals was noted either via direct observation or signs such as tracks, scat, or remains.

2.2.3 Waters of the U.S. Field Methods

Prior to conducting the biological survey, H. T. Harvey & Associates ecologists reviewed background information on water resources potentially present in the BSA. We reviewed aerial imagery on Google Earth Pro (Google Inc. 2024), USFWS National Wetlands Inventory database (USFWS 2024b) (Figure 3), Division of Aquatic Resources database (Division of Aquatic Resources 2016), the Watershed Atlas of Hawaiʻi (Parham et al. 2008), U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey for soil types (Natural Resources Conservation Service 2024). When conducting the biological survey, the biologists looked for signs that might indicate the presence of potential wetlands (e.g. standing or pooled water, saturated soils, cracks in soil surface, predominance of wetland of hydrophytic plants) or water bodies (e.g. ponds, streams, ditches, and drainage or irrigation features) that could be regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA).

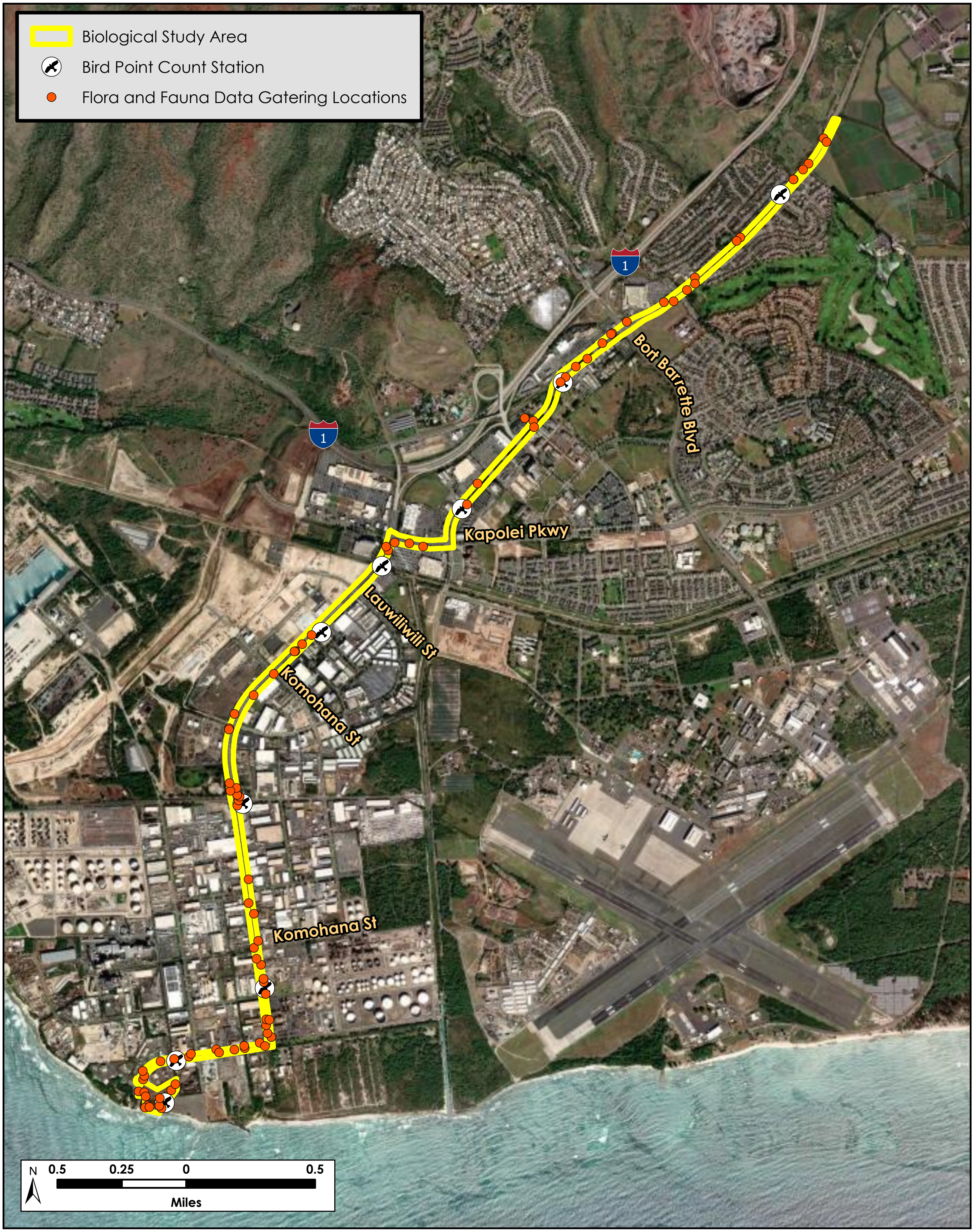

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Figure 3. Observation Points for Biological Survey
Front Haul (4795-01)
March 2025

Section 3.0 Results

3.1 Flora

The species and taxa recorded during the reconnaissance-level survey are indicative of the season (i.e., Fall) and the environmental conditions at the time of the survey. No rare native Hawaiian plant species or taxa that are state or federally listed as threatened, endangered, or taxa that are candidates for listing were observed in the BSA. Table 1 provides a list of the plant species observed and their relative abundance in the BSA. A total of 81 plant taxa were found, of which 11 (~ 14%) are native (indigenous or endemic) and 70 (~84%) are either Polynesian introduced or alien species (Wagner et al. 1999, Gallaher et al. 2020).

Table 1. Plant Species Observed in the Biological Study Area

Family	Scientific Name	Common Name	Status[1]	Relative Abundance[2]
Euphorbiaceae	*Acalypha wilkesiana* Mull. Arg.	Copper leaf	alien	R
Malvaceae	*Abutilon incanum* (Link) Sweet	Hoary abutilon	native?	R
Amaranthaceae	*Alternanthera pungens* Kunth	Khaki weed	alien	R
Amaranthaceae	*Amaranthus viridis* L.	Slender amaranth	alien	U
Asparagaceae	*Asparagus densiflorus* (Kunth) Jessop	asparagus	alien	R
Chenopodiaceae	*Atriplex semibaccata* R.Br.	Australian saltbush	alien	U
Meliaceae	*Azadirachta indica* A.Juss.	neem	alien	R
Asteraceae	*Bidens* alba (L.) DC. var. radiata (Sch.Bip.) Ballard ex Melchert	Beggartick	alien	U
Asteraceae	*Bidens pilosa* L.	Spanish needle	alien	U
Nyctaginaceae	*Boerhavia coccinea* Mill.	Scarlet boerhavia	alien	U
Nyctaginaceae	*Bougainvillea sp.*	Bougainvillea	alien	U
Clusiaceae	*Calophyllum inophyllum* L.	Kamani	Pol	U
Apocynaceae	*Carissa macrocarpa* (Eckl.) A.DC.	Natal plum, carissa	alien	U
Fabaceae	*Cassia grandis* L.	Pink shower tree	alien	C
Casuarinaceae	*Casuarina equisetifolia* L.	Common ironwood	alien	R
Poaceae	*Cenchrus echinatus* L.	Sandbur	alien	U
Poaceae	*Cenchrus ciliaris* L.	Buffelgrass	alien	A
Apiaceae	*Centella asiatica (L.) Urb.*	Asian pennywort	alien	R
Poaceae	*Chloris virgata* Sw.	Feather finger grass	alien	C
Poaceae	*Chloris barbata* Sw.	Swollen finger grass	alien	U
Clusiaceae	*Clusia rosea* Jacq.	Autograph tree	alien	C
Polygonaceae	*Coccoloba uvifera* (L.) L.	Sea grape	alien	U
Arecaceae	*Cocos nucifera* L.	Coconut, niu	pol	R
Combretaceae	*Conocarpus erectus* L.	Button mangrove	alien	R
Liliaceae	*Crinum asiaticum* L.	Spider lily	alien	R

Family	Scientific Name	Common Name	Status[1]	Relative Abundance[2]
Poaceae	*Cynodon dactylon* (L.) Pers.	Bermuda grass	alien	U
Cucurbitaceae	*Cucumis dipsaceus* Ehrenb. ex Spach	Wild cucumber	alien	R
Poaceae	*Cynodon dactylon* (L.) Pers.	Bermuda grass	alien	C
Poaceae	*Eragrostis amabilis (L.) Wight & Arn.*	Lovegrass	alien	C
Euphorbiaceae	*Euphorbia hirta* L.	Spurge	alien	R
Boraginaceae	*Heliotropium curassavicum* L.	Seaside heliotrope	native	U
Boraginaceae	*Heliotropium procumbens* Mill. var. depressum (Cham.) Fosberg	Fourspike heliotrope	alien	U
Araliaceae	*Heptapleurum actinophyllum* (Endl.) Lowry & G. M. Plunkett	Umbrella tree, octopus tree	alien	R
Aqifoliaceae	*Ilex cassine* L.	Dahoon	alien	R
Fabaceae	*Indigofera spicata* Forssk.	Creeping indigo	alien	U
Convolvulaceae	*Ipomoea obscura* (L.) Ker Gawl.	Obscure ipomoea	alien	R
Convolvulaceae	*Ipomoea pes-caprae* (L.) R.Br. ssp. brasiliensis (L.) Ooststr.	Pōhuehue, beach morning glory	native	U
Rubiaceae	*Ixora sp.*	Ixora	alien	U
Fabaceae	*Leucaena leucocephala* (Lam.) de Wit	False koa, koa haole	alien	C
Fabaceae	*Macroptilium atropurpureum* (DC.) Urb.	Vining cow pea	alien	C
Anacardiaceae	*Mangifera indica* L.	Mango	alien	R
Poaceae	*Megathyrsus maximus* (Jacq.) B. K. Simon & S. W. L. Jacobs	Guinea grass	alien	U
Fabaceae	*Millettia pinnata* (L.) Panigrahi	Pongamia	alien	R
Myoporaceae	*Myoporum sandwicense* A.Gray	Naio	native	R
Apocynaceae	*Nerium oleander* L.	Oleander	alien	R
Pandanaceae	*Pandanus tectorius* Parkinson	Hala	native	R
Passifloraceae	*Passiflora foetida* L.	Love-in-a-mist	alien	R
Polypodiaceae	*Phlebodium aureum* (L.) J.Sm.	Lauae haole	alien	R
Phyllanthaceae	*Phyllanthus debilis* Klein ex Willd.	Niruri	alien	R
Urticaceae	*Pilea microphylla* (L.) Liebm.	Artillery plant	alien	R
Fabaceae	*Pithecellobium dulce* (Roxb.) Benth.	Opiuma	alien	U
Asteraceae	*Pluchea indica* (L.) Less.	Indian fleabane	alien	R
Asteraceae	*Pluchea carolinensis* (Jacq.) G. Don	Marsh fleabane, Sourbush	alien	R
Apocynaceae	*Plumeria rubra* L.	Plumeria	alien	R
Arecaceae	*Pritchardia sp.*	Fan palm	alien	R
Fabaceae	*Prosopis pallida* (Humb. & Bonpl. ex Willd.) Kunth	Kiawe	alien	C
Acanthaceae	*Pseuderanthemum carruthersii* (Seem.) Guillaumin	Golden eldorado	alien	U
Euphorbiaceae	*Ricinus communis* L.	Castor bean	alien	U

Family	Scientific Name	Common Name	Status[1]	Relative Abundance[2]
Acanthaceae	*Ruellia sp.*	Ruellia	alien	R
Fabaceae	*Samanea saman* (Jacq.) Merr.	Monkeypod	alien	C
Goodeniaceae	*Scaevola taccada* (Gaertn.) Roxb.	Naupaka kahakai	native	U
Anacardiaceae	*Schinus terebinthifolia* Raddi	Christmas berry	alien	C
Aizoaceae	*Sesuvium portulacastrum* (L.) L.	ʻĀkulikuli	native	C
Malvaceae	*Sida ciliaris* L.	Red ilima	alien	U
Malvaceae	*Sida rhombifolia* L.	Cuban jute	alien	U
Solanaceae	*Solanum melongena* L.	Eggplant	alein	R
Rubiaceae	*Spermacoce assurgens* Ruiz & Pav.	Buttonweed	alien	R
Asteraceae	*Sphagneticola trilobata (L.) Pruski*	Wedelia	alien	U
Poaceae	*Sporobolus virginicus* (L.) Kunth	ʻAkiʻaki	native	U
Asteraceae	*Synedrella nodiflora* (L.) Gaertn.	Node weed	alien	R
Bignoneaceae	*Tabebuia aurea* (Silva Manso) Benth. & Hook.f. ex S.Moore	Caribbean trumpet tree	alien	U
Bignoniaceae	*Tabebuia heterophylla* (DC.) Britton	Pink tacoma	alien	R
Combretaceae	*Terminalia catappa* L.	False kamani, tropical almond	alien	U
Malvaceae	*Thespesia populnea* (L.) Sol. ex Corrêa	Milo	native?	U
Asteraceae	*Tridax procumbens* L.	Coat buttons	alien	R
Asteraceae	*Verbesina encelioides* (Cav.) Benth. & Hook.	Golden crown beard	alien	R
Arecaceae	*Veitchia merrillii*	Manila palm	alien	U
Verbenaceae	*Vitex rotundifolia* L.f.	Pōhinahina	native	U
Sterculiaceae	*Waltheria indica* L.	ʻUhaloa	native	U
Araceae	*Xanthosoma roseum* Schott	Elephant ear, ʻape	alien	R
Asteraceae	*Xanthium strumarium* L. var. canadense (Mill.) Torr. & A.Gray	Cocklebur	alien	U

[1] **Status Notes:** alien = introduced or alien (all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact [i.e., Cook's arrival in the islands in 1778]). Pol = Polynesian introduced or alien species. Native = species that occur naturally in the Hawaiian Islands including indigenous species that have a wider distribution outside of Hawaiʻi. Native? = probably indigenous but possibly introduced in the Hawaiian Islands by man.

[2] **Qualitative Relative Abundance of Observed Species in Study Area:** A = abundant—forming a major part of the vegetation in the BSA. C = common—widely scattered throughout the BSA or locally abundant in a portion of it. U = uncommon—scattered sparsely throughout the BSA or occurring in a few small patches. R = rare—only a few isolated individuals in the BSA.

