The Cove at Ko Olina Redevelopment

DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)

VOLUME II: APPENDICES

KO ʻOLINA, ISLAND OF OʻAHU, HAWAIʻI

APPLICANT:

Cove Campbell Kobayashi LLC

PREPARED BY:

G70

111 S. King Street, Suite 170
Honolulu, Hawaiʻi 96813

MAY 2024

THE COVE AT KO OLINA REDEVELOPMENT

Ko ʻOlina, Island of Oʻahu, Hawaiʻi

Tax Map Key: (1) 9-1-057:027

Draft Environmental Impact Statement
Volume II: Appendices

Applicant:

Cove Campbell Kobayashi LLC

Prepared By:

G70

111 S. King Street, Suite 170
Honolulu, Hawaiʻi 96813

MAY 2024

This Draft Environmental Impact Statement and all ancillary documents were prepared under my direction or supervision, and the information submitted, to the best of my knowledge, fully address document content requirements set forth in Hawaiʻi Revised Statutes, Chapter 343 and Hawaiʻi Administrative Rules § 11-200.1 Subchapter 10.

05/01/2024

Tracy Camuso, AICP **Date**
Principal Planner

Appendix A

EISPN Comment Letters

Federal

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaiʻi 96850

In Reply Refer To:
01EPIF00-2021-TA-0371

July 21, 2021

Ms. Tracy Camuso
Associate Principal
Group 70 International, Inc. dba G70
111 South King Street, Suite 170
Honolulu, Hawaiʻi 96813

Subject: Technical Assistance Pre-EIS Consultation for Redevelopment at the Cove at Ko Olina, Kapolei, Oʻahu

Dear Ms. Camuso:

Thank you for your recent correspondence requesting technical assistance on species biology, habitat, or life requisite requirements. The Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (Service) appreciates your efforts to avoid or minimize effects to protected species associated with your proposed actions. We provide the following information for your consideration under the authorities of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 *et seq*.), as amended.

Due to significant workload constraints, PIFWO is currently unable to specifically address your information request. The table below lists the protected species most likely to be encountered by projects implemented within the Hawaiian Islands. Based on your project location and description, we have noted the species most likely to occur within the vicinity of the project area, in the '**Occurs In or Near Project Area**' column. Please note this list is not comprehensive and should only be used for general guidance. We have added to the PIFWO website, located at https://www.fws.gov/pacificislands/promo.cfm?id=177175840 recommended conservation measures intended to avoid or minimize adverse effects to these federally protected species and best management practices to minimize and avoid sedimentation and erosion impacts to water quality. If your project occurs on the island of Hawaiʻi, we have also enclosed our biosecurity protocol for activities in or near natural areas.

If you are representing a federal action agency, please request an official species list following the instructions at our PIFWO website

https://www.fws.gov/pacificislands/articles.cfm?id=149489558. You can find out if your project occurs in or near designated critical habitat here: https://ecos.fws.gov/ipac/.
Under section 7 of the ESA, it is the Federal agency's (or their non-Federal designee) responsibility to make the determination of whether or not the proposed project "may affect" federally listed species or designated critical habitat. A "may affect, not likely to adversely affect" determination is appropriate when effects to federally listed species are expected to be discountable (i.e., unlikely to occur), insignificant (minimal in size), or completely beneficial. This conclusion requires written concurrence from the Service. If a "may affect, likely to adversely affect" determination is made, then the Federal agency must initiate formal consultation with the Service. Projects that are determined to have "no effect" on federally listed species and/or critical habitat do not require additional coordination or consultation.

Implementing the avoidance, minimization, or conservation measures for the species that may occur in your project area will normally enable you to make a "may affect, not likely to adversely affect" determination for your project. If it is determined that the proposed project may affect federally listed species, we recommend you contact our office early in the planning process so that we may assist you with the ESA compliance. If the proposed project is funded, authorized, or permitted by a Federal agency, then that agency should consult with us pursuant to section 7(a)(2) of the ESA. If no Federal agency is involved with the proposed project, the applicant should apply for an incidental take permit under section 10(a)(1)(B) of the ESA. A section 10 permit application must include a habitat conservation plan that identifies the effects of the action on listed species and their habitats and defines measures to minimize and mitigate those adverse effects.

We appreciate your efforts to conserve endangered species. We regret that we cannot provide you with more specific protected species information for your project site. If you have questions that are not answered by the information on our website, you can contact PIFWO at (808) 792-9400 and ask to speak to the lead biologist for the island where your project is located.

Sincerely,

Island Team Manager
Pacific Islands Fish and Wildlife Office

Enclosures (2)

The table below lists the protected species most likely to be encountered by projects implemented within the Hawaiian Islands. For your guidance, we have marked species that may occur in the vicinity of your project, this list is not comprehensive and should only be used for general guidance.

Enclosure 1. Federal Status of Animal Species

Scientific Name	**Common Name / Hawaiian Name**	**Federal Status**	**May Occur In Project Area**
Mammals			
Lasiurus cinereus semotus	Hawaiian hoary bat/ʻōpeʻapeʻa	E	☒
Reptiles			
Chelonia mydas	green sea turtle/honu - Central North Pacific distinct population segment (DPS)	T	☒
Eretmochelys imbricata	hawksbill sea turtle/ honu ʻea or ʻea	E	☐
Birds			
Anas wyvilliana	Hawaiian duck/koloa	E	☐
Branta sandvicensis	Hawaiian goose/nēnē	T	☐
Fulica alai	Hawaiian coot/ʻalae keʻokeʻo	E	☐
Gallinula galeata sandvicensis	Hawaiian gallinule/ʻalae ʻula	E	☐
Himantopus mexicanus knudseni	Hawaiian stilt/aeʻo	E	☐
Oceanodroma castro	band-rumped storm-petrel Hawaiʻi DPS/ʻakēʻakē	E	☒
Pterodroma sandwichensis	Hawaiian petrel/ʻuaʻu	E	☒
Puffinus auricularis newelli	Newell's shearwater/ʻaʻo	T	☒
Ardenna pacificus	wedge-tailed shearwater/ʻuaʻu kani	MBTA	☐
Buteo solitarius	Hawaiian hawk/ʻio	MBTA	☐
Gygis alba	white tern/manu-o-kū	MBTA	☐
Insects			
Manduca blackburni	Blackburn's sphinx moth	E	☐
Megalagrion pacificum	Pacific Hawaiian damselfly	E	☐
Megalagrion xanthomelas	orangeblack Hawaiian damselfly	E	☐
Megalagrion nigrohamatum nigrolineatum	blackline Hawaiian damselfly	E	☐

Enclosure 2. Federal Status of Plant Species

Plants				
Scientific Name	**Common Name or Hawaiian Name**	**Federal Status**	**Locations**	**May Occur In Project Area**
Abutilon menziesii	ko‘oloa‘ula	E	O, L, M, H	☐
Achyranthes splendens var. *rotundata*	‘ewa hinahina	E	O	☐
Bonamia menziesii	no common name	E	K, O, L, M, H	☐
Canavalia pubescens	‘āwikiwiki	E	Ni, K, L, M	☐
Colubrina oppositifolia	kauila	E	O, M, H	☐
Cyperus trachysanthos	pu‘uka‘a	E	K, O	☒
Gouania hillebrandii	no common name	E	Mo, M	☐
Hibiscus brackenridgei	ma‘o hau hele	E	O, Mo, L, M, H	☐
Ischaemum byrone	Hilo ischaemum	E	K, O, Mo, M, H	☐
Isodendrion pyrifolium	wahine noho kula	E	O, H	☐
Marsilea villosa	‘ihi‘ihi	E	Ni, O, Mo	☐
Mezoneuron kavaiense	uhiuhi	E	O, H	☐
Nothocestrum breviflorum	‘aiea	E	H	☐
Panicum fauriei var. *carteri*	Carter’s panicgrass	E	Molokini Islet (O), Mo	☐
Panicum niihauense	lau‘ehu	E	K	☐
Peucedanum sandwicense	makou	E	K, O, Mo, M	☐
Pleomele (Chrysodracon) hawaiiensis	halapepe	E	H	☐
Portulaca sclerocarpa	‘ihi	E	L, H	☐
Portulaca villosa	‘ihi	E	Le, Ka, Ni, O, Mo, M, L, H, Nihoa	☐
Pritchardia affinis (maideniana)	loulu	E	H	☐
Pseudognaphalium sandwicensium var. *molokaiense*	‘ena‘ena	E	Mo, M	☐
Scaevola coriacea	dwarf naupaka	E	O, Mo, M	☒
Schenkia (*Centaurium*) *sebaeoides*	‘āwiwi	E	K, O, Mo, L, M	☐
Sesbania tomentosa	‘ōhai	E	Ni, Ka, K, O, Mo, M, L, H, Necker, Nihoa	☒
Tetramolopium rockii	no common name	T	Mo	☐
Vigna o-wahuensis	no common name	E	Mo, M, L, H, Ka	☐

Location key: O=O‘ahu, K=Kaua‘i, M=Maui, H=island of Hawai‘i, L=Lāna‘i, Mo=Moloka‘i, Ka=Kaho‘olawe, Ni=Ni‘ihau, Le=Lehua

State of Hawai‘i

DAVID Y. IGE
GOVERNOR

CATHY BETTS
DIRECTOR

JOSEPH CAMPOS II
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
BENEFIT, EMPLOYMENT AND SUPPORT SERVICES DIVISION
1010 Richards Street, Suite 512
Honolulu, Hawaii 96813

Re: 21-0615

July 8, 2021

RECEIVED
JUL 12 2021
G70

Tracy Camuso, AICP
Associate Principal
G70 INTERNATIONAL, INC.
dba G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Ms. Camuso:

Subject: Environmental Impact Statement Preparation Notice (EISPN) for The Cove at Ko Olina Redevelopment project located in Kapolei, Island of Oahu, Hawaii

This is in response to your letter dated June 23, 2021 requesting the Department of Human Services (DHS) review and comment on the above-named project.

The DHS has reviewed The Cove at Ko Olina Redevelopment project and the map of the area. A check on DHS' internal data system and Google Maps found several licensed Before and After School Child Care Facilities and one Group Child Care Center located within a one (1) mile radius of the area that may be affected during the construction phase.

If you should have any questions regarding this matter, please contact Ms. Lisa Galino, Child Care Program Specialist at (808) 586-5712.

Sincerely,

Scott Nakasone

Scott Nakasone
Assistant Division Administrator

c: Cathy Betts, Director

DAVID Y. IGE
GOVERNOR

JADE T. BUTAY
DIRECTOR

Deputy Directors
LYNN A.S. ARAKI-REGAN
DEREK J. CHOW
ROSS M. HIGASHI
EDWIN H. SNIFFEN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
DIR 0634
STP 8.3210

July 8, 2021

Ms. Tracy Camuso, AICP
Associate Principal
Group 70 International, Inc. dba G70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Ms. Camuso:

Subject: Environmental Impact Statement Preparation Notice (EISPN)
The Cove at Ko Olina Redevelopment
Kapolei, Oahu, Hawaii
Tax Map Key: (1) 9-1-057: 027

Thank you for your letter dated June 23, 2021 requesting comments on the proposed project. The State of Hawaii Department of Transportation (HDOT) has reviewed the subject EISPN and understands James Campbell Company (JCC), LLC is proposing to redevelop the 10.85-acre property located between Ali'i Nui Drive and the shoreline makai of the entrance to the Ko Olina Resort in Kapolei. The site is currently occupied by the Paradise Cove, whose lease ends in 2023. The redevelopment of the site includes a new entertainment/performing arts venue, retail shops, open-air marketplace, restaurants, and other amenities to capture the coastal setting and Hawaiian culture.

HDOT has the following comments:

Airports Division (HDOT-A)

1. The proposed project is approximately 3.42 miles from Kalaeloa Airport (JRF). All projects within 5 miles from Hawaii State airports are advised to read the Technical Assistance Memorandum (TAM) for guidance with development and activities that may require further review and permits. The TAM can be viewed at this link: http://files.hawaii.gov/dbedt/op/docs/TAM-FAA-DOT-Airports_08-01-2016.pdf.

2. The proposed project is approximately 18,190 feet from the end of Runway 29 at JRF. Federal Aviation Administration (FAA) regulation requires the submittal of FAA Form 7460-1 Notice of Proposed Construction or alteration pursuant to the Code of Federal Regulations, Title 14, Part 77.9, if the construction or alteration is within 20,000 feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 feet. Construction equipment and staging area heights, including heights of temporary construction cranes, shall be included in the submittal. The form and criteria for submittal can be found at the following website: https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

3. Due to the proximity to the airport, the developer should be aware of potential noise from aircraft operations. There is also a potential for fumes, smoke, vibrations, odors, etc.,

resulting from occasional aircraft flight operations over or near the project location. These impacts may increase or decrease over time and depending on airport operations.

4. The HDOT-A requires that the proposed landscaping does not create a wildlife hazard attractant. Please review the FAA Advisory Circular (AC) 150/5200-33C Hazardous Wildlife Attractants On or Near Airports for guidance. If the project results in a wildlife attractant, these effects shall be immediately mitigated by the developer upon notification by the HDOT-A and/or FAA.

Highways Division (HDOT-HWY)

HDOT-HWY has the following comments relevant to State highways which are to be addressed in the Draft Environmental Impact Statement (EIS):

1. Based on a review of the provided project information, we anticipate a potential adverse impact to State highways. Submit a Traffic Impact Analysis Report (TIAR) prepared and stamped by a licensed engineer. The TIAR and Draft EIS should include:

   a. A description of existing traffic conditions and use of multimodal routes in the study area.

   b. Forecasted traffic and multimodal conditions in the horizon year (year at full project build-out), with and without the project, and including trips generated by planned developments in the study area.

   c. An analysis of project related direct, indirect, and cumulative transportation impacts, including impacts associated with multimodal transportation and safety.

   d. Recommended mitigation for impacts to transportation.

2. The TIAR study area should include the Farrington Highway/Aliinui Drive and Farrington Highway/Koio Drive intersections.

If there are any questions, please contact Mr. Blayne Nikaido of the HDOT Statewide Transportation Planning Office at (808) 831-7979 or via email at blayne.h.nikaido@hawaii.gov.

Sincerely,

JADE T. BUTAY
Director of Transportation

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 21, 2021

LD 0705

Group 70 International, *dba* G70
111 South King Street, Suite 170
Honolulu, HI 96813

Via email: thecovekoolina@g70.design

Attn: Tracy Camuso, AICP

Dear Sirs:

SUBJECT: **Environmental Impact Statement Preparation Notice**
The Cove at Ko Olina Redevelopment
Kapolei, Island of Oahu, Hawaii
TMK: (1) 9-1-057:027

Thank you for the opportunity to review and comment on the subject project. The Land Division of the Department of Land and Natural Resources (DLNR) distributed copies of your request to various DLNR divisions, as indicated on the attached, for their review and comment.

Attached are comments received from our (a) Engineering Division, (b) Division of Forestry and Wildlife, and (c) Office of Conservation and Coastal Lands. Should you have any questions, please feel free to contact Barbara Lee via email at barbara.j.lee@hawaii.gov. Thank you.

Sincerely,

Russell Tsuji

Russell Y. Tsuji
Land Administrator

Attachments

Cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 01, 2021

LD 0705

MEMORANDUM

FROM:

~~TO:~~ **DLNR Agencies:**
_X_ Div. of Aquatic Resources *(via email: kendall.l.tucker@hawaii.gov)*
___ Div. of Boating & Ocean Recreation
_X_ Engineering Division *(via email: DLNR.Engr@hawaii.gov)*
_X_ Div. of Forestry & Wildlife *(via email: Rubyrosa.T.Terrago@hawaii.gov)*
___ Div. of State Parks
_X_ Commission on Water Resource Management *(via email: DLNR.CWRM@hawaii.gov)*
_X_ Office of Conservation & Coastal Lands *(via email: sharleen.k.kuba@hawaii.gov)*
_X_ Land Division – Oahu District *(via email: barry.w.cheung@hawaii.gov)*

TO:

Russell Tsuji

~~FROM:~~ Russell Y. Tsuji, Land Administrator
SUBJECT: **Environmental Impact Statement Preparation Notice (EISPN)**
The Cove at Ko Olina Redevelopment
LOCATION: Kapolei, Island of Oahu, Hawaii; TMK: (1) 9-1-057:027
APPLICANT: **G70 on behalf of the James Campbell Company**

Transmitted for your review and comment is information on the above-referenced subject. The subject EISPN was published on June 23, 2021 in the Office of Environmental Quality Control's periodic bulletin, The Environmental Notice, available at the following link:

http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2021-06-23-TEN.pdf

Please submit any comments by **Thursday, July 22, 2021** to DLNR.Land@hawaii.gov, and copied to barbara.j.lee@hawaii.gov. If no response is received by this date, we will assume your agency has no comments. If you have any questions, please contact Barbara Lee directly via email at barbara.j.lee@hawaii.gov. Thank you.