Additional Notes: This checklist is an inventory of plant species observed on September 24 and 25 and November 14, 2024, during a reconnaissance level botanical survey. The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999); recent name changes are those recorded in Gallaher et al. (2020).

The vast majority of the BSA overlaps a highly developed highway corridor that passes through the town of Kapolei and the Kalaeloa commercial and industrial area. Based on the type, distribution, and abundance of the plant species found, the following three vegetation types were identified in the BSA.

3.1.1 Coastal Sand Dune Vegetation

Approximately 0.6 acres of the BSA at the Barber's Point Beach Park and within the cable landing site can be characterized as Coastal Sand Dune Vegetation (Figure 4, Photo 1). Most of the native plant species documented in the BSA were found in this habitat type. Overall, the vegetation at the cable landing site was sparse with a few scattered coconut (*Cocos nucifera*) trees and ʻakiʻaki (*Sporobolus virginicus*) as the most common ground cover. There were a few patches/mounds of vegetated areas on the beach which were composed of native species of naupaka (*Scaevola taccada*), pōhuehue (*Ipomoea pes-caprae*), ʻakiʻaki and with non-native marsh fleabane (*Pluchea carolinensis*).

3.1.2 Roadside Scrub Vegetation

Approximately 21 acres of the BSA supports roadside vegetation that does not appear to be maintained and is characterized as Roadside Scrub Vegetation (Figure 4). A stretch of about 0.5 mile along Farrington Highway at the western end of the BSA is mostly dominated by buffelgrass and haole koa and kiawe (*Prosopis pallida*) trees (Photo 2). Some other weedy herbaceous species seen here include vining cow pea, cocklebur (*Xanthium strumarium*), Cuban jute (*Sida rhombifolia*), and scarlet boerhavia (*Boerhavia coccinea*). In another stretch of about 0.75 miles along Kalaeloa Blvd toward the southeastern part of the BSA, the vegetation did not appear to be maintained and can be described as Roadside Scrub Vegetation (Figure 4, Photo 3). Commonly seen roadside weedy species here include shrubs of haole koa, marsh fleabane, scattered kiawe and Christmas berry (*Schinus terebinthifolia*) trees, and herbaceous weedy species such as buffelgrass, swollen and feathery finger grass (*Chloris barbata*, *Chloris virgata*), coat buttons (*Tridax procumbens*), vining cow pea, and Cuban jute. Naupaka and ʻuhaloa were the two native species found scattered amongst the weedy vegetation.

3.1.3 Manicured/Maintained Vegetation

The majority of the BSA (approximately 81 acres) can be characterized as manicured or maintained; it was either mowed or composed of a variety of landscape or ornamental plants (Figure 4). For about a 0.7 mile stretch of Farrington Highway, starting from Kapolei Golf Course, the vegetation was composed of shower trees (*Cassia grandis*) with mowed grass and wedelia (*Sphagneticola trilobata*) as the ground cover, and a narrow hedge of natal plum (*Carissa macrocarpa*) (Photo 4). Some ornamental plant species seen at the entrance of the Kapolei Golf Course Road include spider lily (*Crinum asiaticum*), oleander (*Nerium oleander*), and asparagus (*Asparagus densiflorus*). Pōhinahina (*Vitex rotundifolia*) was the only native species planted along the sidewalk by the entrance to the small shopping center at the intersection with Kealanani Avenue. For a stretch of about 0.25 miles, toward the intersection with Fort Barrett Road, the southern portion of the BSA overlaps an undeveloped park or greenway with mowed grass and shower trees (Photo 5).

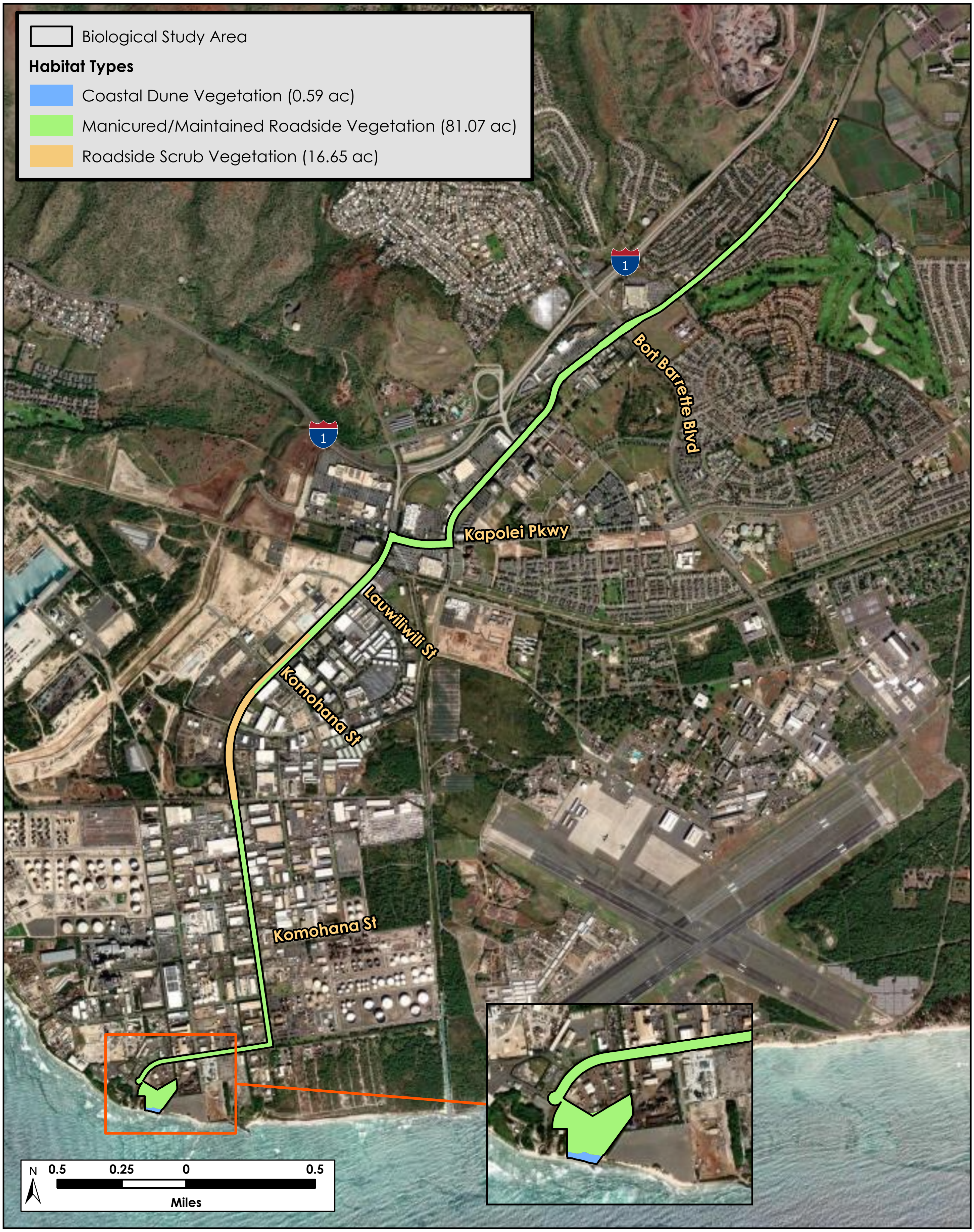

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Figure 4. Project Vegetation/Habitat Types in the Biological Study Area
Front Haul (4795-01)
March 2025

The BSA along the rest of Farrington Highway and along Kamokila Blvd also was composed of Manicured/Maintained Vegetation type. Shower trees along the sidewalk and kamani (*Calophyllum inophyllum*) trees in the median of the road were characteristic along most of Kamokila Blvd (Photo 6). The BSA here was landscaped with ornamental species such as Manila palms (*Veitchia merrillii*), bougainvillea (*Bougainvillea sp.*), spider lily, natal plum, laua‘e fern (*Phlebodium aureum*), and ixora (*Ixora sp.*). For about 1000 feet the BSA on Kamokila Blvd overlaps the mowed lawns of Kapolei Regional Park. Vegetation in the BSA on Kapolei Blvd was mostly landscaped with monkey pod trees (*Samanea saman*) in the median and shower trees and naupaka hedges along the sidewalk.

There is a large concrete hardened drainage at the intersection of Kapolei Parkway and Kalaeloa Blvd with mostly haole koa and guinea grass in the immediate surrounding and fenced in area (Photo 7). Except for the stretch of 0.75 mile of Roadside Scrub Vegetation described above, areas of mowed grass with avenue tree species such tabebuia (*Tabebuia heterophylla*), monkey pod, and shower tree comprised the vegetation in the northern half of BSA on Kalaeloa Blvd between Kapolei Parkway to Malakole Street (Photo 8). Large areas of mowed grass with ornamental species such as oleander along the boundary walls of business complexes were typical in the BSA overlapping the southern half of Kalaeloa Blvd between Malakole Street and Olai Street (Photo 9). Some large trees seen here include shower trees, ironwood (*Casuarina equisetifolia*), seagrape (*Coccoloba uvifera*), pongamia (*Millettia pinnata*), and tabebuia.

Vegetation in the BSA on Olai Street was composed of mostly autograph (*Clusia rosea*), sea grape, and kiawe trees with prostrate weedy herbaceous weeds such creeping indigo, node weed (*Synedrella nodiflora*), Australian saltbush (*Atriplex semibaccata*), and grasses such as radiate finger grass in the ground cover (Photo 10). Inland of the Coastal Sand Dune Vegetation type (describe above on page 11), Barbers Point Beach Park appeared to be maintained to be an open habitat. ‘Ākulikuli (*Sesuvium portulacastrum*), Australian saltbush, ‘aki‘aki grass, and pōhuehue were common here among the low growing prostrate species interspersed with patches of bare ground (Photo 11). Shrubs of naupaka, haole koa, and marsh fleabane and tree species such as tropical almond were mostly limited to the edges along the fence line of the Beach Park (Photo 12). One individual of the native naio (*Myoporum sandwicense*) shrub that appeared to be planted was also found in the western portion of the Beach Park.

Photo 1. Coast Sand Dune Vegetation at the Barbers Point Beach Park Landing Area with Native Pōhuehue (*Vitex rotundifolia*) in the Foreground

Photo 2. Roadside Scrub Vegetation Along Farrington Highway Toward the Eastern End of the Biological Study Area

Photo 3. Roadside Scrub Vegetation Along Kalaeloa Blvd Toward the Western Side of the Biological Study Area

Photo 4. Maintained/Manicured Vegetation Lined with Shower Trees (*Cassia grandis*) Along Farrington Highway

Photo 5. Maintained Mowed Area in the Open Undeveloped Stretch Along Farrington Highway Opposite Kapolei Walmart

Photo 6. Kapolei Parkway in the Biological Study Area Landscaped with Kamani (*Calophyllum inophyllum*) Trees in the Road Median

Photo 7. **Concrete-Lined Drainage in the Biological Study Area at the Intersection of Kapolei and Kalaeloa Boulevards with Haole Koa (*Leucaena leucocephala*) and Guinea Grass (*Megathyrsus maximus*)**

Photo 8. **Representative Vegetation with Tabebuia (*Tabebuia aurea*), Shower Trees, (*Cassia grandis*) and Mowed Grass in the Northern Half of Kalaeloa Blvd between Kapolei Parkway and Malakole Street**

Photo 9. Representative Vegetation with Mowed Grass and Ornamental Plants Such as Oleander (*Nerium oleander*) in the Southern Half of Kalaeloa Blvd between Malakole Street and Olai Street

Photo 10. Autograph Trees (*Clusia rosea*) in the Biological Study Area Along Olai Street

Photo 11. Open Maintained Habitat at Barbers Point Beach Park with Prostrate Herbaceous Species Such as Australian Saltbush (*Atriplex semibaccata*) and ʻĀkulikuli (*Sesuvium portulacastrum*)

Photo 12. At Barbers Point Beach Park Shrubs Such as Naupaka (*Scaevola taccada*) and Trees Such as False Almond (*Terminalia catappa*) Were Seen Only Along the Fenced Boundary

3.2 Fauna

Avian point count surveys identified 101 individual birds representing 14 species (Table 2). The Pacific Golder Plover (*Pluvialis fulva*) was the only native (indigenous) species found in the BSA. It was seen twice, once at the Barbers Point Beach Park and the second time on the manicured lawns at the Kapolei Regional Park. The remaining 14 bird species are introduced or alien (non-native) to the Hawaiian Islands. No rare native Hawaiian birds or bird species that are state or federally listed as threatened, endangered, or taxa that are candidates for listing were observed in the BSA. The rock dove or feral pigeon (*Columba livia*) was the most abundant species, with large groups of up to 40 individuals identified in the park areas overlapping the BSA. Zebra doves (*Geopelia striata*) were the most commonly seen species, found at 7 of the 12 point count stations. Sites with trees had more birds than stations with just grass or buildings. Two of the point count stations had no birds.

Table 2. Bird Species Observed in Biological Study Area

Scientific Name	Common Name	Status	Average Birds Per Point Count Station (n=3)	Number of Stations Occupied (n=3)	Qualitative Relative Abundance
Acridotheres tristis	Common myna	X	0.08	1	Rare
Bubulcus ibis	Cattle egret	X, IW, M	0.08	1	Rare
Carpodacus mexicanus	House finch	X, M	0.66	4	Uncommon
Columba livia	Rock Dove	X	4.58	5	Abundant
Estrilda astrild	Common waxbill	X	0.25	1	Rare
Gallus gallus	Red jungle fowl	X	0.42	1	Rare
Geopelia striata	Zebra dove	X	1	7	Uncommon
Lonchura oryzivora	Java sparrow	X, IW	0.42	1	Rare
Paroaria coronata	Red-crested cardinal	X, M	0.08	1	Rare
Passer domesticus	House sparrow	X	0.08	1	Rare
Pluvialis fulva	Kolea, Pacific Golden Plover	I	0.17	2	Rare
Pycnonotus cafer	Red-vented bulbul	X, IW	0.08	1	Rare
Sicalis flaveola	Saffron Finch	X	0.33	2	Rare
Zosterops japonicus	Warbling White-eye	X, IW	0.58	2	Uncommon

Abundance based on the average number of individuals observed per count station, averaged across all point count stations, as follows:

Abundant – average $\geq$ 4 birds/station

Common – average between 3.9 to 2.0 birds/station

Uncommon – average between 0.5 to 1.9 birds/station

Rare – average < 0.49 birds/station

IW = State (HAR 12-124, Exhibit 5) or Federal (18 U.S.C. 42) injurious wildlife species

X = introduced or alien (non-native species)

M= Listed as a Migratory Bird Treaty Act Protected Species (10.13 List)

The cattle egret (*Bubulcus ibis*), house finch (*Carpodacus mexicanus*), and red-crested cardinal (*Paroaria coronata*) are protected species under the Migratory Bird Treaty Act. The cattle egret, Java sparrow (*Lonchura oryzivora*), red-vented bulbul (*Pycnonotus cafer*), and the warbling white-eye (*Zosterops japonicus*) are on the State of Hawaiʻi Injurious Wildlife list and are known to be harmful to agriculture, aquaculture, or indigenous wildlife or plants, or to constitute a nuisance or health hazard (Hawaiʻi Department of Land and Natural Resources [DLNR] 2015a).

No mammal species were observed during the reconnaissance wildlife survey. However, the area is known to have small feral mammals such as cats, rats, and mongoose.

Neither the Hawaiian green sea turtle nor the hawksbill turtle was observed on the sandy beach at the Barbers Point Beach Park during the fall survey.

3.3 Waters of the U.S.

Characteristics indicating the presence of potential waters of the U.S. were observed at eight locations in the BSA. Location of these aquatic features are illustrated on Figure 5 and described below.

- Olai Street Crossing 1—drainage ditch with earthen bed and banks and standing water (Photo 13). The banks were steep and vegetated. This drainage feature terminated just behind the beach berm on the eastern side of the Barber Point Beach Park.
- Olai Street Crossing 2—drainage ditch with earthen bed and banks and standing water (Photo 13). The banks were steep and vegetated.
- Kalaeloa Drainage Feature 1—drainage ditch with earthen bed and banks and standing water. The banks were steep and vegetated.
- Kalaeloa Drainage Feature 2—drainage ditch with earthen and vegetated bed and banks, presence of water not obvious.
- Kapolei Large Drainage—large concrete lined culvert with some water standing water (Photo 7).
- Farrington Box Culvert 1—large concrete lined box culvert enclosed in fence.
- Farrington Box Culvert 2—large concrete lined box culvert enclosed in fence.

Photo 13. Drainage Features—Olai Street 1 (Left) and Kalaeloa Drainage Feature 2 (Right) Seen in the Biological Study Area

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Figure 5. Location of Potential Waters of the U.S. Regulated Under the Clean Water Act
Front Haul (4795-01)
March 2025

SITE DISTURBANCE			
	SF	ACRAGE	APROX. DIM.
HDD CONSTRUCTION DISTURBANCE	31,716 SF	0.728	~150'x200'
OGB CONSTRUCTION DISTURBANCE	9,948 SF	0.228	~20'x500'
OSP FRONTHAUL CONNECTION DISTURBANCE	600 SF	0.014	20'x30'
TOTAL	42,264	0.970	

Figure 6. Landing Site Limits of Disturbance

Section 4.0 Conclusions and Recommendations

4.1 Flora

The study did not find any botanical concerns associated with the BSA. The vast majority (84%) of the species found are non-native. This is not surprising as the BSA is largely composed of a highly disturbed and well-developed highway corridor. None of the 11 native plant species found in the BSA are known to be rare (DLNR 2024a). Removal of any of these native plant species is not expected to have an adverse effect on species' populations locally or regionally as these native species are known to have a widespread distribution on Oʻahu and throughout the State (Wagner et al. 1999, Gallaher et al. 2020).

No threatened or endangered plant species were found in the BSA. Thirteen endangered plant taxa were identified in the USFWS resource list to potentially occur and therefore be affected by activities at the Project site (IPaC 2024a). The known status, distribution, and threats to these plant taxa are summarized below followed by an assessment of the likelihood that they may occur at the Project site or be potentially impacted by Project activities.

1. ʻAkoko (*Euphorbia celastroides* var*kaenana*)—ʻakoko is a short-lived perennial shrub in the Euphorbiaceae (spurge) family that is known to flower and fruit throughout the year. Historically, it is known to occur only on Oʻahu on windward talus slopes in coastal dry shrubland from 30 to 700 ft. Currently, about 742–1,239 mature individuals occur across only three wild populations on Oʻahu, in Kaʻena Point, Waiʻanae Kai, and Mākua Military Reservation; all being more than 12 miles away from the Project site. Threats to ʻakoko include habitat degradation, human impacts, predation and herbivory by rodents, and fire (USFWS 2022).
2. ʻAkoko (*Euphorbia skottsbergii* var. *skottsbergii*)—ʻakoko is a short-lived perennial shrub in the Euphorbiaceae (spurge) family that is known to flower and fruit throughout the year. Historically, on Oʻahu, ʻakoko occurred on the Ewa Plain between Sisal, Pearl Harbor and Barbers Point in coastal dry shrublands with calcareous substrate or thin soil pockets in the coralline rubble. Populations that historically occurred in the vicinity of the Project site were extirpated at the time of development of the deep draft harbor, West Beach Resort on Oʻahu, and Campbell Industrial Estate. Currently only about 18 individuals are known in the wild and about a 1000 have been outplanted at a few conservation sites such as the Kalaeloa Unit of the Pearl Harbor National Wildlife Refuge, all within five miles of the Project site. Threats to ʻakoko include habitat degradation and herbivory by invertebrates (USFWS 2024c).
3. ʻĀwiwi (*Schenkia sebaeoides*)—ʻāwiwi is a short-lived determinate annual herb in the *Gentianaceae* (gentian) family endemic to Kauaʻi, Oʻahu, Mōlokaʻi, Lānaʻi, and Maui. On Oʻahu ʻāwiwi typically grows in volcanic or clay soils or on cliffs in arid coastal areas or on coral plains below 1,207 ft elevation. On Oʻahu, 24 mature and six immature plants were reported at an existing population

near Koko Crater (~ 25 miles east of the Project site), as well as an estimated 1,000-2,000 individuals from surrounding habitat. Threats to ʻāwiwi include habitat degradation, damage caused by off-road vehicles, trampling by humans, herbivory (USFWS 2021b).

4. Dwarf Naupaka (*Scaevola coriacea*)—dwarf naupaka is a short-lived, perennial herb in the *Goodeniaceae* (goodenia) family. It's typically found within the coastal lithified sand dune habitat. Historically it occurred on all the main Hawaiian islands except Kāhoʻolawe. Currently, it occurs only on Maui and Mōlokaʻi across five wild populations with only about 85 individuals. Threats to dwarf naupaka include habitat degradation, off-road vehicles, collecting, and herbivory by invertebrates, slugs, and rodents (USFWS 2021c).

5. ʻEnaʻena (*Pseudognaphalium sandwicensium* var.*molokaiense*)—ʻenaʻena is a very densely woolly short-lived perennial herb in the Asteraceae (sunflower) family. Historically, its habitat range included coastal areas at sea level to 500-ft, in predominantly arid environments in sandy soil, on sand dunes, and on raised limestone plains and bare clay outcrops on Mōlokaʻi, Maui, Lānaʻi, and Oʻahu. The Oʻahu population is believed to have been extirpated in 1980. Threats to ʻenaʻena include habitat degradation, erosion including rockfalls, and predation by ungulates and nonnative invertebrates (USFWS 2021d).

6. ʻEwa hinahina (*Achyranthes splendens* var. *rotundata*)—this is a short-lived perennial shrub in the Amaranthaceae (amaranth) family that grows on limestone substrate characterized by sinkholes and coralline rubble with only thin soils and pockets of humus present. Historically, ʻewa hinahina was found on arid and semi-arid coastal lowlands of Oʻahu, Mōlokaʻi, and Lānaʻi but currently is only known from three wild populations on Oʻahu; one at Kalaeloa Heritage Park about three miles east of the Project site. Threats to ʻewa hinahina include habitat degradation, fire, and herbivory by insects and insect farming ants (USFWS 2024d).

7. ʻIhi (*Portulaca villosa*)—ʻihi is a short-lived perennial, prostrate, succulent herb in the Portulacaceae (purslane) family. Typical habitats are dry, rocky, clay, lava, or coralline reef sites, from sea level to 5,250-ft elevation in the dry coastal, dry forest, and dry grassland/shrubland. Historically it was known to occur on all main Hawaiian Islands including some off-shore islets but currently the wild populations are known only from Nihoa (~300-500 plants), Mōlokaʻi (~15 individuals), and Hawaiʻi Island (~10 individuals). Threats to ʻihi include habitat degradation, herbivory by feral ungulates, and hybridization (USFWS 2021e).

8. ʻIhiʻihi (*Marsilea villosa*)—ʻihiʻihi is a short-lived perennial fern in the Marsileaceae (water clover) family. It grows in small shallow depressions on level or gently sloping terrain, in clay soil, or lithified sand dunes overlaid with alluvial clay. All reported populations occur below 500 ft. Currently populations of ʻihiʻihi are limited to Mōlokaʻi and Oʻahu—at Lualualei and at Koko Head—both populations more than 10 miles away from the Project site. Threats to ʻihiʻihi include habitat degradation, trampling by humans and off-road vehicles, fire, and drought (USFWS 2023a).

9. Koʻoloaʻula (*Abutilon menziesii*)—koʻoloaʻula is a long-lived perennial shrub in the Malvaceae (mallow) family that flowers and fruits throughout the year. It is known from the islands of Oʻahu, Lānaʻi,

Maui, and Hawaiʻi where it occurs primarily in dryland habitat from 50 to 1,400 ft. The two known wild populations on Oʻahu are in Lualualei and in Kapolei and a few other sites there it has been outplanted. The Kapolei site is within two miles of the Project site and due to being water-limited there has not been any recruitment seen in the last 10 years. Threats to koʻoloaʻula include habitat degradation, predation and herbivory by ungulates, rodents, and invertebrates (USFWS 2023b).

10. ʻOhai (*Sesbania tomentosa*)—ʻohai is a long-lived perennial shrub or tree in the Fabaceae (pea) family that grows on sandy beaches, dunes, or pond margins at elevations between 0 to 694 ft. Historically, ʻohai occurred on all eight of the main Hawaiian Islands and on Nihoa and Necker in the Northwestern Hawaiian Islands. Currently wild populations of ʻohai occur on Kauaʻi, Oʻahu, Mōlokaʻi, Maui, Kāhoʻolawe, Hawaiʻi Island, Nihoa, and Necker. On Oʻahu both wild and outplanted populations occur in Kalaeloa within a couple miles of the Project Site. Threats to ʻohai include habitat degradation, collection and off-road vehicle use by humans, and herbivory by ungulates, rodents, slugs, and nonnative invertebrates (USFWS 2021f).

11. Pōpolo (*Solanum nelsonii*)—pōpolo is a short-lived perennial sprawling or trailing shrub in the Solanaceae (nightshade) family up to 3.2-ft tall. (USFWS 2021f). Typical habitat for pōpolo is coral rubble or sand in coastal sites up to 490-ft in elevation. Historically it is known all main Hawaiian Islands as well as from a few Northwestern Hawaiian Islands. Since its extirpation on Oʻahu in 1860's pōpolo has been at the Kalaeloa Unit of the Peal Harbor National Wildlife Refuge about 1.2 miles east of the Project Site. Threats to pōpolo include habitat degradation and herbivory by ungulates, rats, and invertebrates (USFWS 2021g).

12. Puʻukaʻa (*Cyperus trachysanthos*)—puʻukaʻa is a short-lived perennial sedge in the Cyperaceae (sedge) family. It occurs in seasonally wet sites (mud flats, wet clay soil, or wet cliff seeps) on flats or talus slopes at sea level 0 to 771 ft elevation. Historically, it was known from Niʻihau and Kauaʻi, and from scattered locations on Oʻahu, Mōlokaʻi, and Lānaʻi but currently occurs only on Kauaʻi and Oʻahu. Threats to puʻukaʻa include habitat degradation, destruction by off-road vehicles, and herbicide use (USFWS 2024e).

13. *Vigna o-wahuensis*—this is a short-lived perennial vine or twining herb in the Fabaceae (pea) family that is known to occur in dry to mesic grassland and shrubland from 30 to 4,500 ft in elevation. Historically it was known to occur on 11 Hawaiian islands but currently is limited to the islands of Hawaiʻi, Maui, and Mōlokaʻi. Threats to *V. o-wahuensis* include habitat degradation, drought, fire, and herbivory by slugs, rodents and game birds (USFWS 2020b).

The Project site does not contain suitable habitat for the above discussed endangered plant species. The majority of the Project site is a highly disturbed and well-developed highway corridor. The manicured areas of the highway rights-of-way are routinely mowed and weed whacked and the unmaintained areas are dominated by nonnative species. The Barbers Point Beach Park at the Project site is a recreational area subject to human foot traffic on a daily basis. Rodents and nonnative invertebrates that can damage endangered plants and their propagules are also present at the Project site. These unsuitable conditions combined with the biology, status, and distribution of these endangered plant species (described above) make is highly unlikely for them to establish at the Project site and therefore, Project activities are not likely to adversely impact these endangered plant species.

Three critical habitat parcels for seven endangered plant species (ʻakoko, ʻāwiwi, ʻohai, ʻEwa hinahina, *V. o-wahuensis*, koʻokoʻolau [*Bidens amplectens*], and maʻoliʻoli [*Schiedea kealiae*]) occur within a mile of the Barbers Point Beach Park with the closest parcel being within 120 feet of the Beach Park (Figure 2). Individuals of several endangered species have been outplanted in these critical habitat parcels, are maintained by DLNR and USFWS Wildlife Refuge staff, and volunteers, and have been to known to reproduce successfully. Also, endangered species of ʻEwa hinahina, ʻohai, koʻoloaʻula, and puʻukaʻa are widely cultivate and sold commercially as ornamental species. Therefore, there is very low possibility that an individual of one of these endangered species could occur (outplanted or a temporary recruit) in the relatively less trampled peripheral areas of the Beach Park. Given that ground disturbance related to Project activities at the Beach Park will occur on less than one acre in the most highly disturbed area near the public restrooms and the benches, Project activities are unlikely to have an adverse impact (Figure 6).