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(✓) Comments are attached.

Signed: [signature]
Print Name: Carty S. Chang, Chief Engineer
Division: Engineering Division
Date: Jul 15, 2021

Attachments
Cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Environmental Impact Statement Preparation Notice (EISPN)
The Cove at Ko Olina Redevelopment
Location: Kapolei, Island of Oahu, Hawaii
TMK(s): (1) 9-1-057:027
Applicant: G70 on behalf of the James Campbell Company

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4896.

Signed: ______________________
CARTY S. CHANG, CHIEF ENGINEER

Date: Jul 15, 2021

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

July 19, 2021

MEMORANDUM *Log no. 3232*

TO: RUSSEL Y. TSUJI, Administrator
Land Division

FROM: DAVID G. SMITH, Administrator
Division of Forestry and Wildlife

SUBJECT: Division of Forestry and Wildlife Comments on Environmental Impact Statement Preparation Notice for the Cove at Ko ʻOlina Redevelopment

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your inquiry regarding an Environmental Impact Statement Preparation Notice for The Cove at Ko ʻOlina Resort redevelopment project at Kapolei on Oʻahu, Hawaiʻi; TMK: (1) 9-1-057:027. The proposed project consists of demolition and renovation of existing structures, excavation for foundations, and construction of new structures and associated utilities. These activities are noted as possibly resulting in soil disturbance, hazardous materials removal/disposal, dust and erosion due to demolition and grading, parking and traffic impacts due to construction equipment and trucks, and increased noise due to the construction.

The State threatened White Tern (*Gygis alba*) or Manu o Kū may occur in the vicinity of the proposed project site. If frequent activity of White Terns is observed in trees at the site, DOFAW recommends a qualified biologist survey for the presence of nests and/or nesting behavior prior to any action that could disturb the trees, such as trimming or tree removal. White Tern pairs lay their single egg in a branch fork with no nest. The eggs and chicks can be easily dislodged by construction equipment that nudges the trees. If a nest is discovered, DOFAW staff should be notified at (808) 587-0166 for assistance.

The State listed Hawaiian Hoary Bat or ʻŌpeʻapeʻa (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area and may roost in nearby trees. If any site clearing is required this should be timed to avoid disturbance during the bat birthing and pup rearing season (June 1 through September 15). During this period, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed.

The state endangered Hawaiian Monk Seal (*Monachus schauinslandi*) and threatened Green Sea Turtle (*Chelonia mydas*) may potentially occur or haul out on shore within the vicinity of the proposed project site. If either species is detected within 100 meters of the project area all nearby construction operations should cease and not continue until the focal animal has departed the area on its own accord.

DOFAW recommends minimizing the movement of plant or soil material between worksites, such as in fill. Soil and plant material may contain invasive fungal pathogens, vertebrate and invertebrate pests (e.g. Little Fire Ants, Coconut Rhinoceros Beetles), or invasive plant parts that could harm our native species and ecosystems. We recommend consulting the Oʻahu Invasive Species Committee at (808) 266-7994 in planning, design, and construction of the project to learn of any high-risk invasive species in the area and ways to mitigate spread. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

DOFAW recommends using native plant species for landscaping that are appropriate for the area (i.e. climate conditions are suitable for the plants to thrive, historically occurred there, etc.). Please do not plant invasive species. DOFAW recommends consulting the Hawaiʻi-Pacific Weed Risk Assessment website to determine the potential invasiveness of plants proposed for use in the project (https://sites.google.com/site/weedriskassessment/home).

Artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. This disorientation can result in collision with manmade artifacts or grounding of birds. For nighttime lighting that might be required, DOFAW recommends that all lights be fully shielded to minimize impacts. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea. For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawaiʻi please visit: https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf. If nighttime work is needed, we understand downward and shielded lights will be used. We recommend a monitor be present and if any seabirds are observed circling lights, they should be turned off immediately. Any grounded seabirds should be brought to a permitted rehabber and DOFAW should be notified.

We appreciate your efforts to work with our office for the conservation of our native species. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Paul Radley, Protected Species Habitat Conservation Planning Coordinator at (808) 587-0010 or paul.m.radley@hawaii.gov.

Sincerely,

DGS

DAVID G. SMITH
Administrator

OA-22-9

DAVID Y. IGE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2021 JUL 14 AM 9:48
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2021 JUL -8 P 3:57
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 01, 2021

LD 0705

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources *(via email: kendall.l.tucker@hawaii.gov)*
__Div. of Boating & Ocean Recreation
X Engineering Division *(via email: DLNR.Engr@hawaii.gov)*
X Div. of Forestry & Wildlife *(via email: Rubyrosa.T.Terrago@hawaii.gov)*
__Div. of State Parks
X Commission on Water Resource Management *(via email: DLNR.CWRM@hawaii.gov)*
X Office of Conservation & Coastal Lands *(via email: sharleen.k.kuba@hawaii.gov)*
X Land Division – Oahu District *(via email: barry.w.cheung@hawaii.gov)*

FROM: Russell Y. Tsuji, Land Administrator *Russell Tsuji*
SUBJECT: **Environmental Impact Statement Preparation Notice (EISPN)**
The Cove at Ko Olina Redevelopment
LOCATION: Kapolei, Island of Oahu, Hawaii; TMK: (1) 9-1-057:027
APPLICANT: **G70 on behalf of the James Campbell Company**

Transmitted for your review and comment is information on the above-referenced subject. The subject EISPN was published on June 23, 2021 in the Office of Environmental Quality Control's periodic bulletin, The Environmental Notice, available at the following link:

http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2021-06-23-TEN.pdf

Please submit any comments by**Thursday, July 22, 2021** to DLNR.Land@hawaii.gov, and copied to barbara.j.lee@hawaii.gov. If no response is received by this date, we will assume your agency has no comments. If you have any questions, please contact Barbara Lee directly via email at barbara.j.lee@hawaii.gov. Thank you.

Not in conservation district

( ) We have no objections.
(X) We have no comments.
( ) We have no additional comments.
( ) Comments are attached.

Signed: [signature]
Print Name: Rachel Beasley
Division: OCCL
Date: 7/13/2021

Attachments
Cc: Central Files

LD Ø7Ø5

G70

111 S. King Street
Suite 170
Honolulu, HI 96813
808.523.5866
www.g70.design

June 23, 2021

Subject: Environmental Impact Statement Preparation Notice
The Cove at Ko Olina Redevelopment
Tas Map Key (TMK): (1) 9-1-057: 027
(Kapolei, O'ahu, Hawai'i)

Dear Participant:

On behalf of the James Campbell Company (JCC), G70 is notifying you of the availability of the Environmental Impact Statement Preparation Notice (EISPN) for The Cove at Ko Olina Redevelopment project located in Kapolei, Island of O'ahu, Hawai'i.

The EISPN document can be downloaded from the website of the Office of Environmental Quality Control online at this link: http://oeqc2.doh.hawaii.gov/Doc_Library/2021-06-23-OA-EISPN-The-Cove-at-Ko-Olina-Redevelopment.pdf

Please provide comments via email, fax, or U.S. Mail. The 30-day comment period begins on June 23, 2021 and ends on July 23, 2021. Please submit your comments to:

Group 70 International, Inc. dba G70
111 S. King Street, Suite 170
Honolulu, HI 96813
Attn: Tracy Camuso, AICP
Email: thecovekoolina@g70.design
Fax: (808) 523-5874

An EIS public scoping meeting will be held on **Wednesday, July 7, 2021 at 6:00 PM**. The EIS scoping meeting allows for agencies and the public to assist JCC in determining the range of actions, alternatives, impacts, significant issues and proposed mitigation to be considered in the Draft EIS.

The scoping meeting will be a virtual meeting held via the Zoom platform at the following link: https://g70design.zoom.us/j/99536447944. We encourage you to download the application prior to the meeting. If you have questions regarding the virtual scoping meeting, please contact us at thecovekoolina@g70.design, and we can assist you.

Thank you for your participation in the environmental review process.

Sincerely,
Group 70 International, Inc., dba G70

Tracy Camuso, AICP
Associate Principal

Standard Comments for Land Use Reviews
Clean Air Branch
Hawaii State Department of Health

If your proposed project:

Requires an Air Pollution Control Permit

You must obtain an air pollution control permit from the Clean Air Branch and comply with all applicable conditions and requirements. If you do not know if you need an air pollution control permit, please contact the Permitting Section of the Clean Air Branch.

Includes construction or demolition activities that involve asbestos

You must contact the Asbestos Abatement Office in the Indoor and Radiological Health Branch.

Has the potential to generate fugitive dust

You must control the generation of all airborne, visible fugitive dust. Note that construction activities that occur near to existing residences, business, public areas and major thoroughfares exacerbate potential dust concerns. It is recommended that a dust control management plan be developed which identifies and mitigates all activities that may generate airborne, visible fugitive dust. The plan, which does *not* require Department of Health approval, should help you recognize and minimize potential airborne, visible fugitive dust problems.

Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. In addition, for cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance complaints.

You should provide reasonable measures to control airborne, visible fugitive dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:

a) Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact;
b) Providing an adequate water source at the site prior to start-up of construction activities;
c) Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimizing airborne, visible fugitive dust from shoulders and access roads;
e) Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

If you have questions about fugitive dust, please contact the Enforcement Section of the Clean Air Branch

Clean Air Branch (808) 586-4200 cab@doh.hawaii.gov	Indoor Radiological Health Branch (808) 586-4700

April 1, 2019

DAVID Y. IGE
GOVERNOR

DR. CHRISTINA M. KISHIMOTO
SUPERINTENDENT

STATE OF HAWAI`I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI`I 96804

OFFICE OF FACILITIES AND OPERATIONS

RECEIVED
JUL 26 2021
G70

July 22, 2021

Tracy Camuso, AICP
Group 70 International, Inc. dba G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice for the Cove at Ko Olina Redevelopment, Kapolei, Hawaii, TMK (1) 9-1-057:027

Dear Ms. Camuso:

Thank you for your letter dated June 23, 2021. The Hawaii State Department of Education (HIDOE) has the following pre-consultation comments for the preparation of a Draft Environmental Impact Statement for the proposed redevelopment of the Cove at Ko Olina (Project) located at Kapolei, Island of Oahu, TMK (1) 9-1-057:027.

Based upon the information provided, the Project will not impact HIDOE schools.

Thank you for the opportunity to comment. Should you have questions, please contact Robyn Loudermilk, School Lands and Facilities Specialist, Facilities Development Branch, Planning Section, at 784-5093 or by email at robyn.loudermilk@k12.hi.us.

Sincerely,

Roy Ikeda
Interim Public Works Manager
Planning Section

RI:rll

DAVID Y. IGE
GOVERNOR

CURT T. OTAGURO
COMPTROLLER

AUDREY HIDANO
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)21.135

JUL 14 2021

RECEIVED
JUL 16 2021
G70

Tracy Camuso, AICP
Group 70 International, Inc., dba G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Ms. Camuso:

Subject: Environmental Impact Statement Preparation Notice
The Cove at Ko Olina Redevelopment
Kapolei, Oahu, Hawaii
TMK: (1) 9-1-057: 027

Thank you for the opportunity to comment on the subject project. We have no comments to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities.

If you have any questions, your staff may call Ms. Gayle Takasaki of the Planning Branch at 586-0584.

Sincerely,

CHRISTINE L. KINIMAKA
Public Works Administrator

GT:mo

City and County of Honolulu

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
925 DILLINGHAM BOULEVARD, SUITE 200•HONOLULU, HAWAII 96817
PHONE: (808) 768-7762 • FAX: (808) 768-7792
www.honolulu.gov/dcs

RICK BLANGIARDI
MAYOR

SARAH ALLEN
DIRECTOR

JOY BARUA
DEPUTY DIRECTOR

June 30, 2021

Ms. Tracy Camuso, AICP
Associate Principal
Group 70 International, Inc.
111 So. King Street, Suite 170
Honolulu, Hawai'i 96813

Dear Ms. Camuso:

SUBJECT: Environmental Impact Statement Preparation Notice
The Cove at Ko Olina Redevelopment
TMK: (1) 9-1-057:027, O'ahu, Hawai'i

Thank you for your letter dated June 23, 2021 notifying the City and County of Honolulu, Department of Community Services (DCS), about the availability of an Environmental Impact Statement Preparation Notice (EISPN) for the above-named property.

Our review of the documents indicates that the proposed project will have no adverse impacts on any DCS activities or projects in the surrounding neighborhood.

Thank you for providing us the opportunity to comment on this matter.

Sincerely,

Sarah Allen
Director

G70

DCS/Admin
2566

21 JUN 24 P2:18

111 S. King Street
Suite 170
Honolulu, HI 96813
808.523.5866
www.g70.design

June 23, 2021

Subject: Environmental Impact Statement Preparation Notice
The Cove at Ko Olina Redevelopment
Tas Map Key (TMK): (1) 9-1-057: 027
(Kapolei, O'ahu, Hawai'i)

Dear Participant:

On behalf of the James Campbell Company (JCC), G70 is notifying you of the availability of the Environmental Impact Statement Preparation Notice (EISPN) for The Cove at Ko Olina Redevelopment project located in Kapolei, Island of O'ahu, Hawai'i.

The EISPN document can be downloaded from the website of the Office of Environmental Quality Control online at this link: http://oeqc2.doh.hawaii.gov/Doc_Library/2021-06-23-OA-EISPN-The-Cove-at-Ko-Olina-Redevelopment.pdf

Please provide comments via email, fax, or U.S. Mail. The 30-day comment period begins on June 23, 2021 and ends on July 23, 2021. Please submit your comments to:

Group 70 International, Inc. dba G70
111 S. King Street, Suite 170
Honolulu, HI 96813
Attn: Tracy Camuso, AICP
Email: thecovekoolina@g70.design
Fax: (808) 523-5874

An EIS public scoping meeting will be held on **Wednesday, July 7, 2021 at 6:00 PM.** The EIS scoping meeting allows for agencies and the public to assist JCC in determining the range of actions, alternatives, impacts, significant issues and proposed mitigation to be considered in the Draft EIS.

The scoping meeting will be a virtual meeting held via the Zoom platform at the following link: https://g70design.zoom.us/j/99536447944. We encourage you to download the application prior to the meeting. If you have questions regarding the virtual scoping meeting, please contact us at thecovekoolina@g70.design, and we can assist you.

Thank you for your participation in the environmental review process.

Sincerely,
Group 70 International, Inc., dba G70

Tracy Camuso, AICP
Associate Principal

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU
1000 Ulu`ohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

RICK BLANGIARDI
MAYOR

ROGER BABCOCK, JR., Ph.D., P.E.
DIRECTOR AND CHIEF ENGINEER

DAWN B. SZEWCZYK, P.E.
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 21-407

June 30, 2021

RECEIVED
JUL 07 2021
G70

G70
Mr. Tracy Camuso, AICP
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Dear Mr. Camuso

Subject: Environmental Impact Statement Preparation Notice
The Cove at Ko Olina Redevelopment
TMK: (1) 9-1-057:027

Thank you for the opportunity to review and comment on the subject project.

We have no comments at this time, as we do not have any facilities or easements on the subject property.

If you have any questions, please call Mr. Kyle Oyasato of the Division of Road Maintenance at 768-3697.

Sincerely,

Roger Babcock, Jr., Ph.D., P.E.
Director and Chief Engineer

DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

RICK BLANGIARDI
MAYOR

LAURA H. THIELEN
DIRECTOR

KEHAULANI PU'U
DEPUTY DIRECTOR

RECEIVED
JUL 09 2021
G70

June 30, 2021

Ms. Tracy Camuso, AICP
G-70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Ms. Camuso:

Subject: Draft Environmental Assessment Preparation Notice
The Cove at Ko Olina Redevelopment
Tax Map Key (TMK) 9-1-057:027
Kapolei, Hawaii

Thank you for the opportunity to review and comment at the Pre-Consultation Stage of the Draft Environmental Assessment for the Cove at Ko Olina Redevelopment.

The Department of Parks and Recreation has no comment. As the proposed project will have no impact on any program or facility of the department you may remove us as a consulted party to the balance of the EIS process.

Sincerely,

Laura H. Thielen
Director

LHT:jr
(855379)

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

RICK BLANGIARDI
MAYOR

RADE K. VANIC
INTERIM CHIEF

OUR REFERENCE EO-DK

July 9, 2021

SENT VIA EMAIL

Ms. Tracy Camuso
thecovekoolina@g70.design

Dear Ms. Camuso:

This is in response to your letter of June 23, 2021, requesting input on the Environmental Impact Statement Preparation Notice for the proposed redevelopment of The Cove at Ko Olina located in Kapolei.

The Honolulu Police Department has reviewed the plans and does not have any comments or concerns at this time.

If there are any questions, please call Major Gail Beckley of District 8 (Kapolei, Waianae) at 723-8400.

Thank you for the opportunity to review this project.