A potential impact of implementing the project is the introduction and spread of invasive species during ground disturbance or construction phase. H. T. Harvey & Associates recommend that the project incorporate specifications that will result in the adoption of best management practices to minimize the introduction and spread of invasive species at the Project site. These best management practices may include the following:

- All construction equipment and vehicles should arrive at the work site for the first time in clean condition and free of: any soil; plants or plant parts, including seeds; insects, including eggs; and reptiles and amphibians, including their eggs. Similarly, all construction equipment and vehicles should also be cleaned after use on the Project site and before leaving the site. This would be particularly important for equipment movement between the Project site and the other islands.
- All materials imported to the Project site, including gravel, soil, rock, and sand, should be certified weed free. Invasive species found on stockpiled materials should be removed either chemically or mechanically.
- Only weed-free seed mixtures should be used for hydroseeding and hydromulching on the Project site. A qualified botanist should inspect the seeded areas a minimum of 60 days after the hydroseed/hydromulch is applied. Any species of plant other than those intended to be in the hydroseed/hydromulch should be removed. In particular, plant species that are not known to occur on Oʻahu and those that are actively being controlled on the island should be removed.
- To the extent feasible the project should use native plants for revegetation or landscaping purposes. Potential native plants that are ecologically suitable for landscaping at the Project site include species such as naupaka, pōhinahina, hala (*Pandanus tectorius*), ʻaʻaliʻi (*Dodonea viscosa*), ʻulei (*Osteomeles anthyllidifolia*), and alaheʻe (*Psydrax odorata*). If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive may be substituted. Additional information on selecting

appropriate plants for landscaping can be obtained from the Plant Pono website (http://www.plant pono.org/).

- Only plants grown on O‘ahu should be used for landscaping purposes. If locally grown plants are unavailable, then imported plants may be used, but they should be thoroughly inspected or quarantined if necessary to ensure that they are free of invasive pests such as little fire ants (*Wasmannia auropunctata*), and invasive plant seeds and seedlings that could arrive inadvertently.

4.2 Fauna

Kōlea was the only native bird species observed in the BSA. This species is known to winter in the Hawaiian Islands. They are commonly seen on O‘ahu from August to October in a variety of habitats including those in urban areas such as grassy fields, beaches, golf courses, parks, and residential lawns (DLNR 2015b). Given its wide preference of habitats and the abundance of availability of such habitats outside of the Project site, it is unlikely that the project activities will adversely impact the population of kōlea locally or regionally.

Even though, pueo (*Asio flammeus sandwichensis*), the only native (endemic) owl to the Hawaiian Islands was not seen during this biological survey, it is known to occur on O‘ahu and is state-listed as endangered on O‘ahu (DLNR 2015b). Pueo occupies a variety of habitats including open grasslands and in fact it has been observed in the vicinity of the norther portion of the Project site along Farrington Highway, near University of Hawai‘i West O‘ahu (The Pueo Project 2020). But the Project site is highly disturbed, narrow, linear, highway corridor that does not contain suitable habitat for pueo. Therefore, Project activities, including ground disturbance is unlikely to have an adverse impact on individual pueo birds and their population locally (on O‘ahu) or regionally in the State.

Four state and federally listed waterbird species—Hawaiian duck, coot, stilt, and gallinule, were identified to potentially occur at the Project site (USFWS 2024a). None of these species were observed during this reconnaissance level survey. But these four waterbird species are known to occur on O‘ahu (DLNR 2015b). Stilts have been observed in the vicinity of the BSA at the Kapolei Regional Park and coots and gallinules frequent the water features at golf courses in the vicinity of the Project site (author's personal observations). It is not out of the realm of possibility for these waterbirds to visit the Project site. However, the Project site is highly disturbed, with the majority of it is a narrow, linear, highway corridor. The water features seen in the BSA are mostly culverts (Photo 7) and highly disturbed ditches (Figure 12) that do not contain optimal foraging and breeding habitat for these endangered waterbirds. More suitable habitats for these endangered waterbirds are available elsewhere on O‘ahu including in the vicinity of the Project site, for example, James Cambell National Wildlife Refuge in Pearl Harbor. Therefore, project activities are not likely to have an adverse impact on the local or regional populations of these waterbirds. Additionally, the following measures are recommended to avoid and minimize the potential for *take* of individual waterbirds, if in the rare event they are seen at the Project:

- Post and enforce reduced speed limits and inform project personnel and contractors about the presence of endangered species on-site.
- Incorporate the USFWS's Best Management Practices for Work in Aquatic Environments into the project design.
- 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 three days of project initiation and after any subsequent delay of work of three 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.

As mentioned in Section 1, the Hawaiian hoary bat, a state and federally listed species, was not specifically surveyed for during this reconnaissance-level survey. There are numerous records for this species on O'ahu (Tomich 1986, DLNR 2015b) and their presence at the Project site cannot be ruled out. Hawaiian hoary bats are known to roost in large (typically greater than 15-foot-tall) dense-canopy trees, sometimes at the edges of water bodies, such as streams and lakes (USFWS 1998). Hawaiian hoary bats may hunt for flying insect prey along roadways, and open areas and occasionally roost in large, dense-foliage trees such as those found in the BSA. Because trees greater than 15-ft tall will not be removed, the Project is not likely to have an adverse impact on Hawaiian hoary bats. The following measures are also recommended to further avoid and minimize potential impacts to Hawaiian hoary bats at the Project site.

- Do not disturb, remove, or trim woody plants greater than 15-ft tall during the bat birthing and pup rearing season (June 1 through September 15).
- Do not use barbed wire for fencing.

As mentioned in Section 1, the four listed seabird species—Newell's shearwater, Hawaiian petrel, band-rumped storm-petrel, and short-tailed albatross were not surveyed during this field study. The USFWS IPaC resource lists these species to potentially occur within or near the BSA and therefore, their potential to occur or be impacted by Project activities is discussed here. Three of listed seabirds are pelagic (Newell's shearwater, Hawaiian petrel, and band-rumped storm-petrel) and are known to forage at sea and nest at high elevations in the mountainous interior of the main Hawaiian Islands. The endangered short-tailed albatross is a highly pelagic species and rare visitor to Hawaiian waters and is considered highly unlikely to be encountered anywhere in the vicinity of the Project site. Newell's shearwater and Hawaiian petrel were detected at two and one location, respectively, in the high elevation sites of Waiʻanae and Koʻolau Mountains and they do not nest at low elevations (Young et al. 2019). The band-rumped storm-petrel is also known to nest at high elevation on Kauaʻi and Hawaiʻi Island, possibly on Maui and Lānaʻi, but not on Oʻahu (DLNR 2015b). Movement of these seabirds over land, both inland and seaward, usually occurs nocturnally. Both the Hawaiian petrel and the Newell's shearwater are known to be affected by sources of artificial light, which can distract the birds and cause them to become grounded. This phenomenon is referred to as fallout and it particularly affects fledglings that are leaving the nest for the first time on their way to sea. But downed Newell's shearwater or Hawaiian petrels have not been documented at the Project site (Young et al. 2019). In conclusion, the lack of suitable habitat, the pelagic foraging behavior and the absence of any data to support their potential occurrence in the vicinity of the Project site on Oʻahu suggests that these seabird species are unlikely to traverse the Project site, thus limiting potential exposure to impacts. If in the rare event that a grounded seabird is found at the Project site, then USFWS and Division of Forestry and Wildlife will be informed immediately. These agencies may recommend contacting a wildlife rehabilitation facility such as Feather and Fur Animal Hospital at (808) 254-1548.

Two marine reptiles—Hawaiian green sea turtle or honu and the Hawksbill sea turtle are identified to potentially occur and therefore be potentially affected by activities at the Project site (USFWS 2024a). Even though these species were not observed on the sandy beach of the Barbers Point Beach Park during this reconnaissance survey, they are known to forage in all Hawaiian waters. The Hawaiian green sea turtle has been documented to bask at Paradise Cove beach about 3.5 miles to the west of the Project site and nest along Ewa Beach within five miles of the Barbers Point Beach Park (Parker and Balazs 2015 and 2016). Therefore, it is not out the realm of possibility that the Hawaiian green sea turtle could use the sandy beach area of the Barber Point Beach Park for basking or nesting. Ground disturbance at the Barbers Point Beach Park is limited to the terrestrial park area about 350 ft inland from the shoreline (Figure 6). The subterranean steel conduits or the landing pipes measure approximately seven inches (outside diameter) and house the fiber optic cables. These landing pipes would be installed utilizing horizontal directional drilling methods beginning on land and exiting on the seafloor approximately 4,401 to 5,016 ft from the shoreline. The bore depth at shoreline for the landing pipes would range from approximately 31-ft to 52-ft. Because there will be no above ground disturbance to the sandy beach area during installation of the fiber optic cables, the Project activities are unlikely to adversely impact the Hawaiian green sea turtle and the Hawksbill sea turtle or their potential use of the sandy beach habitat. The Project activities do not entail night-time work. Additionally, the following measures are recommended to avoid and minimize potential impacts to individual turtles in the rare event that either species is seen on the sandy beach portion of the Project site:

- There will be no vehicle use on, or modification of the beach/dune environment during the sea turtle nesting or hatching season, or on beach where sea turtles are known to bask.
- The native dune vegetation will not be removed or destroyed.
- The Project will incorporate applicable Best Management Practices for Work in Aquatic Environments into the Project design.

- Prior to Project initiation, a biologist familiar with sea turtles will conduct a visual survey of the Project site to ensure no basking sea turtles are present. If a basking sea turtle is found within the Project area,
    - All mechanical or construction activities within 100-ft of the basking turtle will cease until the animal voluntarily leaves the area.
    - All activities between the basking turtle and the ocean will also stop.
- Project-related debris, trash, or equipment from the beach or dune will be removed if not actively being used.
- Project-related materials will not be stockpiled in the intertidal zone, reef flats, or stream channel at the Project site.

4.3 Waters of the U.S.

The seven observed aquatic features in the BSA appeared to be man-made structures. These features could potentially be jurisdictional waters of the U.S. regulated by USACE. USACE regulates wetlands (termed special aquatic sites) and waters of the U.S. under provisions of Section 404 of the 1972 CWA (Federal Water Pollution Control Act) and Section 10 of the 1899 Rivers and Harbors Act. Under Section 404 of the CWA, dredged and fill material may not be discharged into jurisdictional waters (including wetlands) without a permit. Hawai‘i has no laws specifically relating to wetland protection, but chapter 205A of the Hawai‘i Revised Statutes provides for regulation of coastal areas, including wetlands and other waters, in conjunction with the Federal Coastal Zone Management Act and CWA. Under the provisions of these and other laws, several State and county agencies regulate the use of wetlands and other waters in Hawai‘i. The conduit for the fronthaul build will be installed by boring underneath the culvert or reinforced channel and will not entail any fill material to be deposited in the water features found within the BSA. Therefore, Project activities are not likely to have any impact on potentially jurisdictional water features observed in the BSA.

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[USFWS] U.S. Fish and Wildlife Service. 2024c. *Euphorbia skottsbergii* var. *skottsbergii* (ʻakoko) Five Year Review and Analysis. <https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/15027.pdf>. Accessed March 4, 2025.

[USFWS] U.S. Fish and Wildlife Service. 2024d. *Achyranthes splendens* var. *rotundata* (Round-leaved chaff flower, ʻEwa hinahina) Five Year Review. <https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/15325.pdf>. Accessed March 4, 2025.

[USFWS] U.S. Fish and Wildlife Service. 2024e. *Cyperus trachysanthos (*puʻukaʻa) Five Year Review. <https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/14829.pdf>. Accessed March 4, 2025.

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Appendix A. U.S. Fish and Wildlife Service IPaC Resource List

IPaC **U.S. Fish & Wildlife Service**

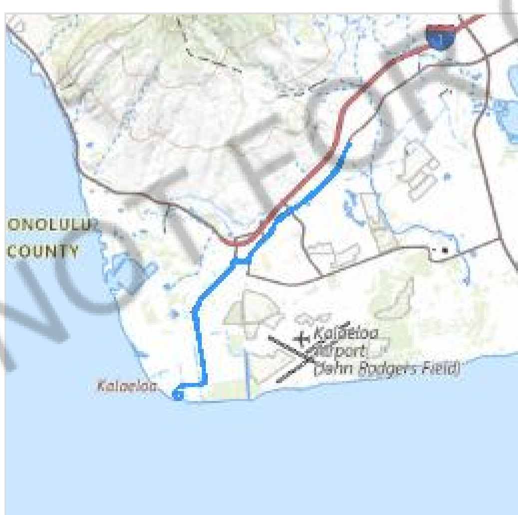
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Honolulu County, Hawaii



Local office

Pacific Islands Fish And Wildlife Office

(808) 792-9400
(808) 792-9580

MAILING ADDRESS

300 Ala Moana Boulevard, Box 50088
Honolulu, HI 96850-5000

PHYSICAL ADDRESS
300 Ala Moana Boulevard, Room 3-122
Honolulu, HI 96850-0056

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Hawaiian Hoary Bat Lasiurus cinereus semotus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/770	Endangered

Birds

NAME	STATUS
Band-rumped Storm-petrel Hydrobates castro No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1226	Endangered
Hawaiian Common Gallinule Gallinula galeata sandvicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6612	Endangered
Hawaiian Coot (alae Ke`oke`o) Fulica alai Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7233	Endangered
Hawaiian Duck Anas wyvilliana Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7712	Endangered
Hawaiian Petrel Pterodroma sandwichensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6746	Endangered
Hawaiian Stilt Himantopus mexicanus knudseni Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2082	Endangered

Newell''s Shearwater Puffinus newelli Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2048	Threatened
Short-tailed Albatross Phoebastria (=Diomedea) albatrus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/433	Endangered

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6199	Threatened
Hawksbill Sea Turtle Eretmochelys imbricata Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3656	Endangered

Flowering Plants

NAME	STATUS
`akoko Euphorbia celastroides var. kaenana Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3842	Endangered
`akoko Euphorbia skottsbergii var. skottsbergii Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6793	Endangered

`ena`ena Pseudognaphalium sandwicensium var. molokaiense — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5993

Awiwi Schenkia sebaeoides — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/7103

Dwarf Naupaka Scaevola coriacea — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4669

Ihi Portulaca villosa — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4886

Ko`oloa`ula Abutilon menziesii — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3268

Ohai Sesbania tomentosa — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/8453

Popolo Solanum nelsonii — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2281

Pu`uka`a Cyperus trachysanthos — Endangered

Wherever found

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/7749

Round-leaved Chaff-flower Achyranthes splendens var. rotundata Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4709	Endangered
Vigna o-wahuensis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8445	Endangered

Ferns and Allies

NAME	STATUS
Ihi`ihi Marsilea villosa Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2169	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their nests, should follow appropriate regulations and implement required avoidance and minimization measures, as described in the various links on this page.

The data in this location indicates that no eagles have been observed in this area. This does not mean eagles are not present in your project area, especially if the area is difficult to survey. Please review the 'Steps to Take When No Results Are Returned' section of the Supplemental Information on Migratory Birds and Eagles document to determine if your project is in a poorly surveyed area. If it is, you may need to rely on other resources to determine if eagles may be present (e.g. your local FWS field office, state surveys, your own surveys).

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report

On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
'apapane Himatione sanguinea This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.	Breeds Dec 1 to Jul 31
Black Noddy Anous minutus melanogenys This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.	Breeds Apr 1 to Nov 30

Bristle-thighed Curlew Numenius tahitiensis | Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.
https://ecos.fws.gov/ecp/species/3913

Bulwer's Petrel Bulweria bulwerii | Breeds May 1 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.

Laysan Albatross Phoebastria immutabilis | Breeds Nov 15 to Jun 15

This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.

O'ahu 'amakihi Chlorodrepanis flava | Breeds Apr 1 to Jul 1

This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.

Pomarine Jaeger Stercorarius pomarinus | Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Red-tailed Tropicbird Phaethon rubricauda melanorhynchos | Breeds Dec 15 to Oct 15

This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.

Sooty Tern Onychoprion fuscatus | Breeds Mar 10 to Jul 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Wandering Tattler Tringa incana | Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in Hawaii and the Pacific Islands.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental

Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

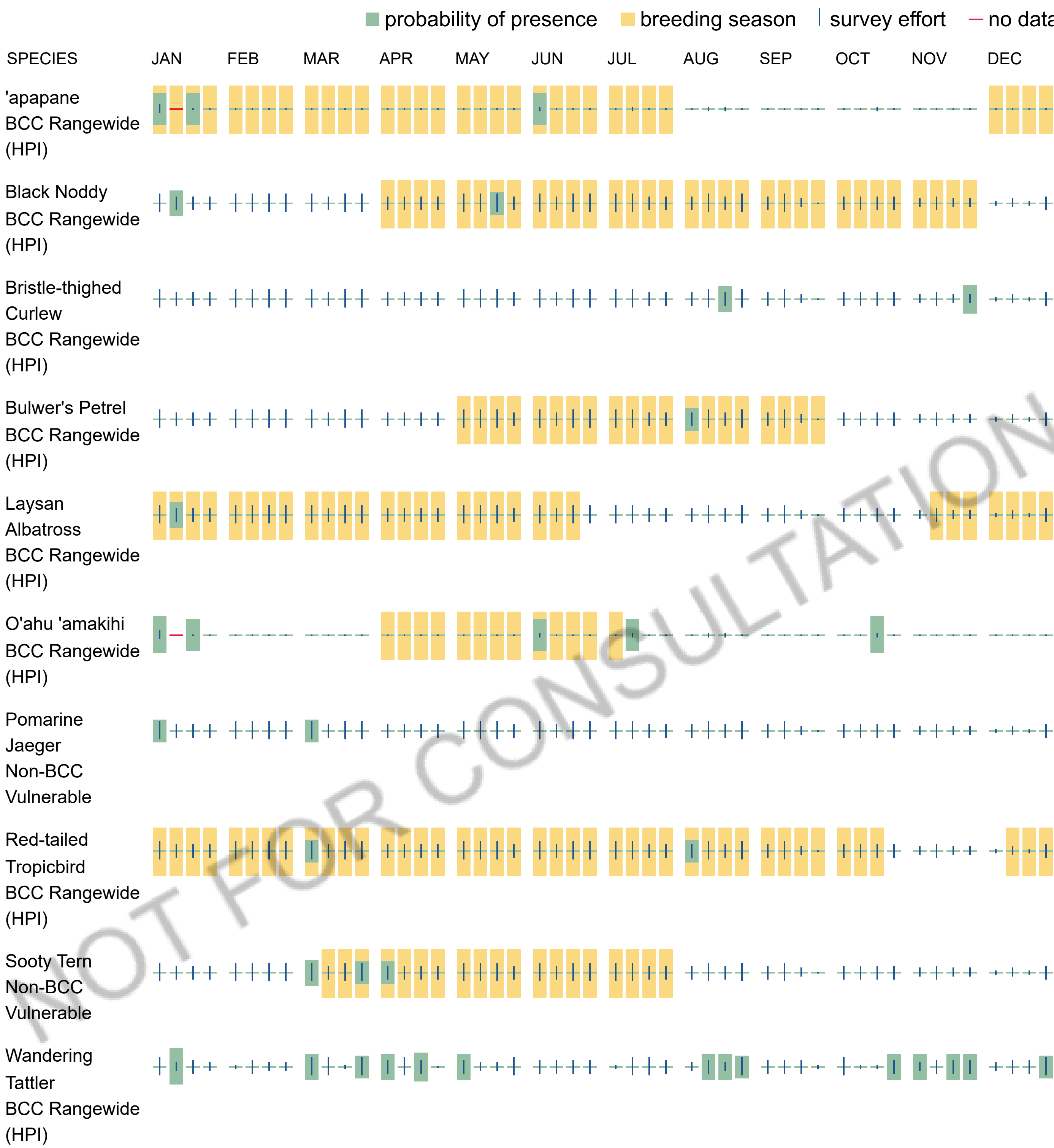
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as “Vulnerable”. See the FAQ “What are the levels of concern for migratory birds?” for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

ESTUARINE AND MARINE DEEPWATER
- E1UBLx

ESTUARINE AND MARINE WETLAND
- M2USP

FRESHWATER FORESTED/SHRUB WETLAND
- PSS3A
- PSS3Cx

RIVERINE
- R4SBCx
- R5UBFx

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix F

Waters of the United States Delineation Report

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O‘ahu Subsea Cable
Telecommunications Facility

Waters of the United States Delineation Report

Prepared for:

Humuhumu Services LLC

March 2025

TETRA TECH

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WATERS OF THE U.S. DELINEATION SUMMARY

Project Name	Oʻahu Subsea Cable Telecommunications Facility
Study Area Location	ʻEwa District, Oʻahu Island, Hawaiʻi 21.348214°, -158.056697° Tax Map Key (TMK) parcels (1) 9-1-016:179; 9-1-016:222
Applicant	Humuhumu Services LLC
Landowner	University of Hawaiʻi (UH)
Survey Dates	February 4, 2025; February 28, 2025
Project Staff	Tiffany Bovino Agostini, Senior Biologist

Humuhumu Services LLC (Humuhumu Services) is proposing to construct a telecommunications facility (Facility) located within approximately 46 acres of land (Study Area) owned by University of Hawaiʻi on Tax Map Keys [1] 9-1-016:179 and 9-1-016:222. The proposed Facility would connect to the Oʻahu Subsea Cable Telecommunications Project, a proposed subsea fiber optic cable system landing at Barbers Point Beach Park. The proposed Facility would consist of a parking lot, warehouse, office building, small mechanical yard, access road, and other associated infrastructure needed to house the fiber optic cable system components and on-site staff. Access for construction would be via existing dirt roads off Farrington Highway.

Humuhumu Services contracted Tetra Tech, Inc. (Tetra Tech) to conduct a delineation of potential Waters of the United States (WOTUS) regulated by the Clean Water Act within the Study Area. This report summarizes the findings of the WOTUS delineation and assessment conducted in the Study Area on February 4, 2025 and February 28, 2025.

Tetra Tech delineated the ordinary high water mark (OHWM) of two branches of non-perennial Kaloʻi Gulch within the Study Area. Tetra Tech also delineated an unnamed agricultural ditch (Referred to as Ditch 2) within the eastern portion of the Study Area. Based on the current regulatory regime (January 2023 Rule and Conforming Rule), the western and eastern branches of Kaloʻi Gulch in the Study Area are not likely considered jurisdictional because these tributaries do not have year-round or continuous surface water, and do not flow directly or indirectly into a traditional navigable water, the territorial seas, or an (a)(1) water. This is consistent with previous jurisdictional determinations for other portions of Kaloʻi Gulch that concluded the gulch was not jurisdictional (POH-2005-89, POH-2015-00063, POH-2019-00164). Although Ditch 2 within the Study Area appears to carry a relatively permanent flow of water, the ditch is also not likely considered a WOTUS because it does not flow into a traditional navigable water, the territorial seas, or an (a)(1) water. No wetlands were observed or delineated in the Study Area. The conclusions within this report are subject to confirmation by the U.S. Army Corps of Engineers, Honolulu District.

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Acronyms and Abbreviations

CFR	Code of Federal Regulations
CWA	Clean Water Act
DAR	State of Hawaiʻi Department of Aquatic Resources
EPA	U.S. Environmental Protection Agency
Facility	Oʻahu Subsea Cable Telecommunications Facility
FAC	Facultative
FACU	Facultative Upland
ha	hectare
km	kilometer
m	meter
mm	millimeter
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
RHA	Rivers and Harbors Act
Tetra Tech	Tetra Tech, Inc.
TMK	Tax Map Key
TNW	Traditional Navigable Waters
UH	University of Hawaiʻi
UPL	Upland
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOTUS	Waters of the United States

Introduction

Humuhumu Services LLC (Humuhumu Services) is proposing to construct a telecommunications facility (the Facility) located within approximately 46 acres of land owned by University of Hawaiʻi (UH) on Tax Map Keys (TMK) [1] 9-1-016:179 and 9-1-016:222. The Facility would connect to the Oʻahu Subsea Cable Telecommunications Project, a proposed subsea fiber optic cable system landing at Barbers Point Beach Park that would provide enhanced internet connectivity between Hawaiʻi, the continental United States, other Pacific Islands, Australia, and Japan. The proposed Facility would consist of a parking lot, warehouse, office building, small mechanical yard, and other associated infrastructure needed to house the fiber optic cable system components and on-site staff. Access for construction would be via existing dirt roads off Farrington Highway. The location of a permanent, new access road for operations is being finalized through discussions with UH.

Existing data show that there are several surface water features within or directly adjacent to the Study Area that may be considered Waters of the United States (WOTUS) and therefore jurisdictional by the U.S. Army Corps of Engineers (USACE) under the Clean Water Act (CWA). Thus, Humuhumu Services contracted Tetra Tech, Inc. (Tetra Tech) to perform a delineation of potential WOTUS within the Study Area (Figures 1 and 2). This report describes the extent and location of potential WOTUS delineated within the Study Area by Tetra Tech on February 4, 2025, and February 28, 2025.

1.1 Regulatory Setting

USACE derives its regulatory authority over WOTUS from two federal laws: (1) Section 404 of the CWA of 1972, and (2) Section 10 of the Rivers and Harbors Act (RHA) of 1899. Under Section 404 of the CWA, dredged and fill material may not be discharged into jurisdictional WOTUS without a permit. Section 10 of the RHA of 1899 prevents unauthorized obstruction or alteration of navigable WOTUS. Navigable waters are defined as “subject to the ebb and flow of the tide and/or presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce” (33 Code of Federal Regulations [CFR] 322.2(a)).

A "Revised Definition of 'Waters of the United States’” rule was published in the Federal Register on January 18, 2023 (Department of Army and EPA 2023a; January 2023 Rule), and the rule became effective on March 20, 2023. However, in August 2023, the U.S. Environmental Protection Agency (EPA) and USACE issued a final rule to amend the 2023 Rule to conform to the WOTUS definition consistent with the U.S. Supreme Court’s May 25, 2023, decision in the case of *Sackett v. Environmental Protection Agency* (Department of Army and EPA 2023b; Conforming Rule). The Conforming Rule became effective on September 8, 2023. Notably, the Conforming Rule removed the significant nexus standard and revised the definition of adjacent to mean “having a continuous surface connection” (Department of Army and EPA 2023b). The Honolulu District is currently interpreting WOTUS under the January 2023 Rule, as amended by the Conforming Rule (EPA 2024).

Categories of jurisdictional waters under the current WOTUS definition include: 1) traditional navigable waters (TNW), territorial seas, and interstate waters (also known as (a)(1) waters); 2) impoundments of WOTUS; 3) tributaries of TNW, territorial seas, and interstate waters that are relatively permanent, standing or continuously flowing bodies of water; 4) certain adjacent wetlands; and 5) certain additional waters. The current definition excludes certain features from jurisdiction including "ditches excavated wholly in and draining only dry land, and that do not carry a relatively permanent flow of water," and "swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow" (Department of Army and EPA 2023b, EPA 2024).

Description of Study Area

As shown in Figures 1 and 2, the approximately 46-acre Study Area is located in southwest Oʻahu, on the leeward side of the Waiʻanae Mountain Range in Kapolei. The Study Area consists primarily of active and fallow agricultural land with a small portion of the Study Area transecting tributaries of Kaloʻi Gulch. Dirt access roads traverse portions of the Study Area and several small agricultural buildings are present. The Study Area is bordered on the northwest by Farrington Highway, on the north and northeast by Kaloʻi Gulch, on the east and south by agricultural fields, on the southeast by Kualakaʻi Parkway, and on the southwest by Kapolei Golf Course Road, a housing development, and the Kapolei Golf Course.

2.1 Climate

The climate in the Study Area is characterized as arid (Price et al. 2012). The closest functioning National Weather Service rainfall gage to the Study Area is at Honouliuli near Pearl Harbor, located roughly 2 miles east of the Study Area. The monthly rainfall totals recorded at the gage between November 2024 and January 2025 (i.e., prior to when the surveys were conducted) are shown in Table 1. The year-to-date total for this gage through the end of December 2024 was approximately 69 percent of average (NWS 2025a). Drought conditions for the area were characterized as severe in mid-January 2025 (NWS 2025b) and were downgraded to moderate drought as of mid-February (NWS 2025c). However, 1.1 inches of rain was recorded at the gage during a winter storm at the end of January that occurred five days before the WOTUS survey (WRCC RAWS 2025). These data suggest relatively wet conditions during the survey.