Sincerely,

DARREN CHUN
Assistant Chief of Police
Support Services Bureau

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

RICK BLANGIARDI
MAYOR

DEAN UCHIDA
DIRECTOR

DAWN TAKEUCHI APUNA
DEPUTY DIRECTOR

EUGENE H. TAKAHASHI
DEPUTY DIRECTOR

July 15, 2021

2021/ELOG-772(MS)
2021/ED-6

Ms. Tracy Camuso
G70
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Ms. Camuso:

SUBJECT: The Cove at Ko Olina Redevelopment Project
Chapter 343, Hawaii Revised Statutes
Environmental Impact Statement Preparation Notice
92-1086 Alii Nui Drive - Honouliuli
Tax Map Key 9-1-057: 27

This responds to your request for comments on the forthcoming Draft Environmental Impact Statement (DEIS) which is to be prepared for the above Project. We look forward to reviewing the DEIS, and we have the following suggestions:

1. Section 1 Project Information: Include a shoreline survey and plans that identify and label the proposed distance from the shoreline.

2. Section 2.1 Project Setting and Description: Provide a more detailed description of the "wide range of events." Note that Condition 1 of the Unilateral Agreement (UA), Ordinance No. 89-27, states that the site is limited to "restaurants and retail activity associated with a Hawaiian Theme Park and a commercial luau operation."

3. Section 2.2 Development Schedule: Include a timeline and describe any proposed phased development of the Project.

4. Section 3.6 Land Use Plans, Policies and Controls: Include details on lot coverage and provision of the 40-foot-wide strip as required by Conditions 2 and 3 of the UA.

Should you have any questions, please contact Malynne Simeon, of our Land Use Approval Branch, at (808) 768-8023, or msimeon@honolulu.gov.

Very truly yours,

FOR Dean Uchida
Director

Enclosure: Receipt No. 131440

OFFICIAL RECEIPT

DEPARTMENT OF PLANNING AND PERMITTING

CITY AND COUNTY OF HONOLULU

131440

Date: May 17, 2021

Received From: G70

Four hundred and no/100 DOLLARS

For: 2021/FD-6 app review fee

Tax Map Key: 9-1-057: 027

$400.00

BOH-Waterfront Plaza-V #52646

DEPARTMENT OF PLANNING AND PERMITTING

OFFICIAL RECEIPT
DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

131440

Date: May 17, 2021

Received From: G70

Four hundred and no/100 DOLLARS

For: 2021/ED-6 app review fee

Tax Map Key: 9-1-057:027

$400.00

Waterfront Plaza-V #52646

DEPARTMENT OF PLANNING AND PERMITTING

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

RICK BLANGIARDI
MAYOR

ALEX KOZLOV, P.E.
DIRECTOR

HAKU MILLES, P.E.
DEPUTY DIRECTOR

RECEIVED
JUL 21 2021
G70

July 14, 2021

Group 70 International, Inc. dba G70
111 S. King Street, Suite 170
Honolulu, Hawaii 96813

Attn: Tracy Camuso, ICP

Dear Tracy:

Subject: Environmental Impact Statement Preparation Notice
The Cove at Ko Olina Redevelopment
TMK: (1) 9-1-057:027
(Kapolei, Oahu, Hawaii)

Thank you for the opportunity to review and comment. The Department of Design and Construction has no comments to offer at this time.

Should you have any further questions, please contact me at 768-8480.

Sincerely,

fnz Alex Kozlov, P.E.
Director

AK:krn (855349)

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

July 28, 2021

Ms. Tracy Camuso, AICP
Group 70 International, Inc.
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Ms. Camuso:

Subject: Your Letter Dated June 23, 2021 Requesting Comments on the Environmental Impact Statement Preparation Notice for The Cove at Ko Olina Redevelopment Project in Kapolei - Tax Map Key: 9-1-057: 027

Thank you for your letter regarding the proposed redevelopment project at The Cove at Ko Olina.

The parcel has an existing nonpotable water meter. However, as of the submittal of this Environmental Impact Statement Preparation Notice, the Barbers Point Nonpotable Wells pumping exceeds State Permitted Use and could be in violation of the State Water Use Permit. We understand that Ko Olina Resort is planning an additional nonpotable well to accommodate future irrigation demands, however, the exploratory well has not been constructed to date. A commitment and schedule for the construction and connection of the nonpotable well is required before the Board of Water Supply (BWS) will approve building permits for the Ko Olina Resort. BWS Rules & Regulations require the use of nonpotable water for irrigation of large landscaped areas, if available. The developer of this project is required to coordinate with Ko Olina Resort for the development of the new nonpotable source. A source development plan should be submitted for BWS review. Confirmation on the adequacy of the wells yield and chloride content are also required before building permits will be approved.

The existing potable water system is adequate to provide off-site fire protection and accommodate the domestic demands of the proposed development. However, please be advised that this information is based upon current data, and therefore, the BWS reserves the right to change any position or information stated herein up until the final approval of the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

The developer will need to obtain a potable water allocation from the Ko Olina Resort and Marina. A copy of the letter should be submitted to the BWS for documentation.

When water is made available, the applicant will be required to pay our Water System Facilities Charges for transmission.

Water conservation measures are required for all proposed developments. These measures include the selection of Water Sense labeled ultra-low-flow plumbing fixtures and toilets, utilization of nonpotable water for irrigation using rain catchment and chiller/air handler condensate, cooling tower conductivity meters and water softening recycling systems, drought and salt tolerant plants, and xeriscaping principles in all landscaping. We recommend installing efficient irrigation systems, such as drip irrigation, and incorporating moisture sensors to avoid operating the irrigation system in the rain and/or if the ground has adequate moisture.

The proposed project is subject to BWS Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of Honolulu Fire Department.

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

cc: Ko Olina Resort

2021/EZOG-1508

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • web: www.honolulu.gov

RICK BLANGIARDI
MAYOR

J. ROGER MORTON
DIRECTOR

JON Y. NOUCHI
DEPUTY DIRECTOR

TP6/21-855237

August 3, 2021

MEMORANDUM

TO: Dean Uchida, Director
Department of Planning and Permitting

FROM: J. Roger Morton, Director
Department of Transportation Services (DTS)

SUBJECT: Environmental Impact Statement Preparation Notice
The Cove at Ko Olina Redevelopment
Tax Map Key (TMK): (1) 9-1-057: 027
(Kapolei, Oahu, Hawaii)

Thank you for the opportunity to provide written comments regarding the subject project. We have the following comments.

1. **Transportation Impact Assessment (TIA).** The applicant should perform a TIA to examine the vehicle, pedestrian, bicycle, and public transit 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 TIA should identify an appropriate speed limit for the streets adjacent to the project by analyzing conflict density and activity level, among other contextual factors, to determine the speed limit that will best minimize the risk of a person being killed or seriously injured. The National Association of City Transportation Officials Safe Speed Study methodology is recommended. A Safe Speed Study should be conducted for the longest relevant segment of a street corridor affected by the project.

The applicant shall submit all native files (e.g., Synchro, Excel, etc.) for the raw multi-modal counts and accompanying analyses to the Regional Planning Branch 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/dsweb/View/Collection-7723.

2. **Neighborhood Impacts**. The area representatives, neighborhood board, as well as the area residents, businesses, emergency personnel (fire, ambulance, and police), Oahu 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.

3. **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.

4. **Parking**. If the project intends to increase the number of on-site parking stalls substantially, a discussion regarding the generation and accommodation of parking demand should be included in the Environmental Impact Statement.

Should you have any questions, please contact Greg Tsugawa, of my staff, at (808) 768-6683.

Individuals and Organizations

Ko Olina
HAWAIʻI

July 23, 2021

Steve Kelly, President
Kapolei Properties Division
James Campbell Company, LLC
1001 Kamokila Boulevard
Kapolei, Hawaiʻi 96707

ATTN: Matt Caires, Manager, Development, James Campbell Company, LLC

Dear Mr. Kelly,

This letter confirms receipt of an email notice received by the Declarant of Ko Olina Community Association, Inc. (KOCA), Ko Olina Development, LLC, dated June 21, 2021, that was forwarded to KOCA and the Ko Olina Resort Operators Association, Inc. (KORA). The correspondence provided notice of the June 23 publication of an Environmental Impact Statement Preparation Notice (EISPN) for the James Campbell Company, LLC's (JCC) "Cove at Ko Olina" ("project"). Written notice was not sent directly to KOCA or KORA.

KOCA was incorporated in 1989 and is responsible for the maintenance and security of all common areas within the resort. This includes all landscaping, flora, street trees, traffic signs, streetlights, drainage ways, shoreline restrooms and showers and common area roadways including the Farrington Highway interchanges. Also included are areas leased and licensed from the State of Hawaiʻi like the rocky shoreline and lands around the marina entrance. These efforts are essential in achieving a uniform, consistent and appealing foundation for maximizing property values.

KOCA also provides benefitted services to individual properties like shoreline sand cleaning/grooming, mowing, trash collection, in-water lagoon maintenance, periodic sand reclamation and other services. A Beach & Sports Club is also provided for residents.

KORA is responsible for destination marketing for Ko Olina Resort. This includes market research, public relations, advertising, sales promotion, and travel industry partnerships. Also included is creation and production of marketing and community events such as the Hawaiʻi Food & Wine Festival, Ko Olina Children's Festival, and the Annual Thanksgiving Outreach program.

KORA also provides benefitted services to individual properties such as support of appropriate independent marketing activities & events, outreach and community service, access to koolina.com and its related social media programs.

1. As you are aware, Ko Olina Resort is an approximately 642-acre master planned resort and residential community – for which entitlements, planning, and environmental reviews were completed and approved decades ago. By contrast, upon review of the project description outlined in the EISPN, it is evident that scope of the proposed project is not

aligned with the Ko Olina Resort Master Plan. Consequently, we are concerned with the potential for cumulative and secondary environmental impacts that may arise from the increased use of the project site (which lies within the geographic footprint of Ko Olina Resort).

We request that JCC designate a representative(s) to serve as a liaison(s) to KOCA and KORA throughout the length of the construction process, as well as during tenant improvements. We also request that in anticipation of construction, project presentations be made available to these entities in the form of in-person and/or virtual events scheduled at various times to provide ample opportunity for participation. The JCC should also regularly provide the community with a schedule of periodic communication updates, which could include a quarterly newsletter, contact information and community opportunities for in-person and/or virtual events to address questions or concerns regarding the progress of the project.

2. The EISPN document states that "Existing civil infrastructure will also be evaluated" in the forthcoming Draft EIS. The project site is served by private infrastructure (i.e. roadways, drainage, wastewater, potable and non-potable water, street cleaning, sidewalk and lighting maintenance, etc.) also utilized by other developments within the Ko Olina Resort area. The scope of development proposed under the EISPN is not in alignment with the overall program of development outlined and approved for Ko Olina Resort. We request JCC consider the impacts of the proposed project on infrastructure systems in the area and ask that the following concerns also be addressed:

   a. The Draft EIS should address increased demand on resort infrastructure and safety as a result of the proposed project. The JCC should also include proposals to ensure equitable responsibility with KOCA regarding the procurement of security services, infrastructure repairs and continued maintenance of the resort's common areas and agreement to collaborate with KORA with regards to project sales and marketing to ensure brand consistency.

   b. There is one entry and exit point into the Ko Olina community that the proposed project will share. As part of our commitment to the community, Ko Olina requires Aloha Team, contracted by KOCA for security services, to operate 24-hour front gate greeting services to ensure efficient traffic flow and to answer resort-related security and safety inquiries. This creates a premiere resort experience for all guests at first contact point. Guests of the new JCC project will also enjoy this experience.

      The proposed project, however, will cause increased congestion at the resort's entry making it difficult for the Aloha Team to keep traffic flowing safely while continuing to provide a unique arrival experience for Ko Olina's residents and guests. The Draft EIS should address any potential conflicts between the two uses since the proposed improvements and activities are intended to be open and activated during daytime hours.

Ko Olina
HAWAIʻI

c. The Draft EIS should discuss specific plans to manage public access to the shoreline and beach areas including vehicle parking, public pathways and beach and water activities. We are concerned with the potential cumulative and secondary impacts to the environment and public access resulting from increased activity along the pristine shoreline, a noted sanctuary for endangered marine life. It is critical for JCC to ensure the preservation of the shoreline area which is especially significant to West Oʻahu communities. Providing adequate infrastructure to support increased shoreline use, including, but not limited to, restrooms, refuse and recycling containers and posted guidelines to ensure care for the area, is also essential.

d. Regular consultation with our team at KOCA should be undertaken to coordinate infrastructure related improvements, operations, logistical demands and any changes that impact resort common areas.

3. The EISPN document outlines that an Archaeological Inventory Survey (AIS) of the project site was conducted in February 2020 and that a Cultural Impact Assessment (CIA) will be prepared in accordance with the regulatory requirements of HRS Chapter 343. It is anticipated that these AIS and CIA documents will be included and assessed within the forthcoming Draft EIS. Nonetheless, the project site lies within a region of Archaeological and Cultural Significance, and there are a number of known archaeological and cultural sites within the boundary of the project site. It is advised that the EIS closely consider and evaluate potential impacts to these archaeological and cultural sites. Future design and programming efforts for the project should appropriately align to the context and presence of archaeological and cultural sites and resources.

4. The EISPN states that development of the project will support the local economy and stimulate economic recovery in the project region. It highlights significant economic impacts resulting from the COVID-19 pandemic. However, tourism in the state of Hawaiʻi is recuperating. According to the Hawaiʻi Tourism Authority (HTA), approximately 30,000 travelers are now flying into the state of Hawaiʻi each day, approximately 80% of the number of 2019 visitor arrivals at this time.

   The volume of visitors travelling to Hawaiʻi is presently overwhelming existing infrastructure and degrading the natural environment. It is understood that HTA, in partnership with local communities, the state of Hawaiʻi and the City and County of Honolulu, is currently in the process of developing the Oʻahu Destination Management Action Plan (Oʻahu DMAP), with planned publication in August 2021. The Oʻahu DMAP will propose tourism strategies intended to redefine, rebuild and reset the direction of tourism over a three-year period. A key component of the Oʻahu DMAP is regenerative tourism. This is an important shift away from exploitative tourism toward contributory tourism. This means the hospitality industry will target visitors interested in ecotourism, agritourism, volunteer-tourism and authentic cultural experiences. Ko Olina has made this sustainable tourism model a priority. It is critical that JCC also commit to this model to support our efforts. JCC should also consult with regenerative tourism experts and partner with experienced and relevant community-based organizations.

92-1047 Olani Street, Unit 1206 • Kapolei, Hawaiʻi 96707 • Telephone (808) 671-2512 • Fax (808) 671-3640 • www.KoOlina.com

Ko Olina
HAWAIʻI

The proposed draft references the cultural significance of the location and we acknowledge that this is an important part of JCC's heritage. The current project plans, however, are indiscriminate. They generally intend to activate the site during both day- and nighttime hours, with facilities for entertainment, dining and retail. It is unclear from the draft document whether the proposed plan will promote the regenerative tourism goals of HTA and the Ko Olina ccommunity. Historically, the project site operated during the evening hours. It provided entertainment catered towards visitors that attend an evening event for 2-3 hours and then depart. The proposed project will significantly intensify the use of the site during all hours of the day and there is no reference to the quality or quantity of the activities and experiences. There is also the potential that increased use will interfere with the existing natural environment, including the natural shoreline, and potentially disturb cultural artifacts at the site.

5. The project site lies within Ko Olina Resort, a fully master planned resort and residential community. The resort continues to be developed under previously approved design guidelines. The EIS should address the potential impacts of the proposed project on visual resources and environment. Ko Olina's design committee currently reviews proposals and plans to ensure that any new development complies with Ko Olina's design guidelines and is constructed in harmony with the environment and aesthetics of the Ko Olina community.

6. We request further consultation regarding project security, pedestrian and vehicle traffic, parking operations and any anticipated impacts (both during and after construction).

7. The EISPN suggests that the project will meet the City's vision for the ʻEwa Region from a resort commercial development standpoint. As discussed previously, however, Ko Olina Resort is a fully master planned resort and residential community. The additional commercial activities and uses proposed within the EISPN do not align with the vision and program set forth under the master plan for Ko Olina Resort.

   a. As stated in the EISPN, the "addition of new retail and restaurants at the site" is anticipated to "activate the site during day- and nighttime hours, attracting both locals and visitors to enjoy new, authentic experiences in the Ko Olina Resort." To be clear, the proposed project site lies within the geographic borders of Ko Olina Resort but the proposed activation of the site during both day- and nighttime hours is out of character for its existing use, and is not compatible with the program outlined under Ko Olina Resort's master plan, which fully anticipated and contemplated the commercial needs of the community.

   b. Given the expansive social and environmental impacts of "over-tourism" during the post-pandemic era, we are concerned about the potential for commercial over-saturation and over-development of the Ko Olina Resort area. We ask that the EIS consider, evaluate and speak to the appropriate management of tourism and tourism related impacts and that the suggested activities, retail and entertainment complement, rather than impede, those already in operation or planned for at Ko Olina.

Ko Olina HAWAI'I

c. Finally, the EIS should also contain a detailed review of potential economic impacts and demand for the project, as proposed. The EIS should also discuss and comparatively evaluate alternatives to the proposed project, in alignment with the requirements of Chapter 343, HRS.

We look forward to reviewing the forthcoming Draft EIS document and participating in the project community engagement and public comment process. It is further requested that the project Team engage and formally consult with both the Ko Olina Community Association and the Ko Olina Resort Operators Association in conjunction with and pursuant to the on-going EIS process for the proposed project.

Sincerely,
Ko Olina Community Association, Inc.
Ko Olina Resort Operators Association, Inc.

Ken Williams
General Manager

Copy to: Malynne Simeon
City and County of Honolulu
Department of Planning and Permitting
650 S. King St., 7th Floor
Honolulu, Hawai'i 96813
msimeon@honolul.gov

Noelle Besa Wright

From: Karen Messick <karenlmessick@me.com>
Sent: Wednesday, June 23, 2021 5:01 PM
To: The Cove at Ko Olina - 220069-01
Subject: The Cove Ko Olina

Follow Up Flag: Follow up
Flag Status: Flagged

Aloha,

Very exciting new on the Cove.

As a resident who walks by the existing Paradise Cove location daily and observes traffic flow….
I noticed on the proposed site plan only one traffic entrance/exit..this could present a traffic flow problem.
Obviously with retail and other commercial interests of all day activity, deliveries, and patrons I would suggest a turn lane into the new Cove area, otherwise the two main lanes on Ali'nui Drive will back up. In addition, suggest a left turn signal at both the exit/entrance to the New Cove, as well as a left turn signal at Olani St. and Ali’nui Drive.

Traffic flow is a major concern to keep residential traffic flowing. Rush hours returning home is pretty heavy and when there could be a significant problem.
As well as Saturday and Sunday mornings when traffic flows in for beach access.
Controlling parking for beach access will also be an issue, as it is now for the marketplace.

In addition parking for delivery vehicles needs to be created because if there is none and the delivery trucks park on Ali’nui drive, like they do now on Olani Street while servicing the market and restaurants, it will be a traffic nightmare.

Thank you for listening.
Karen Messick
President The Coconut Plantation at Ko Olina HOA

Noelle Besa Wright

From: Kathryn N <katneko@gmail.com>
Sent: Monday, July 19, 2021 8:46 AM
To: The Cove at Ko Olina - 220069-01

Subject: Feedback on development

Follow Up Flag: Follow up
Flag Status: Completed

Aloha,

I saw the recent article in mid week about the possible plans for the cove at Koolina. As a resident of Kapolei I frequent the area and have enjoyed the temporary relief of an excessive amount of tourists over the last year. Now that tourism is in full effect once again, it is sad to see how all of our beaches including those in Ko'Olina have been inundated with visitors who are not mindful respectful of our wildlife or aina. I see trash on the beach and people harassing the Hawaiian sea turtles. On a recent trip when I was watching the gorgeous fish in the water and group of people jumped into the water next to me. Immediately a film of oil covered the top of the water from sprayed on sunscreen. It honestly breaks my heart. I'm sure that this letter will not sway any planned development but our hidden gems like the Cove is slowing fading away. As much as you may try to "embrace the hawaiian culture and respect the history of the place" the more you attract the more will be extracted until we are left with places like Waikiki. We all know that that is not true Hawaii.

Thank you for taking the time to read my comment, Kathryn

Sent from my iPhone

Appendix B

Archaeological Inventory Survey

Draft

Archaeological Inventory Survey Report for the Paradise Cove Redevelopment Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: [1] 9-1-057:027

Prepared for the
James Campbell Company, LLC

Prepared by
Brittany Enanoria, B.A.,
Scott A. Belluomini, B.A.,
David W. Shideler, M.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i

(Job Code: HONOULIULI 181)

February 2020

O‘ahu Office		Maui Office
P.O. Box 1114		1860 Main St.
Kailua, Hawai‘i 96734	www.culturalsurveys.com	Wailuku, Hawai‘i 96793
Ph.: (808) 262-9972		Ph.: (808) 242-9882
Fax: (808) 262-4950		Fax: (808) 244-1994

Management Summary

Reference	Archaeological Inventory Survey Report for the Paradise Cove Redevelopment Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu, TMK: [1] 9-1-057:027 (Enanoria et al. 2020)
Date	February 2020
Project Number(s)	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: HONOULIULI 181
Investigation Permit Number	CSH completed the archaeological inventory survey (AIS) fieldwork under archaeological fieldwork permit number 19-07, issued by the Hawaiʻi State Historic Preservation Division (SHPD) per Hawaiʻi Administrative Rules (HAR) §13-13-282.
Agencies	SHPD
Land Jurisdiction	James Campbell Company, LLC
Project Proponent	James Campbell Company, LLC
Project Funding	James Campbell Company, LLC
Project Location	The project area is currently occupied primarily by Paradise Cove Luau located between Aliʻinui Drive and the shoreline *makai* (seaward)/west of the entrance to the Ko Olina Resort. The project area is depicted on the 1998 Ewa U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	Beginning in 2023, the James Campbell Company plans to improve the 10.85-acre property known as Paradise Cove. The intent of the upcoming property improvement is to create an authentic Hawaiian gathering place with an inclusive, spiritual, genuine, surprising, and welcoming character for *kamaʻāina* (Hawaiʻi residents) and visitors. When completed, new amenities will celebrate the traditions, beauty, and spirit of ancient Hawaiʻi in an immersive coastal setting unlike any place on Oʻahu. The revitalized property will be comprised of a unique mix of Hawaiian music and entertainment, dining, shopping, and other activities that will stand out to the community for its unique setting and memorable experiences. The history of the place will be recognized. Planned improvements include a new performing arts venue capable of housing a daily entertainment experience focused on Hawaiian culture. To activate the property as a gathering place throughout the day, other planned improvements will likely include small-scale retail shops, an open-air marketplace showcasing only Hawaiʻi and West Oʻahu goods and services, restaurants showcasing local cuisine and agricultural products, daytime activities appropriate for the coastal setting, and welcoming and engaging common areas. Potential programming may include commercial activities highlighting the sense of the place, cultural

	workshops, and landscaping programs and coordinated events and programs with the neighboring Lanikūhonua Cultural Institute. The improvements are planned for completion around 2025 when the property will be opened to the public with a new and authentic sense of place recognizing its special setting and history.
Project Acreage	10.85 acres (4.39 hectares)
Historic Preservation Regulatory Context	This AIS investigation fulfills the requirements of HAR §13-276 and was conducted to identify, document, and assess significance of any historic properties. This document is intended to support the proposed project's historic preservation review under Hawaiʻi Revised Statutes (HRS) §6E-42 and HAR §13-284. It is also intended to support any project-related historic preservation consultation with stakeholders, such as state and county agencies and interested Native Hawaiian Organizations (NHOs) and community groups. Six previous studies have been conducted within the project area. Komori and Dye (1979) conducted archaeological testing at West Beach (initial development of Ko Olina) and documented salt pans (no State Inventory of Historic Places [SIHP] number assigned) located in the western portion outside the current project area. In 1987, Davis and Haun conducted an AIS for West Beach identifying coastal wetlands (SIHP # 50-80-12-3362) consisting of two features including Feature 1, coastal backwater (in the southern portion of the project area) and Feature 2, a habitation area (outside the project area). Davis (2000) conducted data recovery for the Davis and Haun (1987) study area, and documented SIHP # -3362. Glidden et al. (1993) conducted data recovery testing in selected areas of Paradise Cove and observed the coastal wetlands (SIHP # -3362) in the southern portion of the current project area. Human skeletal remains were identified for a gas line excavation in the western portion of the project area at the main stage (Jourdane 1995). Hammatt (1995) documented an additional four human burials within the remaining gas line excavation.
Fieldwork Effort	Fieldwork was accomplished between 21 October and 12 November 2019 by Scott Belluomini, B.A., Jessica Burden, B.A., Brittany Enanoria, B.A., Thomas Martel III, B.A., and Alison Welser, M.A., under the direction of Project Manager David Shideler, M.A., and the general supervision of Principal Investigator Hallett H. Hammatt, Ph.D. This work required approximately 30 person-days to complete.
Historic Properties Identified and Significance	One previously identified historic property was identified. SIHP # 50-80-12-3362, coastal wetlands, and is assessed as significant per HAR §13-284-6 under significance Criteria d (have yielded, or is likely to yield information important for research on prehistory or history). One previously identified historic property is within the current project area but not identified during this AIS: SIHP # 50-80-12-4968, human

	skeletal remains, assessed as significant per HAR §13-284-6 under significance Criteria d (have yielded, or is likely to yield information important for research on prehistory or history) and e (have an important value to the Native Hawaiian people or to another ethnic group of the state due to its associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts these associations being important to the group's history and cultural identity).
Project Effect	The proposed project will potentially affect two historic properties (SIHP #s 50-80-12-3362 and 50-80-12-4968) identified within the project area. The project-specific effect is "effect, with agreed upon mitigation commitments" pursuant to HAR §13-284-7.
Mitigation Commitments	The agreed up on mitigation commitments outlined below will reduce the project's potential effect on the significant historic properties: Archaeological monitoring (a form of archaeological data recovery) of all ground-disturbing activities is agreed upon for the entire project area. On-site archaeological monitoring will be conducted to identify and document any additional exposures of SIHP #s 50-80-12-3362 and 50-80-12-4968 and any newly identified historic properties that may be identified during construction. An archaeological monitoring plan will be submitted meeting the requirements of HAR §13-279-4 to the SHPD for review and acceptance. The burial preserve area shall remain in perpetuity to preserve the *iwi kupuna* (Native Hawaiian skeletal remains).

Table of Contents

List of Figures

List of Tables

Section 1 Introduction

1.1 Project Background

At the request of James Campbell Company, LLC, Cultural Surveys Hawaiʻi, Inc. (CSH) has prepared this archaeological inventory survey report (AISR) for the Paradise Cove Redevelopment project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu, TMK: [1] 9-1-057:027. The project area is currently leased by Paradise Cove, located between Aliʻi Nui Drive and the shoreline, *makai* (seaward)/west of the entrance to the Ko Olina Resort. The project area is depicted on a portion of the 1998 Ewa U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2), and a 2013 aerial photograph (Figure 3).

Beginning in 2023, the James Campbell Company plans to improve the 10.85-acre (4.39-hectare) property known as Paradise Cove. This will be the first major improvement of amenities on the property in over 25 years.

Use of the property has been primarily for commercial *lūʻau* and entertainment operations since the late 1970s. The on-property facilities that house the current entertainment business date from the property's last major redevelopment in the early 1990s when the property was zoned and subdivided in recognition of its long-time commercial use. Prior to its commercial use, the property was part of the neighboring Lanikūhonua property which was the residence of Alice Kamokilaikawai Campbell (1884–1971) for over 30 years. Kamokila Campbell was the daughter of James Campbell (1826–1900). The Paradise Cove property was acquired by James Campbell in 1877 as a part of his purchase of the *ahupuaʻa* (traditional land division) of Honouliuli.

The intent of the upcoming property improvement is to create an authentic Hawaiian gathering place with an inclusive, spiritual, genuine, surprising, and welcoming character for *kamaʻāina* (Hawaiʻi residents) and visitors. When completed, new amenities will celebrate the traditions, beauty, and spirit of ancient Hawaiʻi in an immersive coastal setting unlike any place on Oʻahu. The revitalized property will be comprised of a unique mix of Hawaiian music and entertainment, dining, shopping, and other activities that will stand out to the community for its unique setting and memorable experiences. The history of the place will be recognized.

Planned improvements include a new performing arts venue capable of housing a daily entertainment experience focused on Hawaiian culture. To activate the property as a gathering place throughout the day, other planned improvements will likely include small-scale retail shops, an open-air marketplace showcasing only Hawaiʻi and West Oʻahu goods and services, restaurants showcasing local cuisine and agricultural products, daytime activities appropriate for the coastal setting, and welcoming and engaging common areas. Potential programming may include commercial activities highlighting the sense of the place, cultural workshops, and landscaping programs and coordinated events and programs with the neighboring Lanikūhonua Cultural Institute.

The property's improvement will abide by its zoning limit that no more than 30% of the property will be occupied by structures thereby keeping intact a natural sense of open space and *makai* view planes. Structures will be set well back from the shoreline considering resiliency needs for rising seas and storm events, the natural and cultural sensitivity of the near shore areas and to

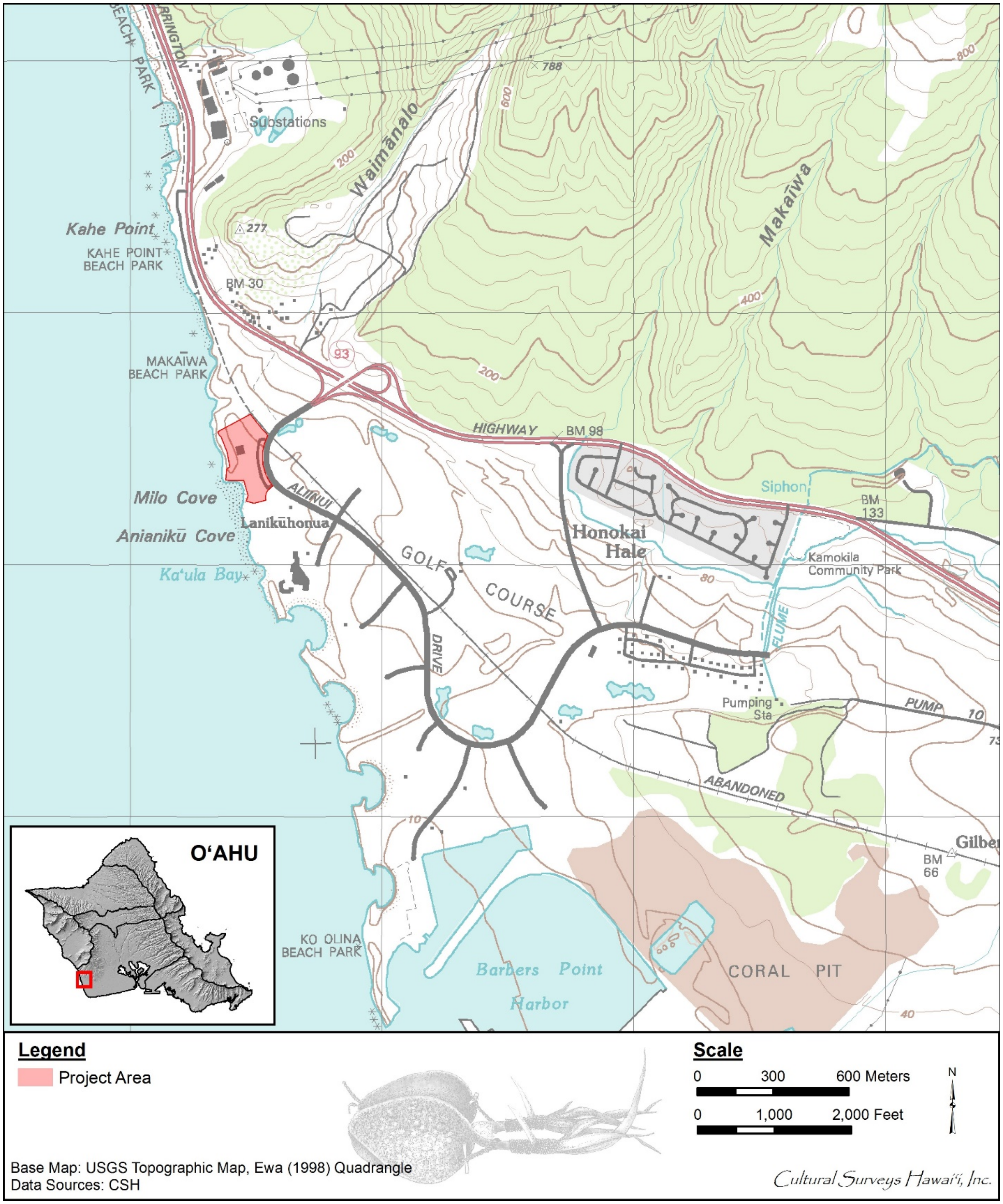


Figure 1. Portion of the 1998 Ewa USGS 7.5-minute topographic quadrangle map showing the location of the project area