Table 1. Monthly Rainfall at Honouliuli Gage Prior to and During the Survey

Month	Rainfall Total; Percentage of Average
November 2024	0.66 inches; 23%
December 2024	0.00 inches; 0%
January 2025	1.57 inches; 42%
February 2025	0.00 inches; 0%

Source: NWS 2025a, WRCC RAWS 2025.

2.2 Topography and Soils

The Study Area is relatively flat with elevations ranging from approximately 75 to 125 feet above mean sea level, gradually sloping from northwest to southeast (Figure 3). The topography varies where an embankment parallels the length of the Study Area's northwestern and northeastern boundaries and where Kaloʻi Gulch intersects the Study Area.

The Natural Resources Conservation Service (NRCS) characterizes the soils within the Study Area as consisting primarily of Ewa silty clay loam, 3 to 6 percent slopes, and Honouliuli clay, 0 to 2 percent slopes (Figure 3; NRCS 2025a). Smaller portions of the Study Area are composed of Waialua silty clay, 0 to 3 percent slopes, and Ewa stony silty clay, 6 to 12 percent slopes (Figure 3; NRCS 2025a). Ewa silty clay loam consists of well-drained soil formed on foot slopes with low runoff. Honouliuli clay is composed of well-drained soil formed on alluvial flats with negligible runoff. Waialua silty clay is composed of moderately well-drained soil formed from alluvial fans on foot slopes with low runoff. Ewa stony silty clay is also formed on foot slopes and is composed of a top layer of stony silty clay underlain with silty clay loam characterized as well-drained (NRCS 2025a).

The NRCS National List of Hydric Soils (NRCS 2025b) for Oʻahu Island includes 10 hydric soils. The soil units mapped by NRCS in the Study Area are not listed as hydric soils.

2.3 Surface Waters

The Study Area is situated within the Kaloʻi watershed which encompasses roughly 11 square miles (Parham et al. 2008, CWRM 2022). Water resources identified by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2024), the U.S. Geological Survey (USGS) topographic and National Hydrography Dataset (NHD; USGS 2023), the State of Hawaiʻi Division of Aquatic Resources dataset (DAR 2008), and the Commission on Water Resource Management ditch data (CWRM 2019) in the Study Area and immediate vicinity are shown in Figure 4. These datasets identify two tributaries of the non-perennial Kaloʻi Gulch and a ditch (referred to as Ditch 1) within the Study Area. The Kaloʻi Gulch tributaries are identified as intermittent streams by NHD (USGS 2023), as non-perennial streams by DAR (DAR 2008), and as Palustrine, Scrub-Shrub, Broad-Leaved Evergreen, Temporary Flooded, Nontidal (PSS3A) by NWI (USFWS 2024). An unnamed ditch (referred to as Ditch 1) is shown in the southwestern corner of the Study Area and continues east crossing through the eastern portion of the Study Area near Kaloʻi Gulch (Figure 4). Ditch 1 is defined as a canal/ditch by NHD (USGS 2023) and Riverine, Unknown Perennial, Unconsolidated Bottom, Semi-permanently Flooded, Nontidal, Excavated (R5UBFx) by NWI (USFWS 2024).

The Kaloʻi Gulch stream system consists of numerous tributaries that originate in the Waiʻanae Mountain Range near Palikea Ridge and the Makakilo Quarry (Figure 5). Two non-perennial tributaries of Kaloʻi Gulch originate near Makakilo Quarry: Kaloʻi Gulch to the west and Hunehune Gulch to the east (Figure 4). The western branch of the Kaloʻi Gulch tributary is mapped along the northern boundary of the Study Area between 100 to 180 feet away. It joins with Hunehune Gulch roughly 250 feet north of the Study Area and then crosses through the eastern portion of the Study

Area. A more eastern branch of Kaloʻi Gulch, which originates near Palikea Ridge, also crosses through the eastern portion of the Study Area. These branches join roughly 100 feet south of Study Area (Figure 4). Further south of the Study Area, Kaloʻi Gulch passes through various residential developments, roadways, stormwater retention ponds, and a series of golf courses. According to these datasets, Kaloʻi Gulch does not have a defined ocean outlet; rather, Kaloʻi Gulch ends in ʻEwa Beach south of Keoneula Blvd and roughly 1,780 feet upslope of the Pacific Ocean (Figure 5).

2.4 Flora and Fauna

Tetra Tech conducted a general biological survey of the Study Area on October 9, 2024, February 4, 2025, and February 28, 2025. Surveys for the state-listed Hawaiian short-eared owl/ pueo (*Asio flammeus sandwichensis*) were conducted on October 10, 2024, October 25, 2024, and November 8, 2024. The biological resources in the Study Area have been highly modified for agricultural uses. No federally or state listed species were recorded in the Study Area. Several listed animal species not observed, but with the potential to occasionally occur in or traverse the Study Area, include the Hawaiian short-eared owl, Hawaiian stilt/ aeʻo (*Himantopus mexicanus knudseni*), Hawaiian coot/ ʻalae keʻokeʻo (*Fulica alai*), Hawaiian petrel/ ʻuaʻu (*Pterodroma sandwichensis*), Newell's shearwater/ ʻaʻo (*Puffinus newelli),* band-rumped storm-petrel/ ʻakēʻakē (*Hydrobates castro*), and the Hawaiian hoary bat/ ʻōpeʻapeʻa (*Lasiurus semotus*) (Tetra Tech 2025).

Three main vegetation types occur in the Study Area: Agricultural Fields, Buffelgrass Grassland, and Koa Haole Scrub. Agricultural Fields—composed of actively cultivated basil plants (*Ocimum basilicum* – FACU)[1]—dominate the Study Area. Various weedy plant species grow along the edges of the agricultural fields and dirt access roads, including wire grass (*Eleusine indica* – FACU), swollen fingergrass (*Chloris radiata* – FACU), jungle-rice (*Echinochloa colona* – FACW), *Sida rhombifolia* (FACU), spiny amaranth (*Amaranthus spinosus* – FACU), cheese weed (*Malva parviflora* – FACU), pigweed (*Portulaca oleracea* – FACU), sow thistle (*Sonchus oleraceus* – FACU), and castor bean (*Ricinus communis* – FACU). The Koa Haole Scrub, which occurs in a few discrete areas, is characterized by open to dense stands of koa haole (*Leucaena leucocephala* subsp. *leucocephala* – UPL) trees with a dense, unmaintained understory of buffelgrass (*Cenchrus ciliaris* – FACU) or Guinea grass (*Megathyrsus maximus* – FAC). A few individuals of kiawe (*Neltuma pallida* – FACU) trees are scattered within this vegetation type. The Buffelgrass Grassland is dominated by swaths of buffelgrass (FACU) within which various weedy species are scattered, including Guinea grass, *Boerhavia coccinea* (UPL), coat buttons (*Tridax procumbens* – FAC), creeping indigo (*Indigofera spicata* – UPL), red-flowered sida (*Sida ciliaris* – UPL), smooth rattlepod (*Crotalaria pallida* – FAC), obscure morning glory (*Ipomoea obscura* – FAC), vining cow pea (*Macroptilium atropurpureum* – FAC), slender mimosa (*Desmanthus pernambucanus* – FACU), and small-statured sprouts of koa haole and ʻopiuma (*Pithecellobium dulce* – FAC). Three native plant species were recorded: ʻuhaloa

[1] Indicator status based on 2020 Regional Wetland Plant List (USACE 2020). FAC = Facultative; FACU = Facultative Upland; UPL – Upland. Taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023).

(*Waltheria indica* – FACU), hoary abutilon (*Abutilon incanum* – UPL), and kou (*Cordia subcordata* – FACU) (Tetra Tech 2025).

Most of the wildlife recorded in the Study Area are non-native to the Hawaiian Islands. The most common bird species recorded during the surveys were common myna (*Acridotheres tristis*), warbling white-eye (*Zosterops japonicus*), and red-vented bulbul (*Pycnonotus cafer*). Only one native bird species—the migratory Pacific golden-plover/ kōlea (*Pluvialis fulva*)—was recorded within the Study Area (Tetra Tech 2025).

Methodology

Before the survey, Tetra Tech reviewed aerial imagery, topographic maps, and water resource datasets to inform the field delineation of WOTUS potentially in the Study Area. This included NWI data (USFWS 2024), NHD data (USGS 2023), DAR streams data (DAR 2008), ditch information (CWRM 2019), the Atlas of Hawaiian Watersheds (Parham et al. 2008), and NRCS soil data (NRCS 2025a, NRCS 2025b).

Tetra Tech delineated potential WOTUS on February 4, 2025. A supplemental survey of the southeastern portion of the Study Area was conducted on February 28, 2025. During the field survey, Tetra Tech specifically focused on locations where existing data and aerial imagery show potential WOTUS within and immediately adjacent to the Study Area. The geographic coordinates of the ordinary high water mark (OHWM) and other features were collected in the field with an iPad mini with ArcGIS Field Maps and a Geode GPS receiver. Data were collected to sub-meter accuracy. The linear length and acreage of these features were calculated by projecting these point and line data files in a geographic information system.

For this Project, Tetra Tech also assessed the potential federal jurisdiction for each feature based on the current regulatory regime (see Section 1.1); however, USACE will ultimately determine jurisdiction.

3.1 Streams

During the field survey, stream boundaries were delineated by recording the location of the OHWM as defined in the USACE Regulatory Guidance Letter 05-05 (USACE 2005), Rapanos Guidance (EPA and USACE 2008), and the national OHWM manual (David et al. 2025). Indicators of OHWM can be physical or vegetative, and include the following: benches, shelving, drift lines, natural lines impressed on the bank, changes in the character of soil, transitions in vegetation type and density, destruction of terrestrial vegetation (matted-down vegetation), sediment deposition, presence of litter and debris, presence of wrack lines, bed and banks, multiple observed flow events, scour, sediment sorting, and water staining (USACE 2005; EPA and USACE 2008; Lichvar and McColley 2008; Mersel and Lichvar 2014; David et al. 2025).

3.2 Ditches

The location and condition of any ditches or related infrastructure (e.g., culverts, pipes) within or adjacent to the Study Area were recorded during the survey.

3.3 Wetlands

The 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987), as amended, outlines the technical guidelines and methods for identifying and delineating wetlands potentially subject to Section 404 of the CWA. This manual is supplemented by the 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawaiʻi and Pacific Islands Region (USACE 2012).

Based on these documents, jurisdictional wetlands are identified using the following three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology. All three criteria must be present for an area to be considered a wetland, unless problematic natural processes or atypical recent human disturbance has resulted in the absence of positive wetland indicators (USACE 2012).

During the survey, Tetra Tech scanned the Study Area for surface wetland hydrology indicators and hydrophytic vegetation based on the National Wetland Plant List (USACE 2020); however, no wetland sampling points were taken in the Study Area because no wetlands have previously been identified in the Study Area, and no potential wetlands were observed during the survey.

Results

As shown in Table 2, Tetra Tech delineated three potential WOTUS within the Study Area: two branches of Kaloʻi Gulch and an unnamed agricultural ditch referred to as Ditch 2. No wetlands were observed or delineated in the Study Area. A summary of each feature delineated within the Study Area is provided below. Figures are provided in Appendix A and photographs are provided in Appendix B.

Table 2. Potential Waters of the U.S. Delineated in the Study Area

Feature Name	NWI Classification Codes[1]	NHD Classification	Length and Acreage Delineated in Study Area
Kaloʻi Gulch - Western Branch	PSS3A	Intermittent Stream	283 feet; 3,189 square feet
Kaloʻi Gulch - Eastern Branch	PSS3A	Intermittent Stream	114 feet; 1,655 square feet
Ditch 2	N/A	N/A	110 feet; 550 square feet
1. PSS3A = Palustrine, Scrub-Shrub, Broad-Leaved Evergreen, Temporary Flooded, Nontidal.			

4.1 Non-Wetland Waters

4.1.1 Kaloʻi Gulch – Western Branch

The western branch of Kaloʻi Gulch originates near Makakilo Quarry and continues southeast crossing under the H-1 Freeway and Farrington Highway via culvert systems. It runs along the north and northeastern boundary of the Study Area before crossing through the eastern portion of the Study Area. It continues south to join with the eastern branch of Kaloʻi Gulch roughly 130 feet south of the Study Area.

Tetra Tech delineated approximately 283 linear feet (3,189 square feet) of the western branch of Kaloʻi Gulch within the Study Area (Figure 6). The width of the western branch ranges from 7 to 16 feet wide in the Study Area. No flowing water or standing surface water was present in the western branch of Kaloʻi Gulch during the survey; however, saturated soil was observed in small areas of the channel bed, matted down grass was recorded, and wrack (accumulation of material deposited by flow events) was found at several locations collected behind obstructions indicating a recent flow event. The OHWM was delineated based on changes in slope that generally corresponded to a change in the type and density of vegetation. The break in slope ranged from moderate to sharp, with some vertical cutbanks on the right bank. Vegetation within the channel bed below the OHWM was generally absent. Guinea grass (FAC) was present on banks, but grass was denser at and above the OHWM than on the banks. Koa haole trees (UPL) were present at and above the OHWM, but not within the channel. Several PVC pipes were observed crossing the western branch. Photos 1 through 5 (Appendix B) show the conditions at the western branch of Kaloʻi Gulch during the survey.

4.1.2 Kaloʻi Gulch – Eastern Branch

The eastern branch of Kaloʻi Gulch originates near Palikea Ridge and joins with several tributaries to form one channel just mauka (upslope) of the H-1 Freeway. It then passes through the UH West Oʻahu campus and agricultural land before crossing through the eastern portion of the Study Area. The eastern branch continues south to join with the western branch of Kaloʻi Gulch roughly 130 feet south of the Study Area.

Tetra Tech delineated approximately 114 linear feet (1,655 square feet) of the eastern branch of Kaloʻi Gulch within the Study Area (Figure 6). The width of the eastern branch ranges from 13 to 16 feet wide in the Study Area. No flowing water or continuous surface water was present in this branch during the survey. Matted down grass in the channel suggests previous flow events. The OHWM was delineated based on a break in slope and changes in vegetation. The break in slope is generally sharp with banks roughly 8 to 10 feet tall. Dense mats of Guinea grass (FAC) are present above the OHWM, while Guinea grass is shorter or discolored along the banks and matted down in the channel bed. Koa haole trees (UPL) are present at or above the OHWM and break in slope, but not within the channel. Photos 6 through 9 (Appendix B) show the conditions observed at the eastern branch during the survey.