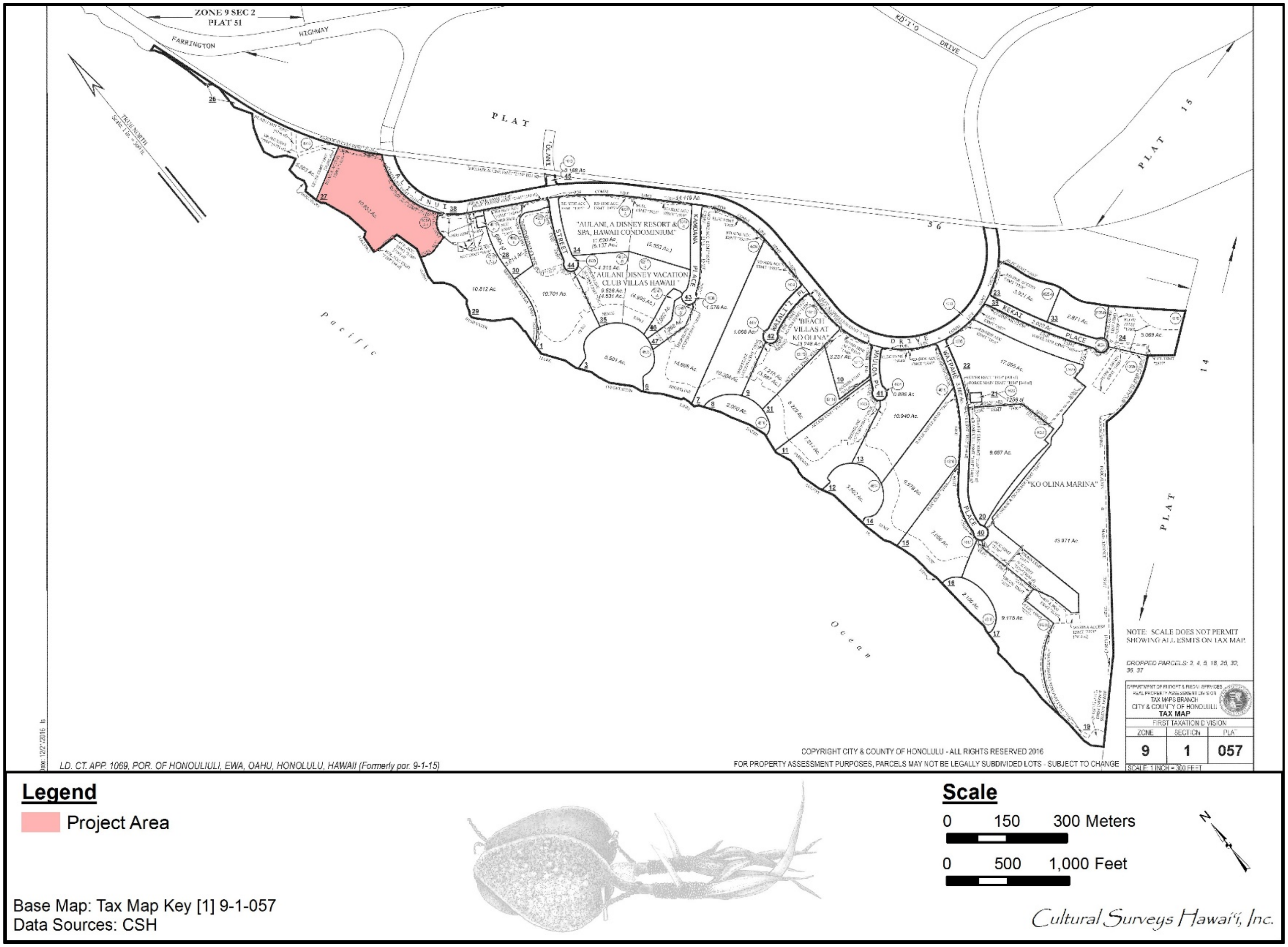


Figure 2. TMK: [1] 9-1-057 showing the location of the project area (Hawai‘i TMK Service 2016)

Figure 3. Aerial photograph showing the location of the project area (Google Earth 2013)

ensure open access shoreline paths. Other considerations include sustaining an appropriate level of beach access so as not to overwhelm the natural cove and lagoon that is a truly special resource.

The improvements are planned for completion around 2025 when the property will be opened to the public with a new and authentic sense of place recognizing its special setting and history.

1.2 Historic Preservation Regulatory Context and Document Purpose

This AIS investigation fulfills the requirements of Hawai‘i Administrative Rules (HAR) §13-13-276 and was conducted to identify, document, and make significance assessments of any historic properties. This document is intended to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) §6E-42 and HAR §13-275, as well as the project’s environmental review under HRS §343. It is also intended to support any project-related historic preservation consultation with stakeholders, such as state and county agencies and interested Native Hawaiian Organizations (NHOs) and community groups.

Six previous studies have been conducted within the project area. Komori and Dye (1979) conducted archaeological testing at West Beach (initial development of Ko Olina) and documented salt pans (no State Inventory of Historic Places [SIHP] number assigned) located in the western portion outside the current project area. In 1987, Davis and Haun conducted an AIS for West Beach identifying coastal wetlands (SIHP # 50-80-12-3362) consisting of two features including Feature 1, coastal backwater (in the southern portion of the project area) and Feature 2, a habitation area (outside the project area). Davis (2000) conducted data recovery for the Davis and Haun (1987) study area, and documented SIHP # -3362. Glidden et al. (1993) conducted data recovery testing in selected areas of Paradise Cove and observed the coastal wetlands (SIHP # -3362) in the southern portion of the current project area. Human skeletal remains (SIHP # -3362) were identified for a gas line excavation in the western portion of the project area at the main stage (Jourdane 1995). Hammatt (1995) documented an additional four human burials within the remaining gas line excavation.

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is on the southwest coast of O‘ahu at Ko Olina, with elevations typically below 5 m above mean sea level. Annual temperature in the project area averages 23.8˚ C (74.7˚ F) (Giambelluca et al. 2014). The mean annual rainfall is between 567 mm (22.19 inches) and 569 mm (22.43 inches) (Giambelluca et al. 2013). Surface water in the vicinity is quite limited. Makaīwa Gulch and Waimānalo Gulch to the northeast host intermittent streams, but these rarely flow except during major storms (see Figure 6).

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), the project area’s soils are diverse (Figure 4). The northern portion of the project area extending to a small portion of the shoreline is within Keaau clay, 0 to 2% slopes (KmA). The remainder of the shoreline is within coral outcrop (CR). The southeastern portion of the project area is within Keaau clay, saline, 0 to 2% slopes (KmbA). The southern portion of the project area is adjacent to Jaucas sand, 0 to 15% slopes (JaC).

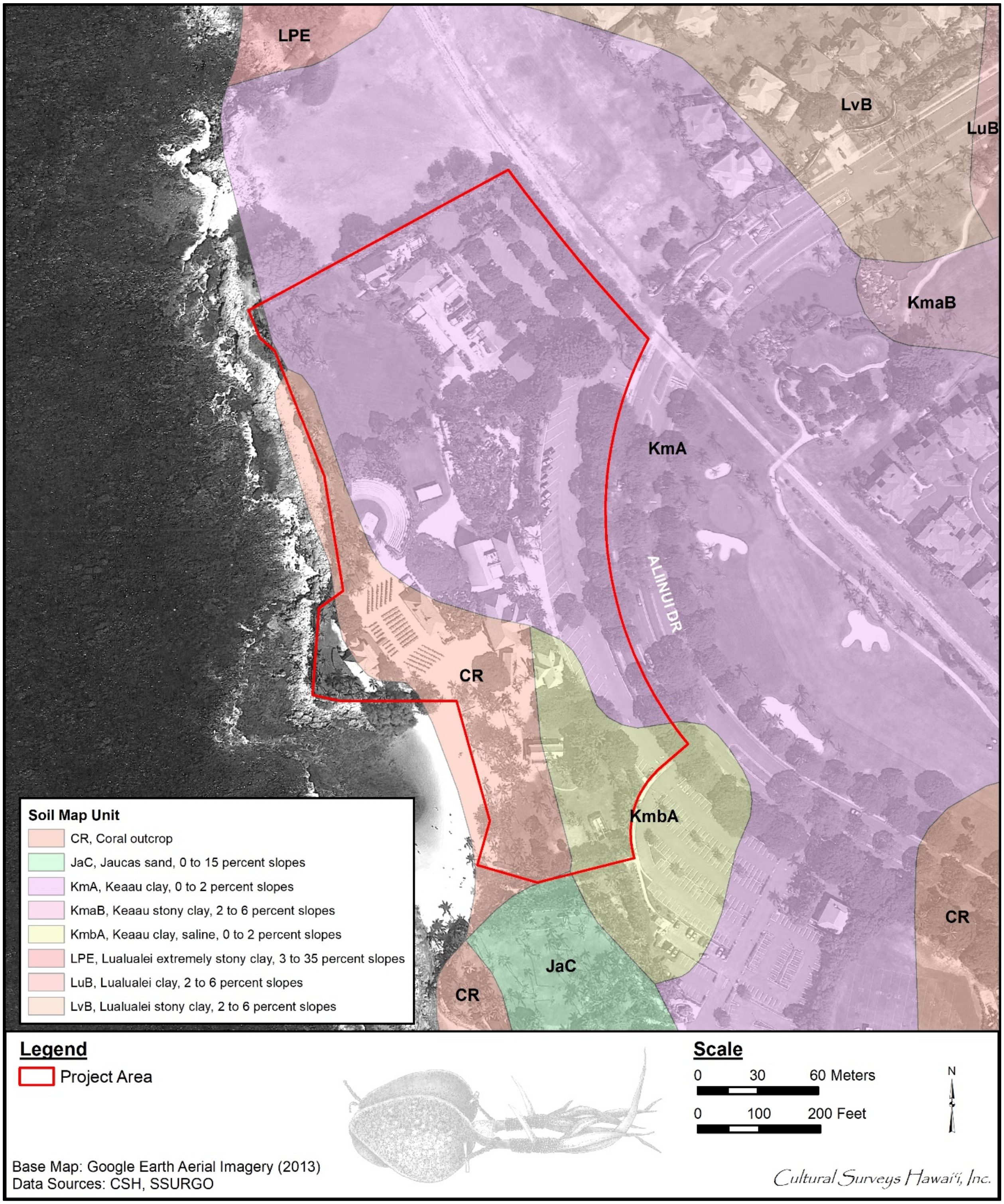


Figure 4. Portion of a 2013 Google Earth aerial imagery with overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972; USDA SSURGO 2001), indicating soil types within and surrounding the project area

Keaau series are described as follows:

> This series consists of poorly drained soils on the coastal plains on the island of Oahu. These soils are developed in alluvium deposited over reef limestone or consolidated coral sand. They are nearly level and gently sloping. Elevations range from 5 to 40 feet. The annual rainfall amounts to 20 to 35 inches. Most of the rainfall occurs between November and April. The mean annual soil temperature is 73˚ F. Keaau soils are geographically associated with Kaloko, Mokuleia, and Pearl Harbor soils.
>
> These soils are used for sugarcane and pasture. The natural vegetation consists of kiawe, bemudagrass, bristly foxtail, and fingergrass [Foote et al. 1972:64–65]

Coral outcrop soils are described as follows:

> Coral outcrop (CR) consists of coral or cemented calcareous sand on the island of Oahu. The coral reefs formed in shallow ocean water during the time the ocean stand was at a higher level. Small areas of coral outcrop are exposed on the ocean shore, on the coastal plains, and at the foot of the uplands. Elevations range from sea level to approximately 100 feet. The annual rainfall amounts to 18 to 40 inches. Coral outcrop is geographically associated with Jaucas, Keaau, and Mokuleia soils.
>
> Coral outcrop makes up about 80 to 90 percent of the acreage. The remaining 10 to 20 percent consists of a thin layer of friable, red soil material in cracks, crevices, and depressions within the coral outcrop. This soil material is similar to that of the Malama series.
>
> This land type is used for military installations quarries, and urban development. Vegetation is sparse. It consists of kiawe, koa haole, and fingergrass. [Foote et al. 1972:29]

The Jaucas soil series is described as follows:

> excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean. These soils occur on all islands of this survey area. They developed in wind- and water deposited sand from coral and seashells. They are nearly level to strongly sloping. Elevations range from sea level to 100 feet. [Foote et al. 1972:48]

1.3.2 Built Environment

Paradise Cove is located adjacent to Lanikūhonua Cultural Institute to the south, Makaiwa Beach Park to the north, Kai Lani at Ko Olina Aoao and a portion of Ko Olina Golf Course to the east, and the Pacific Ocean to the west (see Figure 3). Ali‘inui Drive is the major vehicular artery servicing the resorts of Ko Olina and connecting them to the H-1 freeway system. The project area has been extensively modified from sugarcane development and previous construction activities related to Paradise Cove. The eastern portion of the project area consists of a large paved parking lot area. The remainder of the Paradise Cove area consists of large flat grassy areas, portable and intact buildings, and modern *lū‘au* huts. The landscaping includes coconut trees (*Cocos nucifera*), *kiawe* (*Prosopis pallid*), *naupaka* (*Scaevola sericea*), mimosa trees (Albizia julibrissin), and various exotic shrubs.

Section 2 Methods

2.1 Field Methods

CSH completed the fieldwork component of this AIS under archaeological fieldwork permit number 19-07, issued by the State Historic Preservation Division (SHPD) pursuant to HAR §13-282. Fieldwork was accomplished between 21 October and 12 November 2019 by Scott Belluomini, B.A., Jessica Burden, B.A., Brittany Enanoria, B.A., Thomas Martel III, B.A., and Alison Welser, M.A., under the direction of Project Manager David Shideler, M.A., and the general supervision of Principal Investigator Hallett H. Hammatt, Ph.D. This work required approximately 30 person-days to complete.

In general, fieldwork included 100% pedestrian inspection of the project area, GPS data collection, and subsurface testing.

2.1.1 Pedestrian Survey

Archaeologists undertook a 100%-coverage pedestrian inspection of the project area for the purpose of historic property identification and documentation. The pedestrian survey was accomplished through systematic sweeps spaced 10 m apart (Figure 5). The inventory, documentation, and significance evaluation of potential architectural historic properties are not part of the scope of this AIS. Archaeologists documented the general characteristics of the project area and took general photographs of the project area. The eastern portion of the project area consists of a large paved parking lot area. The remainder of the Paradise Cove area consists of large flat grassy areas, portable and intact buildings, and modern *lūʻau* huts.

2.1.2 GPS Data Collection

Archaeologists recorded the locations of each of the exterior test excavations using a Trimble Pro XH mapping grade GPS unit with real-time differential correction. This unit provides sub-meter horizontal accuracy in the field. GPS field data was post-processed, yielding horizontal accuracy between 0.5 and 0.3 m. GPS location information was converted into GIS shape files using Trimble's Pathfinder Office software, version 2.80, and graphically displayed using ESRI's ArcGIS 10.3. CSH utilizes the NAD 83 HARN datum and UTM Zone 4N coordinate system.

2.1.3 Subsurface Testing

The subsurface testing program was backhoe-assisted and involved 16 test excavations in which two were entirely hand excavated. The testing strategy was based on consultation with the SHPD and cultural descendant Nettie Fernandez Tiffany. In general, linear trenches measuring approximately 6 m (20 feet [ft]) long and 0.6 m (2 ft) wide were excavated within the project area.

The subsurface testing plan originally consisted of 19 subsurface test excavations (T-1 through T-19). The subsurface testing plan was modified per the request of SHPD in a meeting held on 24 May 2018 to exclude three proposed test excavations (T-1 through T-16). Previous archaeological studies show extensive investigation within the existing parking lot areas in the western portion of the project area consisting entirely of fill material. Due to previously conducted testing and no archaeological findings, one test excavation was placed in the parking lot area in the northwestern portion of the project area (T-3).

Figure 5. 2013 Google Earth Aerial Imagery depicting the project area in red and archaeological pedestrian survey track log in yellow

Six previous test excavations were conducted near the shoreline and yielded three previously identified historic properties including salt pans (no SIHP assigned), coastal marshlands (SIHP # 50-80-12-3362), and human burials (SIHP # -4968). Current AIS test excavations were placed targeting those areas and within areas not previously investigated. The remainder of the test excavations were placed for representative distribution. Some trenches were reoriented based on known subsurface utilities via the maintenance crew and concerns from Ms. Tiffany. The eastern portion of the project area included specific instruction from Ms. Tiffany regarding proximity to known human burials in the near vicinity. Two AIS test excavations in this area (T-10 and T-12) were entirely hand excavated to a maximum depth of 3 ftbs or sterile material to avoid possible known voids in the coral shelf and sterile Jaucas sand.

Two test excavations (T-11 and T-14) were abandoned due to the presence of an active sewer drain line and a fire sprinkler line that both broke during excavation activities.

A stratigraphic profile of each test excavation was drawn and photographed. The observed sediments were described using standard USDA soil description observations/terminology. Sediment descriptions included Munsell color, texture, consistence, structure, plasticity, cementation, origin of sediments, descriptions of any inclusions such as cultural material and/or roots, lower boundary distinctiveness and topography, and other general observations. Where stratigraphic anomalies or potential cultural deposits were exposed, these were carefully represented on test excavation profile maps.

Archaeologists photographed the general study area and in-progress work, recording on-the-job procedures, personnel, work conditions, and the area's natural and/or built environment. Additionally, they photographed all subsurface features, cultural deposits, and profiles. They included a photographic scale and north arrow, as appropriate, in each photograph.

When archaeologists encountered potential historic properties, they documented them as discussed above in addition to illustrating a plan map, if possible. Additional documentation of the potential historic properties included, if possible, size, horizontal extent, descriptions of features, presence and/or absence of surface and subsurface remains, and information that can contribute to the assessments of integrity, function, age, and significance in accordance with HAR §13-276-5.

CSH osteologist Alison Welser, M.A., examined and identified all faunal remains in the field; faunal remains were collected for further laboratory analysis and curation. When historic artifacts were present within historic fill deposits, CSH archaeologists collected a representative artifact assemblage for laboratory analysis and curation. The representative artifact assemblage was selected to include examples of types of artifacts present and select artifacts with diagnostic features. CSH archaeologists recorded provenience for each artifact collected. CSH personnel cleaned, identified, and tabulated these historic artifacts from fill deposits, providing a sufficient characterization of the types and ages of historic artifacts within these fill deposits.

2.2 Laboratory Methods

Materials collected during AIS fieldwork were identified and catalogued at CSH's laboratory facilities on Oʻahu. Analysis of collected materials was undertaken using standard archaeological laboratory techniques. Materials were washed, sorted, measured, weighed, described, and/or photographed.

2.2.1 Artifact Analysis

In general, artifact analysis focused on establishing, to the greatest extent possible, material type, function, cultural affiliation, and age of manufacture. As applicable, artifacts were washed, sorted, measured, weighed, described, photographed, and catalogued. Diagnostic (dateable or identifiable) attributes of artifacts were researched. Historic artifacts were identified using standard reference materials (e.g., Elliott and Gould 1988; Fike 1987; Godden 1964; Kovel and Kovel 1986; Lehner 1988; Lindsey 2014; Millar 1988; Munsey 1970; Toulouse 1971; Whitten 2009; and Zumwalt 1980), as well as resources available on the internet.

Analyzed materials were tabulated and are presented in Section 5.1 Artifact Analysis.

2.2.2 Faunal Analysis

Faunal analysis focused on species identification and evidence of food consumption. For collected invertebrate remains, shell midden was first separated from non-midden shell. Non-midden shell was then weighed as a bulk total with no additional analysis warranted. Shell midden was identified to the lowest possible taxa, weighed, and analyzed. Common shells were identified and analyzed using an in-house comparative collection and reference texts (e.g., Abbott and Dance 1990; Eisenberg 1981; Kay 1979; Titcomb 1979). Carl Christensen, Ph.D. was consulted for identification of rare and/or extinct invertebrates. Collected non-human vertebrate skeletal material was identified to the lowest possible taxa and analyzed using an in-house comparative collection and reference texts (e.g., Adams and Crabtree 2012; Olsen 1964; Schmid 1972; Sisson 1953). A catalogue of all collected material was prepared and is presented in Section 5.2: Faunal Analysis.

2.2.3 Disposition of Materials

Materials collected during the current AIS (excluding human remains and grave goods) will remain temporarily curated at the CSH office in Waimānalo, O‘ahu. CSH will make arrangements with the landowner regarding the disposition of this material. Should the landowner request different archiving of material, an archive location will be determined in consultation with the SHPD. All data generated during the AIS are stored at the CSH offices.

2.2.4 Research Methods

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai‘i, the Hawai‘i State Archives, the Mission Houses Museum Library, the Hawai‘i Public Library, and the Bishop Museum Archives; study of historic photographs at the Hawai‘i State Archives and the Bishop Museum Archives; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona ‘Aina database (Waihona ‘Aina 2020).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Section 3 Background Research

3.1 Traditional and Historical Background

3.1.1 Historical Setting

The project area is on the southwestern margin of the traditional Hawaiian land unit (*ahupuaʻa*) of Honouliuli. Honouliuli Ahupuaʻa, had tremendous and varied resources available for exploitation by early Hawaiians (Figure 6). The "karstic desert" and marginal utility of the limestone plain, which is the most readily visible terrain, does not characterize the *ahupuaʻa* as a whole. The richness of this land unit is marked by the following available resources:

1. Twelves miles of coastline with continuous shallow fringing reef, which offered rich marine resources
2. Four miles fronting the waters of West Loch that offered extensive fisheries (mullet, *awa* [milkfish], shellfish) as well as frontage suitable for development of fishponds (for example, Laulaunui)
3. The lower portion of Honouliuli Valley in the ʻEwa plain offered rich, level, alluvial soils with plentiful water for irrigation from the stream as well as abundant springs. This irrigable land would have stretched well up the valley.
4. A broad limestone plain which, because of innumerable limestone sinkholes, offered a nesting home for a large population of avifauna; this resource may have been one of the early attractions for human settlement.
5. An extensive upland forest zone extending as much as 12 miles inland from the edge of the coastal plain. As Handy and Handy (1972:469) have pointed out, the forest was much more distant from the lowlands here than on the windward coast, but it was much more extensive. Much of the upper reaches of the *ahupuaʻa* would have had species-diverse forest with *kukui* (*Aleurites moluccana*), *ʻōhia* (*Metrosideros* sp.), *ʻiliahi* (sandalwood), *hau* (*Hibiscus tiliaceus*), *kī* (ti leaf), banana, etc.

The political and cultural center of the *ahupuaʻa* is understood to have been the relatively dense settlement and rich lands for irrigated taro cultivation at the *ʻili* (land division smaller than an *ahupuaʻa*) of Honouliuli, where Honouliuli Stream empties into the north portion of the West Loch of Pearl Harbor (popularly known as the "Honouliuli Taro Lands"). The name of the *ahupuaʻa*, translated as "dark bay" (Pukui et al. 1974:51), may refer to the nature of the waters of West Loch at the mouth of Honouliuli Stream. Early accounts and maps indicate a large settlement at the *ʻili* of Honouliuli, and it may well be that the political power of this village was so great it was able to extend its jurisdiction well to the northwest into an area that might have been anticipated to fall under the dominion of the Waiʻanae ruling chiefs of Oʻahu's leeward coast.

The main route connecting the Honouliuli taro lands and southeast Oʻahu to the Waiʻanae Coast passed north/northeast of the project area (Figure 6 through Figure 8), but there would also have been a trail along the coast. Our earliest detailed map of the vicinity, the Malden map of 1825 (see Figure 8) indicates the nearest community just northeast of the project area along the coast.

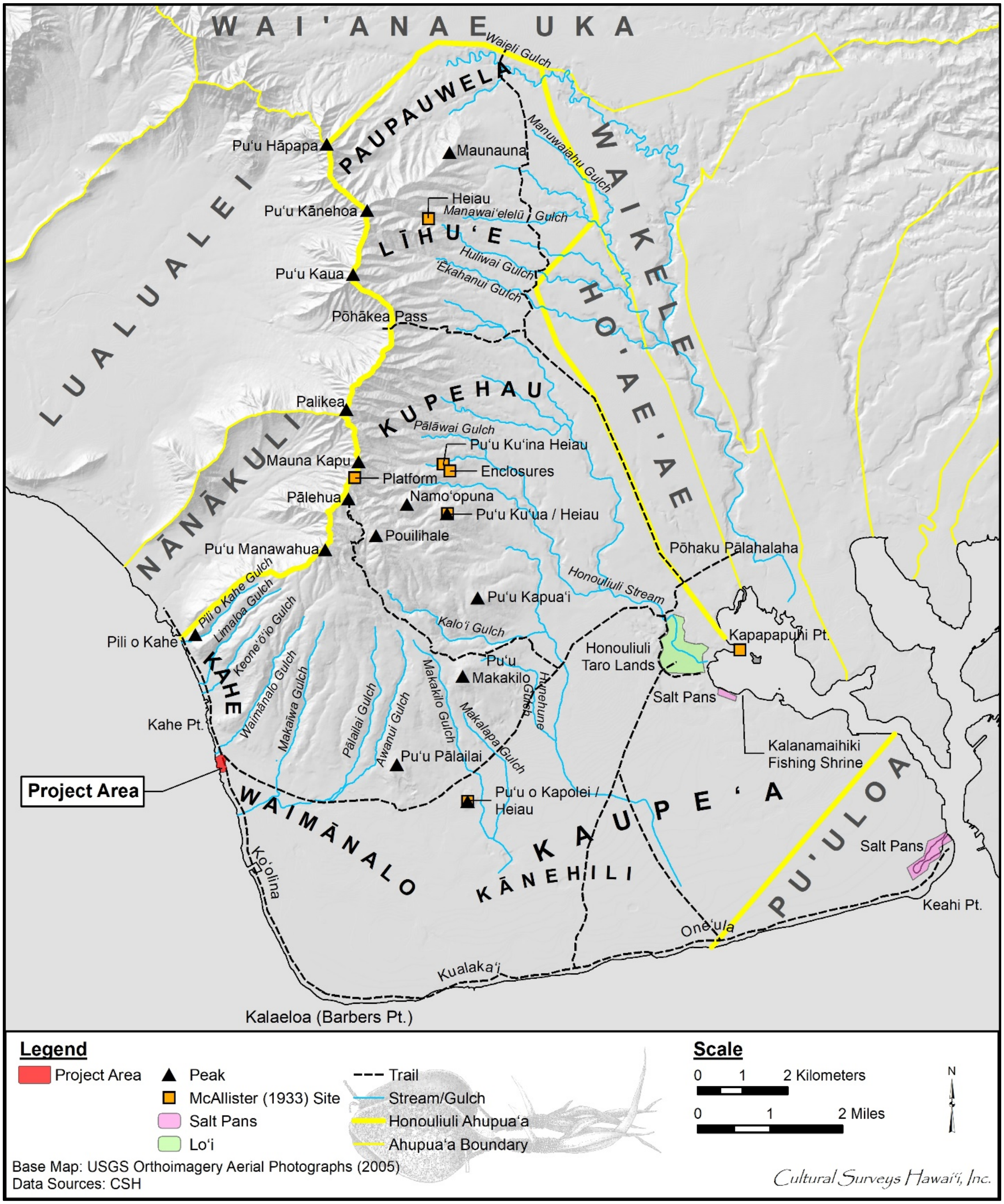


Figure 6. 2005 USGS Orthoimagery Aerial Photograph with overlay of the location of the Paradise Cove Redevelopment project area, and the cultural landscape of Honouliuli Ahupuaʻa in southwest Oʻahu

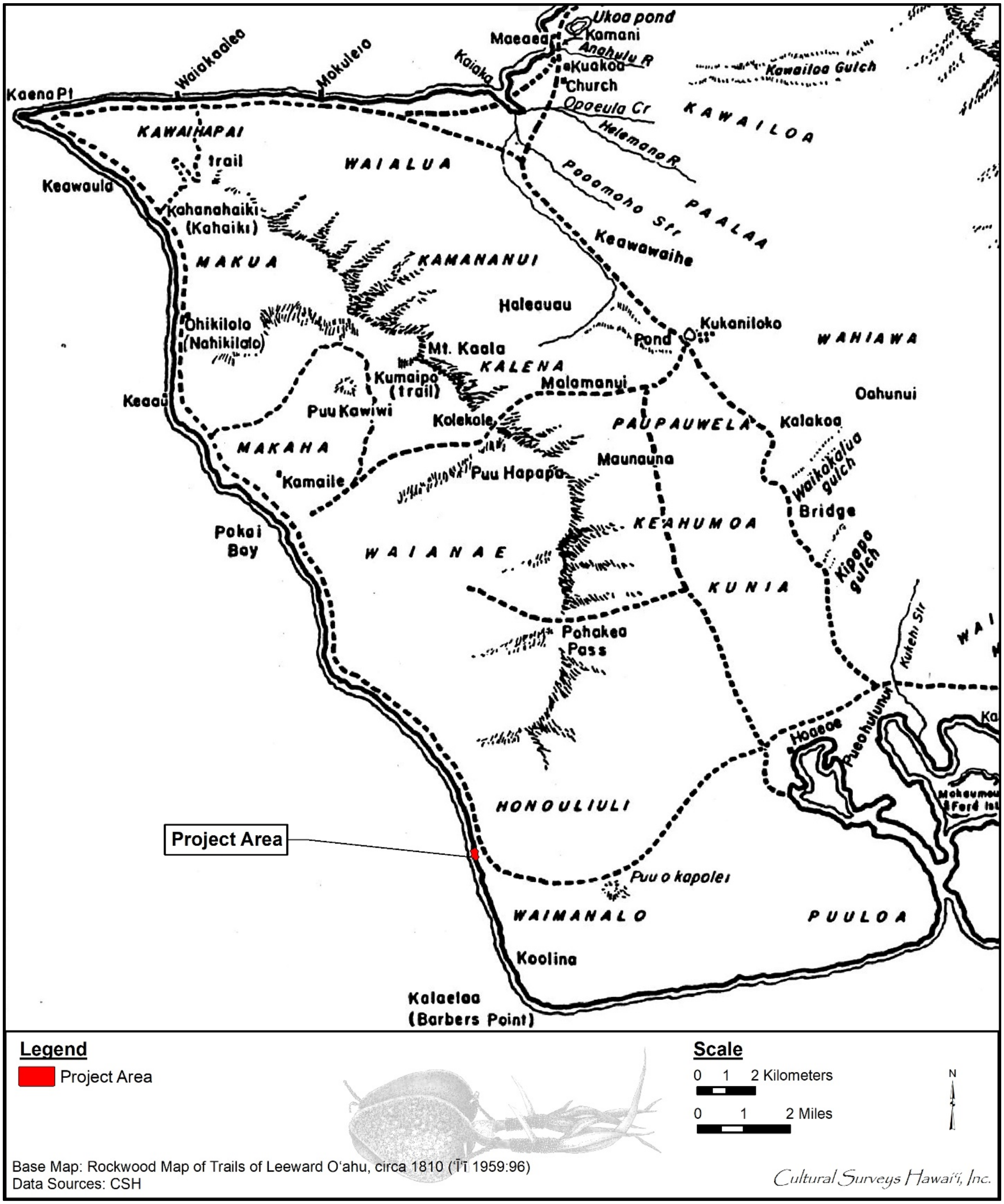


Figure 7. Portion of Rockwood map of trails of Leeward O‘ahu ca. 1810 (from ‘Ī‘ī 1959:96) showing the location of the Paradise Cove Redevelopment project area

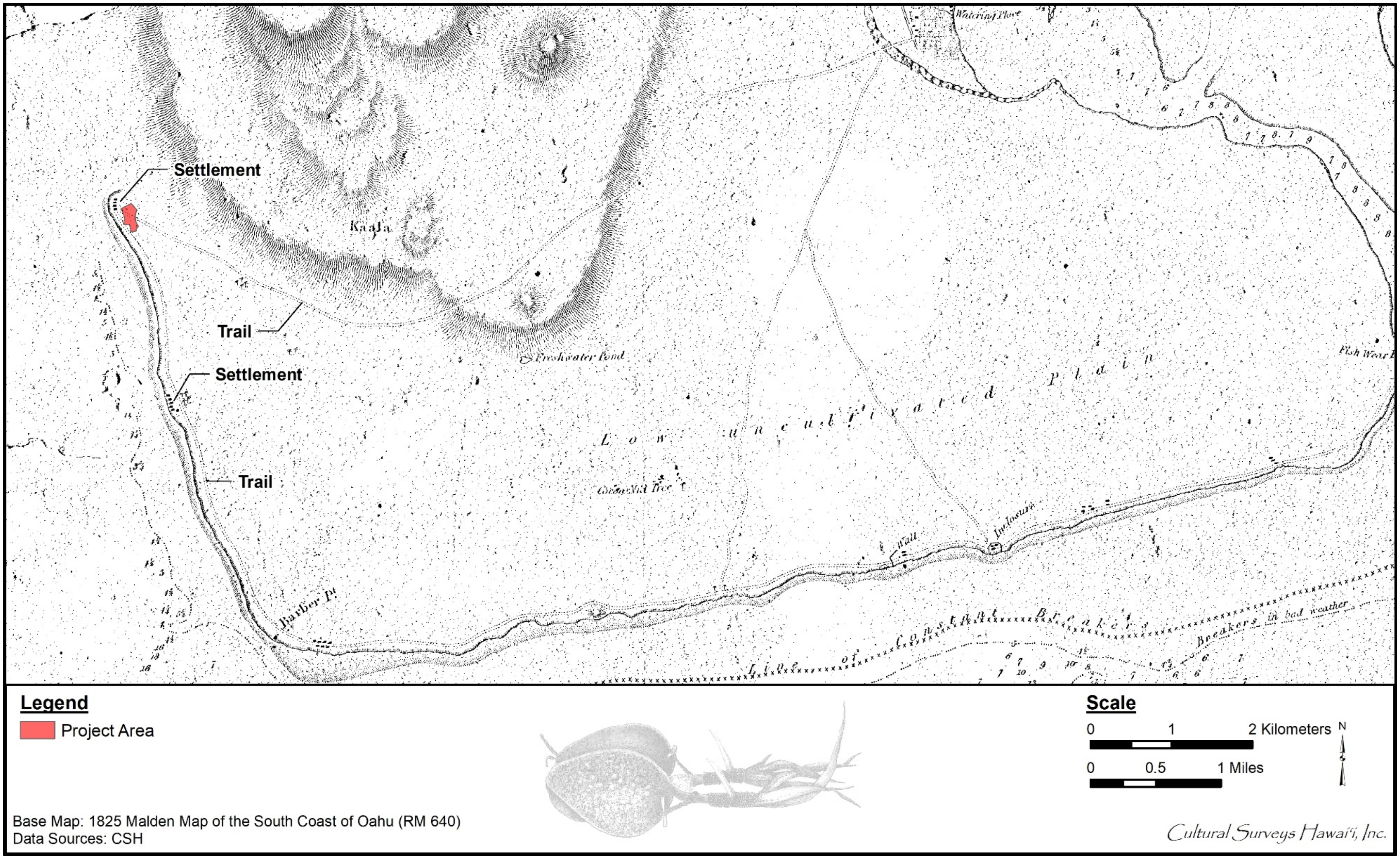


Figure 8. Portion of 1825 Malden map of the South Coast of Oahu (RM 640) showing the location of the Paradise Cove Redevelopment project area in relation to former trails and settlements

3.1.2 Mythological and Traditional Accounts

The traditions of Honouliuli Ahupuaʻa have been compiled and summarized in studies by Sterling and Summers (1978), Hammatt and Folk (1981), Kelly (1991), Charvet-Pond and Davis (1992), Maly (1992), and Tuggle and Tomonari-Tuggle (1997). Themes of these traditions include connections with Kahiki (the traditional homeland of Hawaiians, probably in reference to central Polynesia) and the special character and relationship of the places known as Puʻuokapolei and Kualakaʻi.