4.1.3 Ditch 2

A 5-foot-wide earthen ditch occurs in the eastern portion of the Study Area. Tetra Tech delineated 110 linear feet (550 square feet) of this ditch within the Study Area (Figure 6). Surface water was present in Ditch 2 during the survey, with duckweed (*Lemna* sp. - OBL) floating on the water surface (Photo 10) suggesting this portion of the ditch has realtively permanent water. False daisy (*Eclipta prostrata* - FACW) was also observed rooted in the ditch within the Study Area. Ditch 2 was delineated based on the break in slope, vegetation, and presence of water.

Based on observations during the survey, the ditch appears to receive excess irrigation water from nearby agricultural fields that connect to the ditch by small trenches (Photo 11). Based on a review of Google Earth imagery (Google Earth Pro 2024), the ditch begins about 180 feet northeast of the Study Area and runs along the eastern side of the agricultural fields. Ditch 2 connects to Kaloʻi Gulch roughly 520 feet south of the Study Area (Photo 12). Based on observations during the field survey and a review of existing data, it is assumed that Ditch 2 was constructed in dry land[2] and only drains dry land (i.e., is not situated close enough to a water feature to drain that water feature).

4.1.4 Ditch 1

As stated in Section 2.3, NHD identifies a canal/ditch within the southwestern corner of the Study Area and crossing through the central portion of the Study Area near Kaloʻi Gulch. However, no evidence of this ditch (referred to as Ditch 1) was seen within the Study Area during the survey (Photos 13-14). Evidence of an old concrete-lined ditch and flume were seen northeast of the Study Area, east of the western branch of Kaloʻi Gulch. The concrete ditch to the northeast of the Study Area is no longer active based on overgrown vegetation within the ditch (Photo 15). The flume that used to cross the western branch of Kaloʻi Gulch is in disrepair, no longer in use, and does not cross to the western side of Kaloʻi Gulch (Photo 16). Thus, evidence of Ditch 1 only occurs outside of the Study Area and this inactive ditch does not carry relatively permanent water. The location and orientation of Ditch 1 suggests that the ditch was constructed in dry land.

4.1.5 Linear Depression

A 5 to 6-foot-wide linear depression occurs in the southeastern portion of the Study Area adjacent to Kualakaʻi Parkway. This may be a former ditch. During the survey, no surface water or evidence of surface water was observed in the feature. The linear depression is overgrown with non-hydrophytic vegetation (including Guinea grass) (see Photo 17). Observations during the survey indicate that the linear depression does not carry a relatively permanent flow of water. Based on observations during the field survey and a review of existing data, it is assumed that the linear depression was constructed in dry land and only drains dry land.

[2] Dry land refers to “areas of the geographic landscape that do not include waters such as streams, rivers, wetlands, lakes, ponds, tidal waters, ditches, and the like” (Department of Army and EPA 2023a).

4.2 Wetlands

No wetlands were identified or delineated within the Study Area.

Assessment and Conclusions

Under the current regulatory regime (January 2023 Rule and Conforming Rule), the USACE takes jurisdiction over certain tributaries, including tributaries of TNW, the territorial seas, or interstate waters that are relatively permanent, standing or continuously flowing bodies of water. Jurisdictional tributaries include natural, man-altered, or man-made water bodies such as rivers, streams, or ditches that eventually flow directly or indirectly into a TNW, the territorial seas, or (a)(1) waters or (a)(2) impoundments. For tributaries to be considered jurisdictional, they must have flowing or standing water year-round or continuously during certain times of the year, not only for a short duration in direct response to precipitation (Department of Army and EPA 2023a). Under the January 2023 Rule, ditches are excluded if they were excavated wholly in and draining only dry land and do not carry a relatively permanent flow of water (Department of Army and EPA 2023a).

As described below, none of the three non-wetland features delineated in the Study Area are likely considered WOTUS under the current regulatory regime. These conclusions are subject to confirmation by the USACE Honolulu District. Should the USACE determine that features within the Study Area are jurisdictional, impacts to jurisdictional waters should be avoided wherever practicable. If impacts cannot be avoided and the Facility requires placement of dredged or fill materials into a jurisdictional WOTUS, a USACE permit (likely a Nationwide Permit) would be required. If a USACE permit is required, additional permits from other agencies may also be required (e.g., Water Quality Certification from Department of Health Clean Water Branch) before commencing any work.

5.1 Kaloʻi Gulch

Data on the current duration and frequency of water flow within the western and eastern branches of Kaloʻi Gulch could not be found; however, according to NHD and DAR, Kaloʻi Gulch is not perennial and does not have year-round or continuous surface water. This is supported by Tetra Tech's observations in the field. No surface water or flowing water were observed during the survey even though a heavy rain event occurred five days prior to the survey. The OHWM indicators also do not suggest continuous water flow in this area. The branches of Kaloʻi Gulch within the Study Area likely have episodic flow events in response to precipitation and do not appear to have continuous flow for extended periods of time.

In addition, Kaloʻi Gulch does not flow directly or indirectly into a TNW, the territorial seas, or an (a)(1) water. The exact stream course in the lower reaches is unknown due the amount of alteration, but surface water is not present throughout the lower reaches and Kaloʻi Gulch appears to terminate near the golf course ponds adjacent to Keoneula Blvd. In May 2015, the USACE

Honolulu District stated that the last trace of Kaloʻi Gulch is found just over 1 mile from the shoreline of the Pacific Ocean (USACE 2015). In September 2019, the USACE Honolulu District stated: "there is still no significant nexus between Kaloi Ditch and the Pacific Ocean" (USACE 2019). Thus, Kaloʻi Gulch is not likely to be considered a WOTUS under the current regulatory regime.

This determination is consistent with several previous jurisdictional determinations for other portions of Kaloʻi Gulch (e.g., UH West Oʻahu campus [POH-2005-89], Farrington Highway Bridges #1, #2, and #3 Rehabilitation Project [POH-2015-00063], West Oʻahu Solar [POH-2019-00164]). These determinations concluded that Kaloʻi Gulch is not jurisdictional because there was no connection between the gulch and the Pacific Ocean (USACE 2006, USACE 2015, USACE 2019).

5.2 Ditch 2

Even though Ditch 2 within the Study Area was excavated in dry land, it is not excluded from jurisdiction under the January 2023 Rule because it appears to carry a relatively permanent flow of water. However, the water in Ditch 2 does not flow directly or indirectly into a TNW, the territorial seas, or an (a)(1) water. The ditch connects to Kaloʻi Gulch, which does not have year-round or continuous surface water, and is not a WOTUS or connected to the Pacific Ocean or another (a)(1) water (see Section 5.1). Thus, Ditch 2 is likely not considered a WOTUS.

5.3 Ditch 1

No evidence of the NHD-identified Ditch 1 was observed within the Study Area. The inactive ditch recorded to the northeast of the Study Area would be excluded from jurisdiction because it does not carry a relatively permanent flow of water (i.e., no flowing or standing water year-round or continuously during certain times of the year) and appears to have been excavated wholly in and draining only dry land.

5.4 Linear Depression

The linear depression in the southeastern portion of the Study Area adjacent to Kualakaʻi Parkway appears to be a former ditch. Ditches "excavated wholly in and draining only dry land, and that do not carry a relatively permanent flow of water" are excluded from CWA jurisdiction under the January 2023 Rule (Department of Army and EPA 2023a). Therefore, this depression would be excluded from jurisdiction given it does not carry a relatively permanent flow of water and appears to have been constructed wholly in dry land (e.g., not within a stream, lake, wetland, or other waterbody).

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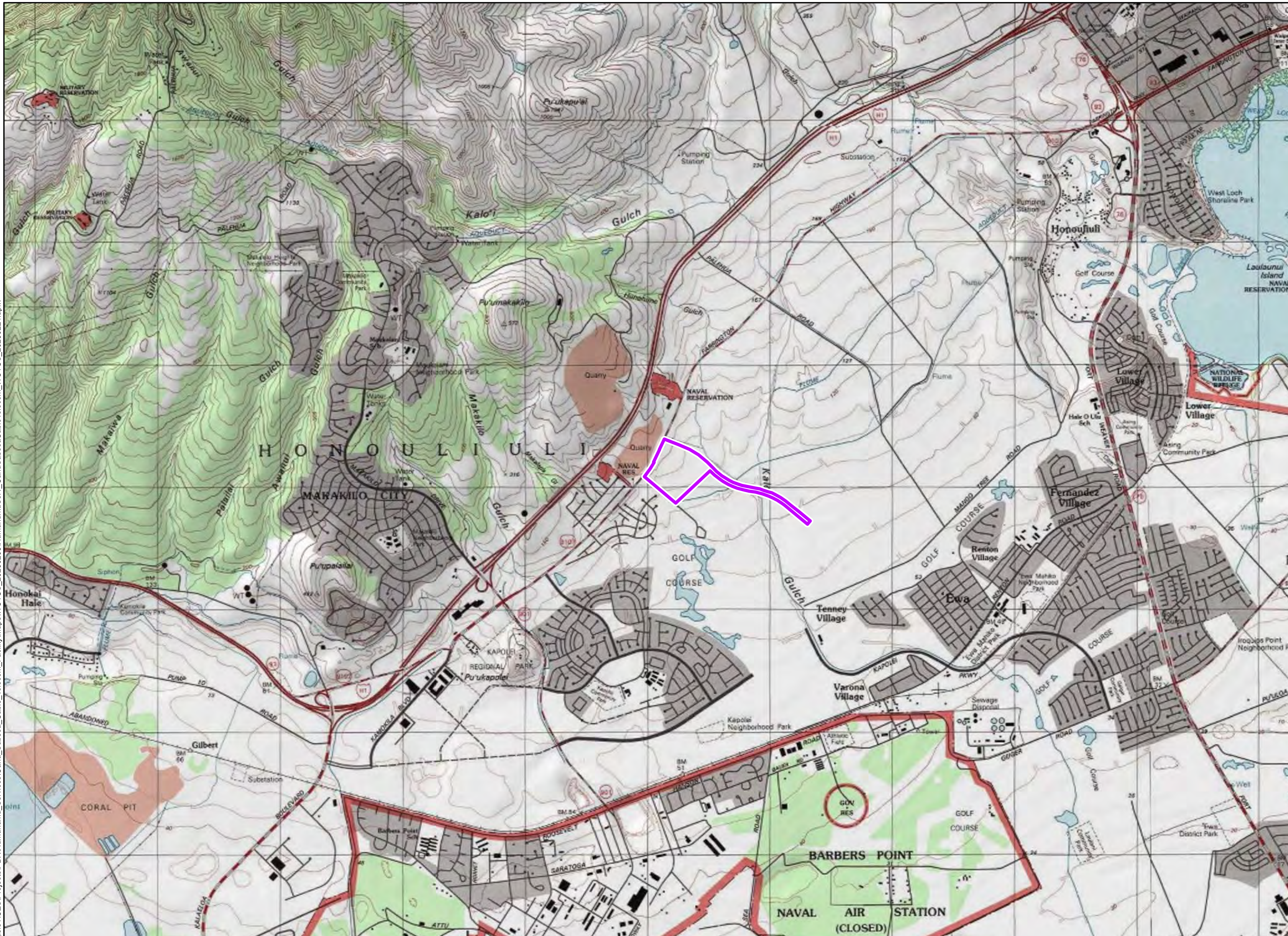
Appendix A. Figures

O'ahu Subsea Cable Telecommunications Facility

Humuhumu Services LLC
February 25th, 2025

Figure 1
Project Study Area and Vicinity

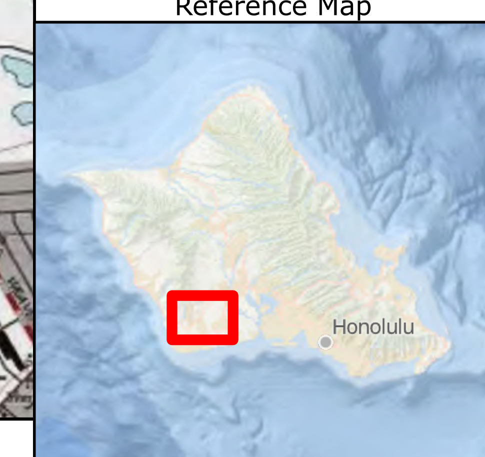
CITY & COUNTY OF HONOLULU, HAWAI'I



Study Area

TETRA TECH

Reference Map



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O'ahu Subsea Cable Telecommunications Facility