Connections with Kahiki are found in numerous place names, traditional events, and with the beings associated with Honouliuli. There are several versions of Kahaʻi leaving from Kalaeloa for a trip to Kahiki to bring breadfruit back to ʻEwa (e.g., Kamakau 1991:110). There are several stories that associate places in the region with Kamapuaʻa and the Hina family, as well as with Pele's sisters, all of whom have strong connections with Kahiki (cf. Kamakau 1991:111; Pukui et al. 1974:200).

Puʻuokapolei was one of the most sacred places in Honouliuli (cf. Sterling and Summers 1978:33). Puʻuokapolei's connections with Kahiki are emphasized when it is noted that the hill was the home of Kamapuaʻa's grandmother, Kamaunuaniho, the Kahiki ancestor to the people of Oʻahu (Fornander 1919:5:318; Kahiolo 1978:81, 107). By name, Kapolei is associated with the goddess Kapo, another connection with the Pele and Kamapuaʻa stories (Kamakau 1976:14).

McAllister (1933:108) records that a *heiau*, or temple, was on Puʻuokapolei but was destroyed before his survey of 1930. The *heiau* may have been associated with the sun (Fornander 1919:3:292). The hill was used as a point of solar reference or as a place where such observations were made. Puʻuokapolei may have been the gate of the setting sun. There is little specific information for Puʻuokapolei, but the place name itself ("hill of beloved Kapo") is hard to ignore. It is mentioned in some cosmologies that Kū was the god of the rising sun, and Hina should be associated with the setting sun (Hina is the mother of Kamapuaʻa). Fornander (1919:3:292) states that Puʻuokapolei may have been a jumping off place (also connected with the setting sun) and associated with the dead who roamed the adjacent Plain of Kaupeʻa.

Puʻuokapolei was also the primary landmark for travelers between Pearl Harbor and the west Oʻahu coast, with a main trail running just inland of it (ʻĪʻī 1959:27, 29). Puʻuokapolei was probably the most common name used as a reference for the area of the ʻEwa Plain in traditional Hawaiʻi (cf. Nakuina 1992:54; Fornander 1916-1920:2:318; E.M. Nakuina 1904 in Sterling and Summers 1978:34).

3.1.3 Early Historic Period

Various Hawaiian legends and early historical accounts indicate the *ahupuaʻa* of Honouliuli was once widely inhabited by pre-Contact Hawaiian populations, including the Hawaiian *aliʻi* (chiefly class). This substantial settlement is attributable for the most part to the plentiful marine and estuarine resources available at the coast, as well as lowlands fronting the West Loch of Pearl Harbor (Kaihuopalaʻai) suitable for wetland taro cultivation. In addition, forest resources along the slopes of the Waiʻanae Range, as suggested by E.S. and E.G. Handy, probably acted as a viable subsistence alternative during times of famine and/or low rainfall:

> The length or depth of the valleys and the gradual slope of the ridges made the inhabited lowlands much more distant from the *ʻwao*, or upland jungle, than was

> the case on the windward coast. Yet the *ʻwao* here was more extensive, giving greater opportunity to forage for wild foods during famine time. [Handy and Handy 1972:469–470]

John Papa ʻĪʻī describes a network of leeward Oʻahu trails that in later historic times encircled and crossed the Waiʻanae Range, allowing passage from West Loch to the Honouliuli lowlands, past Puʻu Kapolei and Waimānalo Gulch to the Waiʻanae coast and onward, along the shoreline of Oʻahu (ʻĪʻī 1959:96–98). Following ʻĪʻī's description, a portion of this trail network would have passed close to the present Farrington Highway alignment, north of the project area.

The Hawaiian *aliʻi* were also attracted to this region. One historical account of particular interest refers to an *aliʻi* residing in Ko Olina—the name associated with the immediate vicinity of the project area:

> Koolina is in Waimanalo near the boundary of Ewa and Waianae. This was a vacationing place for chief Kakuhihewa and the priest Napuaikamao was the caretaker of the place. Remember Reader, this Koolina is not situated in the Waimanalo on the Koolau side of the island but the Waimanalo in Ewa. It is a lovely and delightful place and the chief, Kakuhihewa loved this home of his. [*Ke Au Hou* 13 July 1910 in Sterling and Summers 1978:41]

Other early historical accounts of the general region typically refer to the more populated eastern portion of ʻEwa District, where missions and schools were established, and subsistence resources were perceived to be greater. However, the presence of historic properties along the barren coral plains and coast of southwest Honouliuli Ahupuaʻa indicate pre-Contact and early post-Contact populations also adapted to less inviting areas, despite the environmental hardships.

Subsequent to Western Contact in the area, the landscape of the ʻEwa plains and Waiʻanae slopes was adversely affected by the over-harvesting of the sandalwood forest, and particularly by the introduction of domesticated animals and exotic plant species. Domesticated animals including goats, sheep, and cattle were brought to the Hawaiian Islands by Captain George Vancouver in the early 1790s and were allowed to graze freely about the land for some time after. It is unclear when the domesticated animals were brought to Oʻahu; however, L.A. Henke reports the existence of a longhorn cattle ranch in Waiʻanae by at least 1840 (Frierson 1972:10). At the same time, perhaps as early as 1790, exotic vegetation species were introduced to the area. These typically included vegetation best suited to a terrain disturbed by the logging of sandalwood forest and eroded by animal grazing. Within the project area, the majority of the vegetation is composed of introduced species, mainly grasses.

At Contact, the most populous *ahupuaʻa* on the island was Honouliuli, with the majority of the population centered around Pearl Harbor. In 1832, a missionary census of Honouliuli recorded the population as 1,026. Within four years the population was down to 870 (Schmitt 1973:19, 22). In 1835, there were eight to ten deaths for every birth (Kelly 1991:157–158). Between 1848 and 1853, there was a series of epidemics of measles, influenza, and whooping cough that often wiped out whole villages. In 1853, the population of ʻEwa and Waiʻanae combined was 2,451 people. In 1872, it was 1,671 (Schmitt 1968:71). The inland area of ʻEwa was probably abandoned by the mid-nineteenth century due to population decline and consolidation of the remaining people in the town of Honouliuli.

3.1.4 Mid- to Late 1800s

The Organic Acts of 1845 and 1846 initiated the process of the Māhele—the division of Hawaiian lands—which introduced private property into Hawaiian society. In 1848, the crown and the *aliʻi* received their land titles. The common people received their *kuleana* (individual parcels) in 1850. During the Māhele of 1848, 72 individual land claims in the *ahupuaʻa* of Honouliuli were registered and awarded by King Kamehameha III to commoners (Tuggle and Tomonari-Tuggle 1997:34). The 72 *kuleana* awards were almost all made adjacent to Honouliuli Gulch, which contained fishponds and irrigated taro fields. No commoner awards were within or in the immediate vicinity of the project area, which appears to have been included in the largest *aliʻi* award (Royal Patent 6071, LCA 11216, *ʻĀpana* [lot] 8) granted in Honouliuli Ahupuaʻa to Miriam Keʻahi-Kuni Kekauʻōnohi on January 1848 (Native Register). Kekauʻōnohi acquired a deed to all unclaimed land within the *ahupuaʻa*, totaling 43,250 acres.

Kekauʻōnohi was one of Liholiho's (Kamehameha II's) wives, and after his death she lived with her half-brother, Luanuʻu Kahalaiʻa, who was governor of Kauaʻi (Kelly 1983:21). Subsequently, Kekauʻōnohi ran away with Queen Kaʻahumanu's stepson, Keliʻiahonui and became the wife of Chief Levi Haʻalelea. Upon her death on 2 June 1851, her property passed to her husband and his heirs. In 1863, the owners of the *kuleana* lands deeded their lands back to Haʻalelea to pay off debts owed to him (Frierson 1972:12). In 1864, Haʻalelea died, and his second wife, Anadelia Amoe, transferred ownership of the land to her sister's husband, John Coney (Yoklavich et al. 1995:16).

In 1871, John Coney rented the land to James Dowsett and John Meek, who used the land for cattle grazing. In 1877, James Campbell purchased most of Honouliuli Ahupuaʻa—including the project area—for a total of $95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek, and James Robinson and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). He let the land rest for one year and then began to restock the ranch, so that he had 5,500 head after a few years (Dillingham 1885 in Frierson 1972:14).

An 1873 map depicts sparse housing in the vicinity of the project area with surroundings undeveloped and likely utilized for cattle grazing (Figure 9). An oblong-shaped area in the southern portion of the project area extends south into the Lanikūhonua area and northwest into the Pacific Ocean. The area appears to be an area containing a water feature that drains out into the sea.

In 1881, a medical student touring the island to provide smallpox vaccinations to the population viewed Campbell's property, called the Honouliuli Ranch:

> 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 manieizie 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

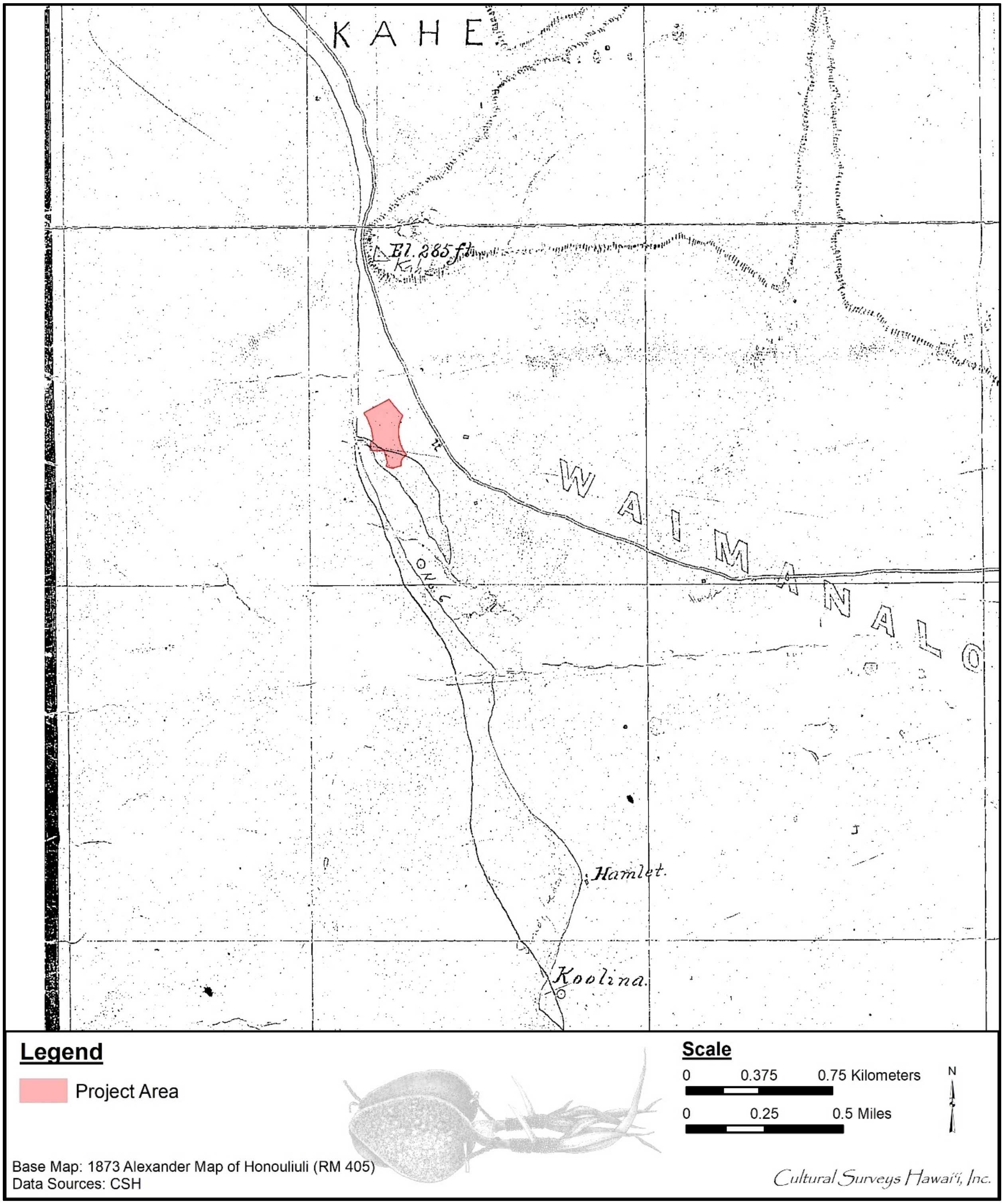


Figure 9. Portion of 1873 Alexander map of Honouliuli (RM 405) showing the southern portion of the project area within a former water feature surrounded by undeveloped lands

> 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 because they kill the growth of mimosa bushes, which would otherwise overrun the country and destroy the pasturage for cattle. [Briggs 1926:62–63]

Most of Campbell's lands in Honouliuli were used exclusively for cattle ranching. At that time, one planter remarked that "the country was so dry and full of bottomless cracks and fissures that water would all be lost and irrigation impracticable" (Ewa Plantation Company 1923:6–7). In 1879, Campbell brought in a well-driller from California to search the ʻEwa plains for water. The exploratory well, drilled to a depth of 240 ft near Campbell's home in ʻEwa, resulted in "a sheet of pure water flowing like a dome of glass from all sides of the well casing" ("The Legacy of James Campbell" n.d. in Pagliaro 1987:3). Following this discovery, plantation developers and ranchers drilled numerous wells in search of the valuable resource. A Hawaii Government map from 1881 shows a stone quarry to the southeast of the project area (Figure 10).

In 1886, Campbell and B.F. Dillingham put together the "Great Land Colonization Scheme," which was an attempt to sell Honouliuli land to homesteaders (Thrum 1886:74). This homestead idea failed, but with the water problem solved by the drilling of artesian wells, Dillingham decided the area could be used instead for large-scale cultivation (Pagliaro 1987:4). In 1889, Campbell leased his property to Benjamin Dillingham, who subsequently formed the Oahu Railway and Land Company (OR&L) as the result of a franchise granted by King Kalākaua in 1886. In 1889, Dillingham opened the first 9 miles of narrow-gauge track on the King's birthday. To attract business to his new railroad system, Dillingham subleased all land below 200 ft elevation to William Castle, who in turn sublet the area to the Ewa Plantation Company for sugarcane cultivation. Dillingham's Honouliuli lands above 200 ft elevation, which were suitable for sugarcane cultivation, were sublet to the Oahu Sugar Company. Throughout this time, and into modern times, cattle ranching continued in the area and Honouliuli Ranch—established by Dillingham—was the "fattening" area for the other ranches (Frierson 1972:15).

3.1.5 1900s to Present

Historic maps and aerial photographs depict little change from the early 1900s to the development of the Ko Olina area for the resort area and harbor (Figure 11 through Figure 20). During the early 1900s, the Ewa Plantation Company grew quickly. When the rainy season began, they plowed ground perpendicular to the slope so that soil would be carried down the drainage ditches into the lower coral plain. After a few years, about 373 acres of coral wasteland were reclaimed in this manner (Immisch 1964). By the 1920s, the Ewa Plantation Company was generating large profits and was the "richest sugar plantation in the world" (*Paradise of the Pacific* December 1902:19–22). The 1919 U.S. Army War Department map (see Figure 12) shows plantation infrastructure including a railway, large wall, and unimproved road near the project area. A 1939 map of the Ewa Plantation indicates Field No. 1 is within the project area (see Figure 15).