Humuhumu Services LLC
February 25th, 2025

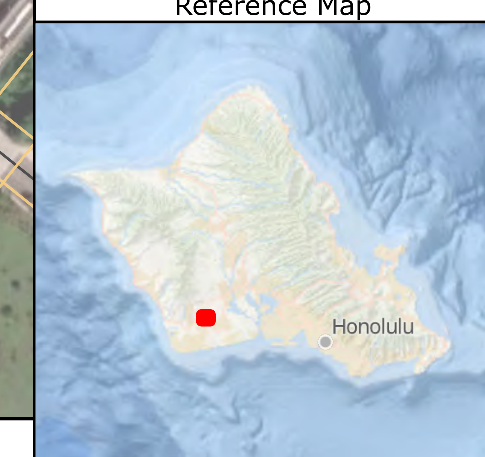
Figure 2
Study Area
and Tax Map Keys

CITY & COUNTY OF HONOLULU, HAWAI'I

Study Area
TMK Parcel
Highway
Roadway

TETRA TECH

Reference Map



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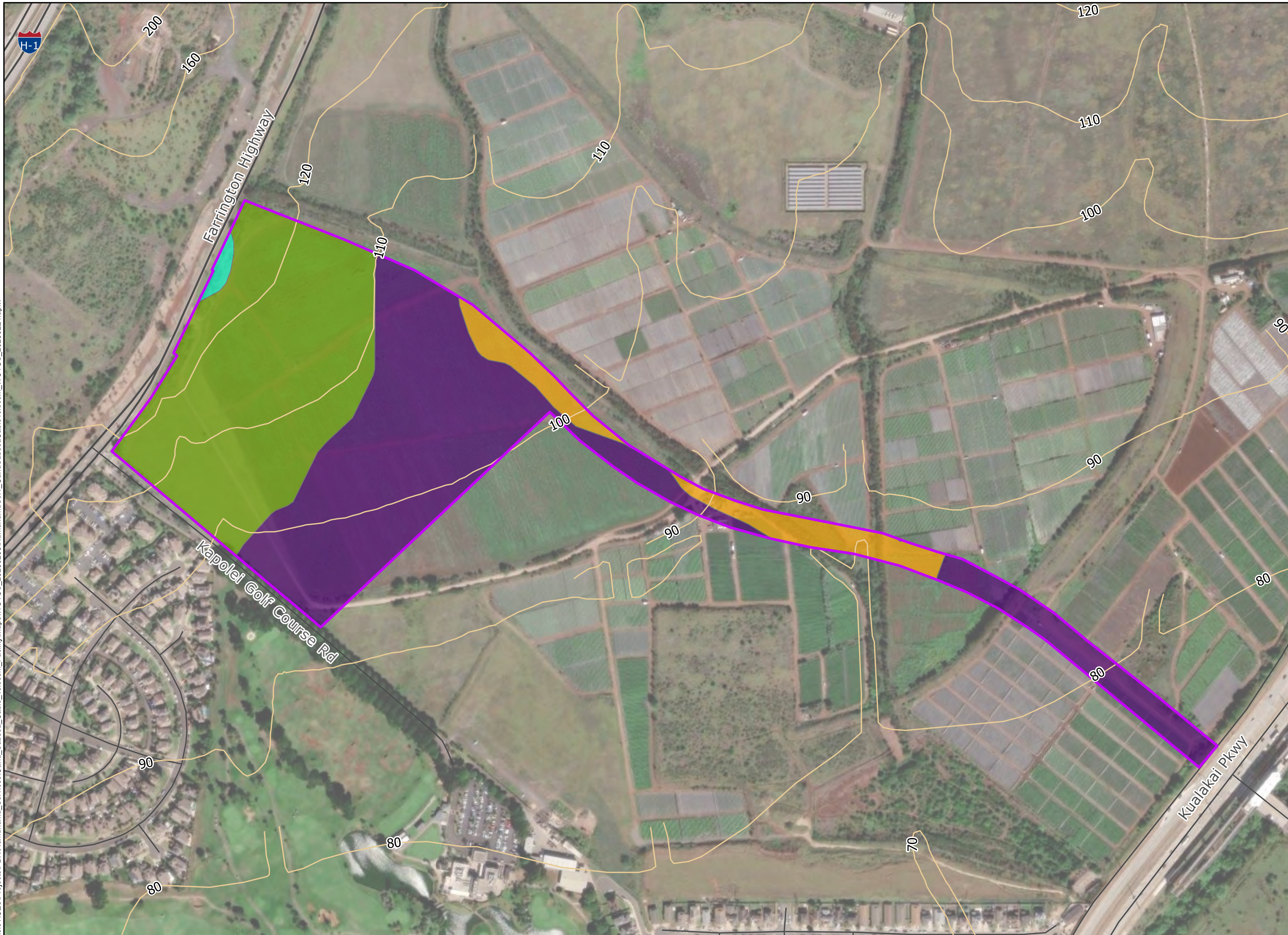
O'ahu Subsea Cable Telecommunications Facility

Humuhumu Services LLC
February 25th, 2025

Figure 3
Topography and Soils within the Study Area

CITY & COUNTY OF HONOLULU, HAWAI'I



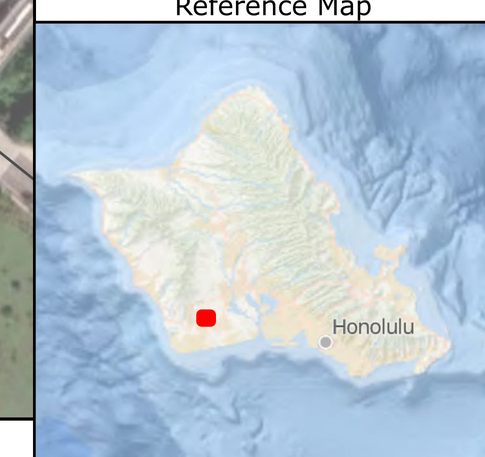
- Study Area
- Highway
- Roadway
- 10-ft Elevation Contour

NRCS Soil Symbol

- EaB - Ewa silty clay loam, 3 to 6 percent slopes
- EwC - Ewa stony silty clay, 6 to 12 percent slopes
- HxA - Honouliuli clay, 0 to 2 percent slopes
- WkA - Waialua silty clay, 0 to 3 percent slopes

TETRA TECH

Reference Map



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O'ahu Subsea Cable Telecommunications Facility

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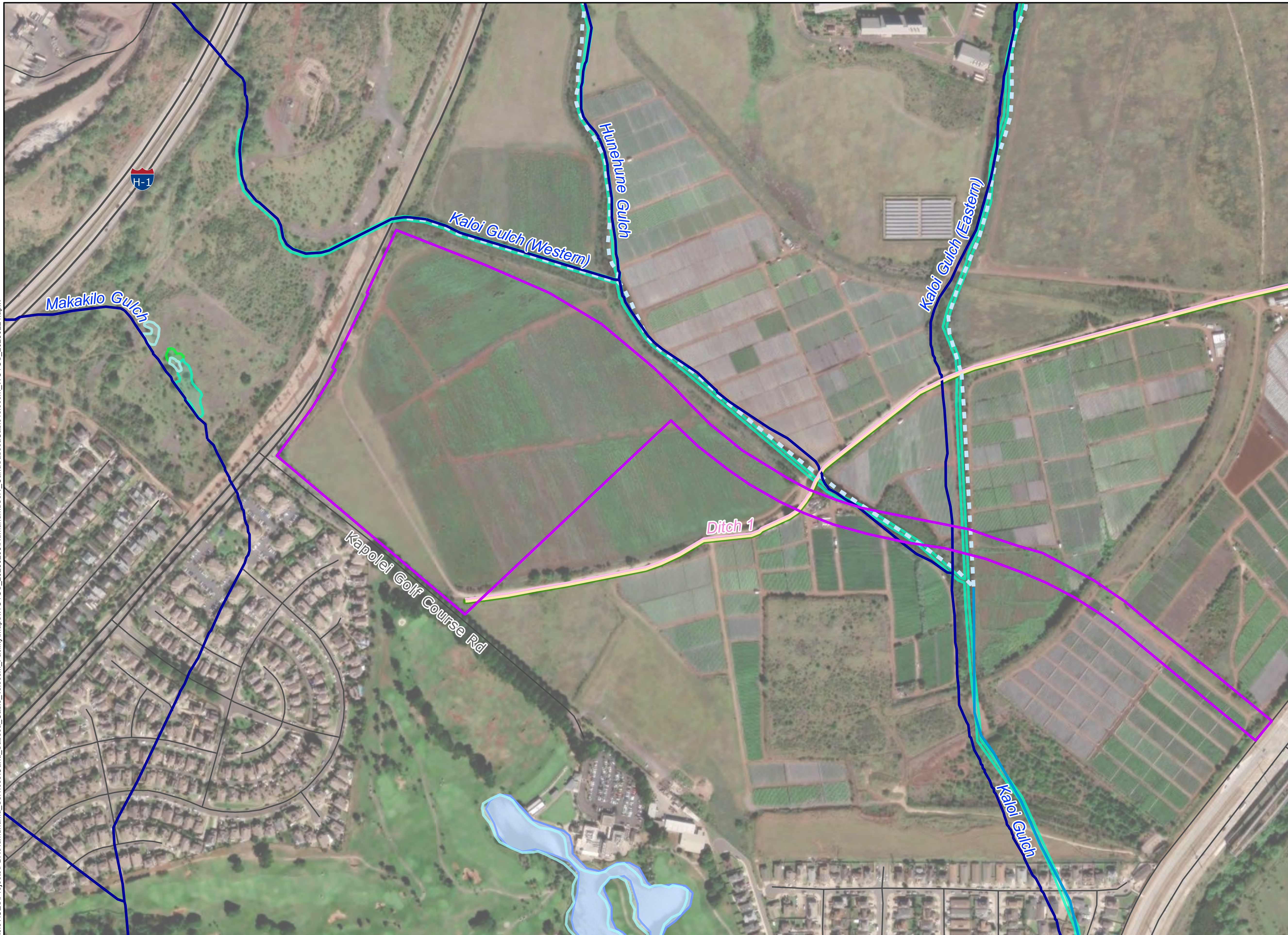
February 25th, 2025

Figure 4
Water Resources Identified by NWI, NHD, DAR, and CWRM Datasets

CITY & COUNTY OF HONOLULU, HAWAI'I



Study Area
Highway
Roadway

National Wetlands Inventory
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine

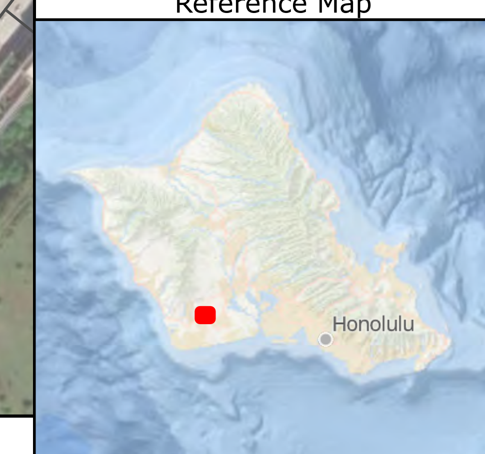
National Hydrography Dataset
Canal/Ditch
Intermittent Stream
Perennial Stream
Waterbody

Division of Aquatic Resources
Stream

Commission on Water Resource Management
Ditch

TETRA TECH

Reference Map



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Oʻahu Subsea Cable Telecommunications Facility

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February 25th, 2025

Figure 5
Overview of
Kaloʻi Gulch System

CITY & COUNTY OF HONOLULU, HAWAIʻI

- Study Area
- Highway
- Roadway

National Wetlands Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

National Hydrography Dataset

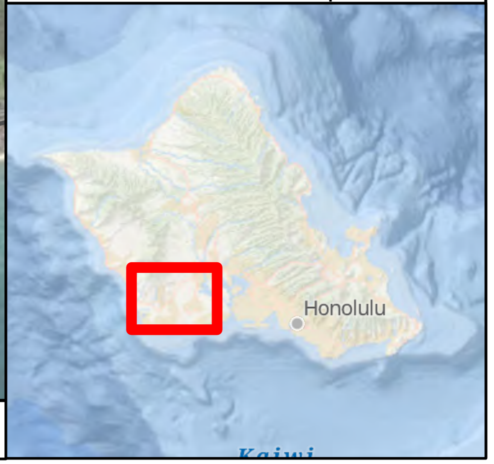
- Canal/Ditch
- Intermittent Stream
- Perennial Stream
- Waterbody

Division of Aquatic Resources

- Stream

TETRA TECH

Reference Map



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O'ahu Subsea Cable Telecommunications Facility

Humuhumu Services LLC
February 25th, 2025

Figure 6
Delineated OHWM and Ditch

CITY & COUNTY OF HONOLULU, HAWAI'I

- Study Area
- Roadway
- Approximate Gulch Location
- Delineated Ditch 2
- Delineated OHWM

TETRA TECH

Reference Map

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Appendix B. Representative Photographs

Oʻahu Subsea Cable Telecommunications Facility

Humuhumu Services LLC
February 25th, 2025

Appendix B
Photolog Map

CITY & COUNTY OF HONOLULU, HAWAIʻI

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Photo 1. Western branch of Kalo‘i Gulch, looking down from above the OHWM on the left bank showing koa haole trees at or near the OHWM. Date: 02/04/2025.

Photo 2. Western branch of Kaloʻi Gulch, looking upstream showing lack of vegetation within the channel bed compared to Guinea grass along slopes and koa haole trees at break in slope. Date: 02/04/2025.

Photo 3. Western branch of Kaloʻi Gulch showing break in slope, change in vegetation, and PVC pipe across channel. Date: 02/04/2025.

Photo 4. Exposed tree roots on right bank of Kalo‘i Gulch (western branch) below top of bank suggesting erosion from water. Date: 02/04/2025.

Photo 5. Western branch of Kalo‘i Gulch showing saturated soils in the channel bed and a break in slope at the koa haole tree lines on the left and right banks. Date: 02/04/2025.

Photo 6. Looking downstream at the eastern branch of Kaloʻi Gulch showing matted down, dead Guinea grass in the channel bed and koa haole trees at the break in slope. Date: 02/04/2025.

Photo 7. Looking at left bank of eastern branch of Kalo‘i Gulch showing sharp break in slope and change in the Guinea grass height and condition at and near channel bed. Date: 02/04/2025.

Photo 8. Looking upstream at the eastern branch of Kalo'i Gulch showing koa haole trees at break in slope on left bank. Date: 02/04/2025.

Photo 9. Looking upstream at eastern branch of Kalo‘i Gulch showing dead, matted down grass in channel bed and steep slopes with koa haole trees at break in slope. Date: 02/04/2025.

Photo 10. Ditch 2 showing surface water with floating duckweed. Date: 02/04/2025.

Photo 11. Showing narrow trench created from agricultural field to adjacent Ditch 2 suggesting water in ditch is sourced from excess irrigation. Date: 02/04/2025.

Photo 12. Showing Ditch 2 (left side) connecting to Kalo'i Gulch (right side) south of the Study Area. Date: 02/04/2025.

Photo 13. Looking east from the southwestern corner of the Study at NHD-identified Ditch 1 location, showing no evidence of a ditch. Date: 02/04/2025.

Photo 14. Looking at NHD-identified Ditch 1 location within the eastern portion of the Study Area, showing no evidence of a ditch . Date: 02/04/2025.

Photo 15. Inactive concrete-lined ditch to the northeast of the Study Area at NHD-identified ditch location. Date: 02/04/2025.

Photo 16. Flume in disrepair at NHD-identified Ditch 1 location showing where the ditch previously crossed the western branch of Kaloʻi Gulch. Date: 02/04/2025.

Photo 17. Looking southwest at the overgrown, dry ditch in the southeastern portion of the Study Area near Kualakaʻi Parkway. Date: 02/28/2025.

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Photo 17. Looking southwest at the overgrown, dry ditch in the southeastern portion of the Study Area near Kualakaʻi Parkway. Date: 02/28/2025.