By 1920, the lands of Honouliuli were used primarily for sugarcane cultivation and ranching (Frierson 1972:18). Much of the lands in western Honouliuli unsuitable for commercial sugar cultivation remained pasture land for grazing livestock. In the late 1920s, the main residential communities were at the northeast edge of the ʻEwa Plain. The largest community was still at Honouliuli village. ʻEwa was primarily a plantation town, focused around the sugar mill, with a

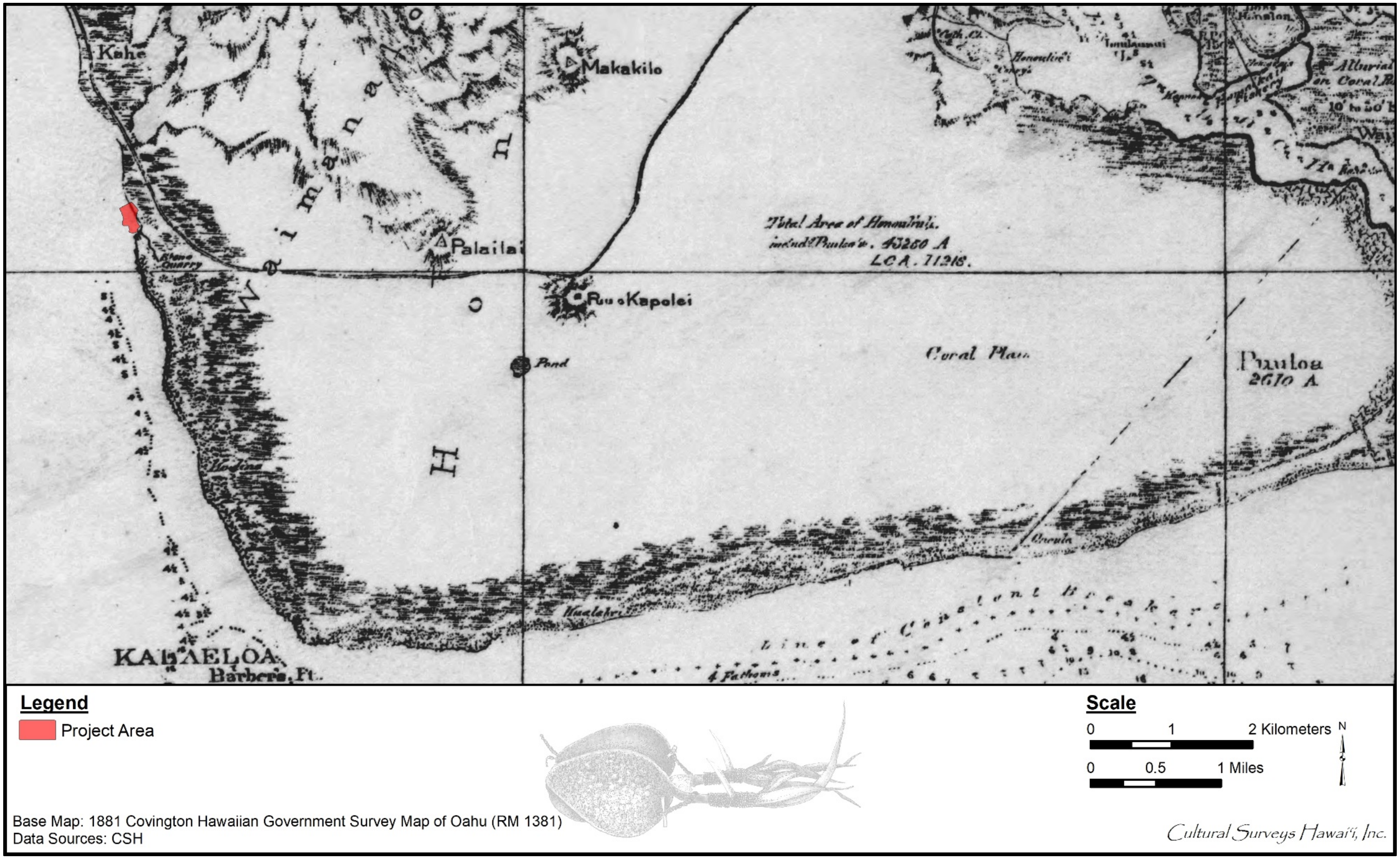


Figure 10. Portion of 1881 Covington Hawaiian Government Survey map of Oahu (RM 1381) showing the location of the Paradise Cove Redevelopment project area with a stone quarry to the southeast

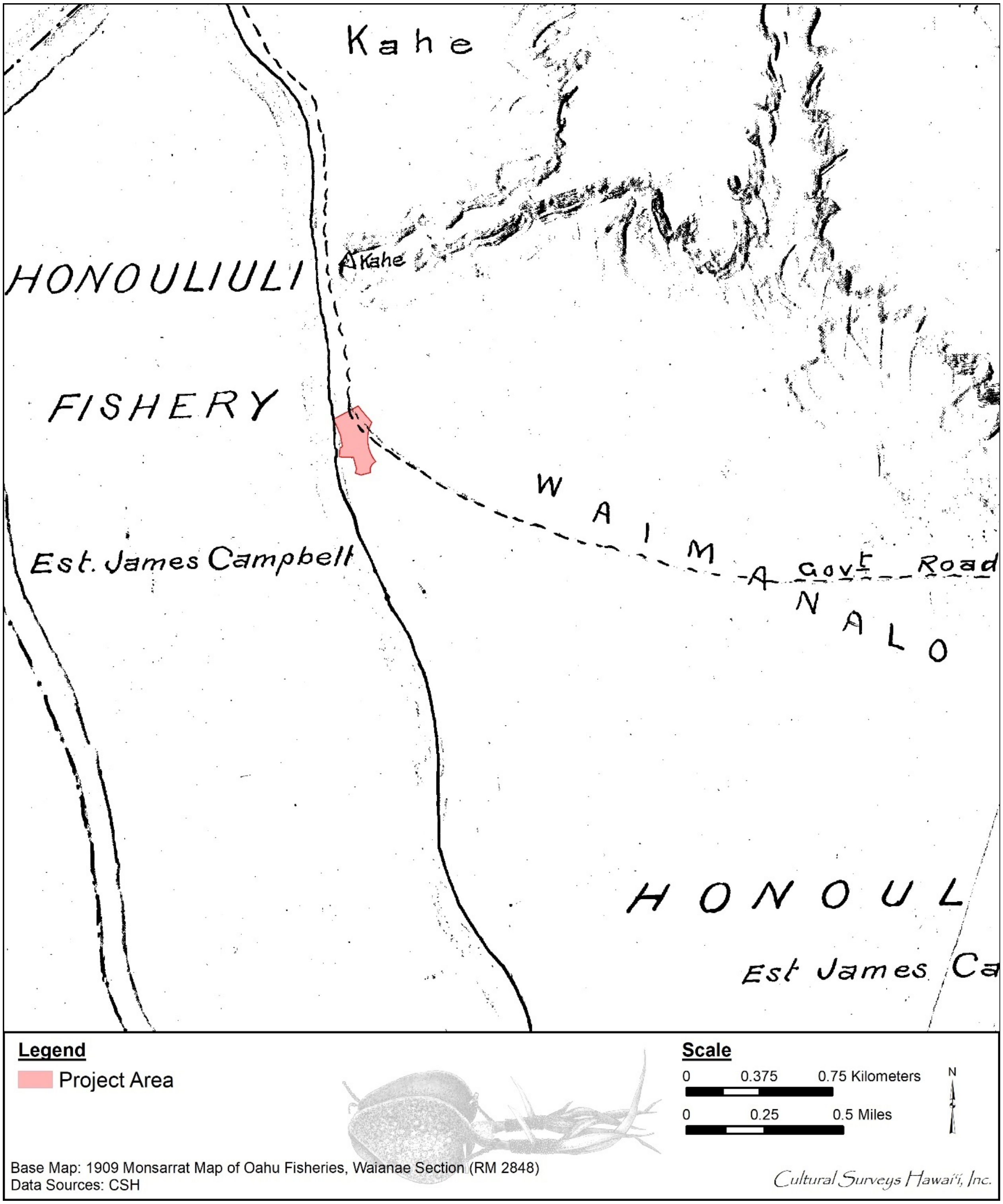


Figure 11. Portion of a 1909 Monsarrat map of Oahu Fisheries, Waianae Section (RM 2848) showing the location of the Paradise Cove Redevelopment project area

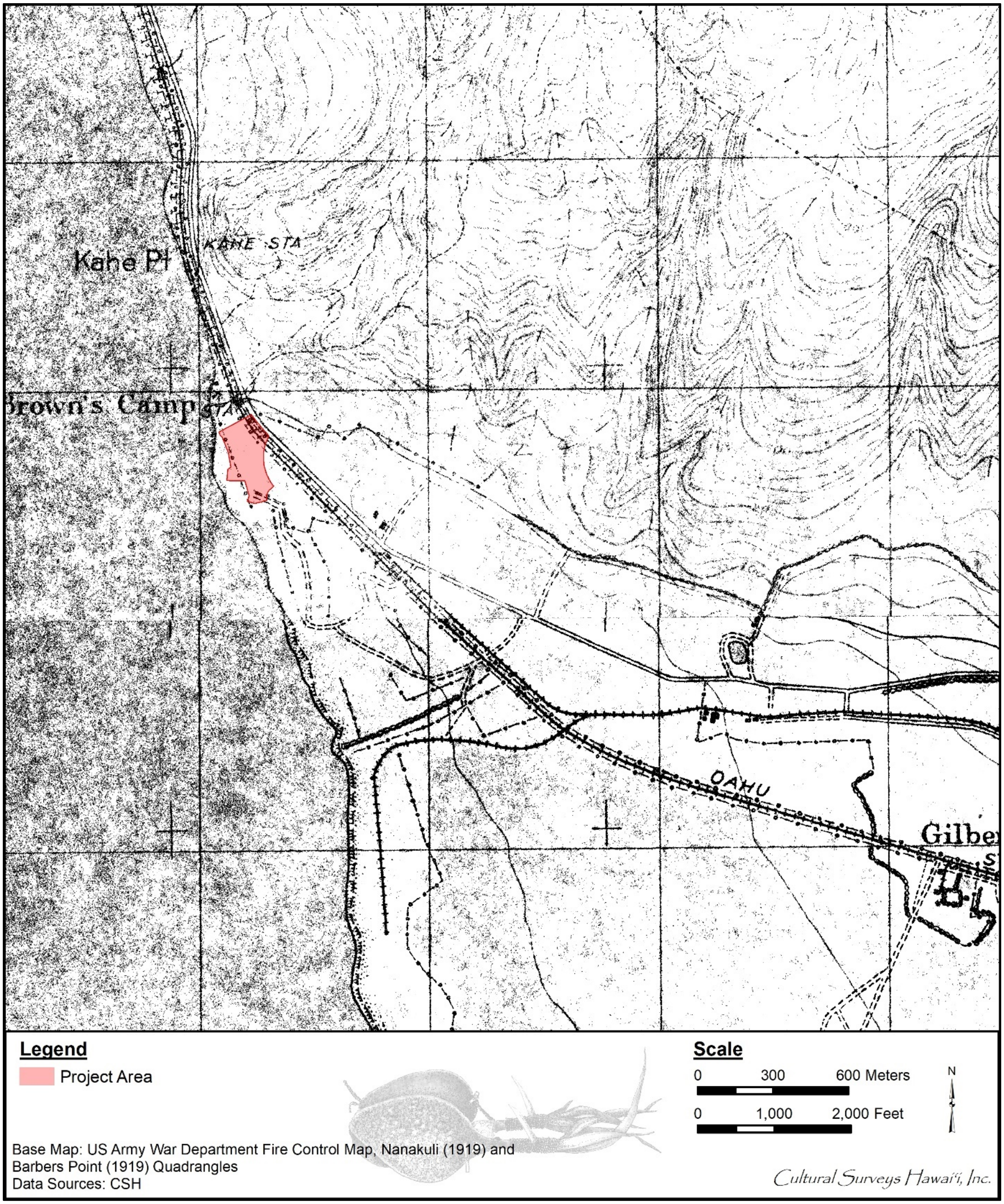


Figure 12. Portion of 1919 U.S. Army War Department fire control map, Nanakuli and Barbers Point quadrangles, showing the location of the Paradise Cove Redevelopment project area showing the OR&L Railroad to the northeast

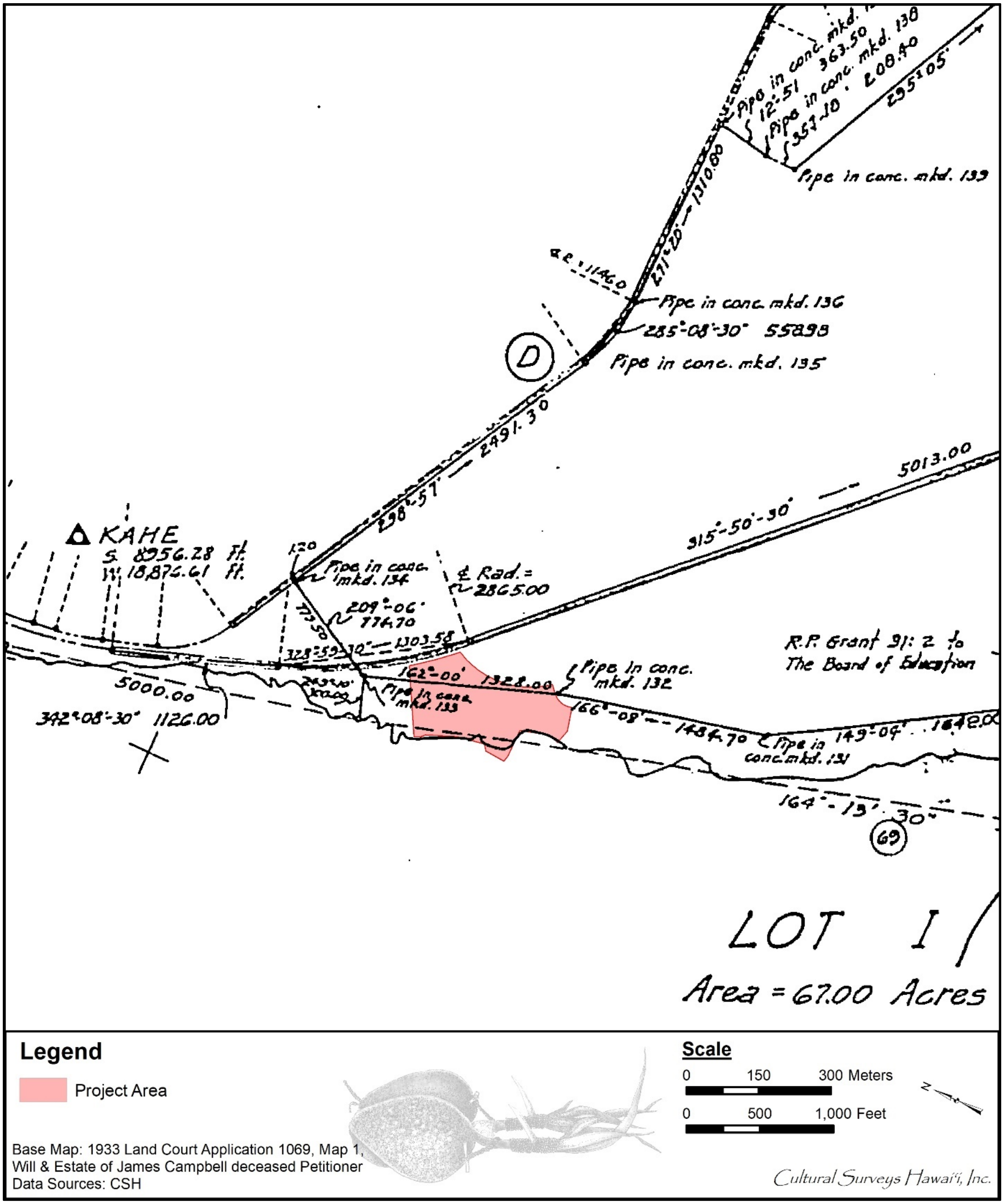


Figure 13. Portion of a 1933 Land Court Application 1069, Map 1, Will and Estate of James Campbell deceased Petitioner, showing the location of the Paradise Cove Redevelopment project area

Figure 14. Portion of the 1936 U.S. Army War Department terrain map, Waianae and Barbers Point quadrangles showing the location of the Paradise Cove Redevelopment project area (the white area east of the project area is likely sugarcane lands)

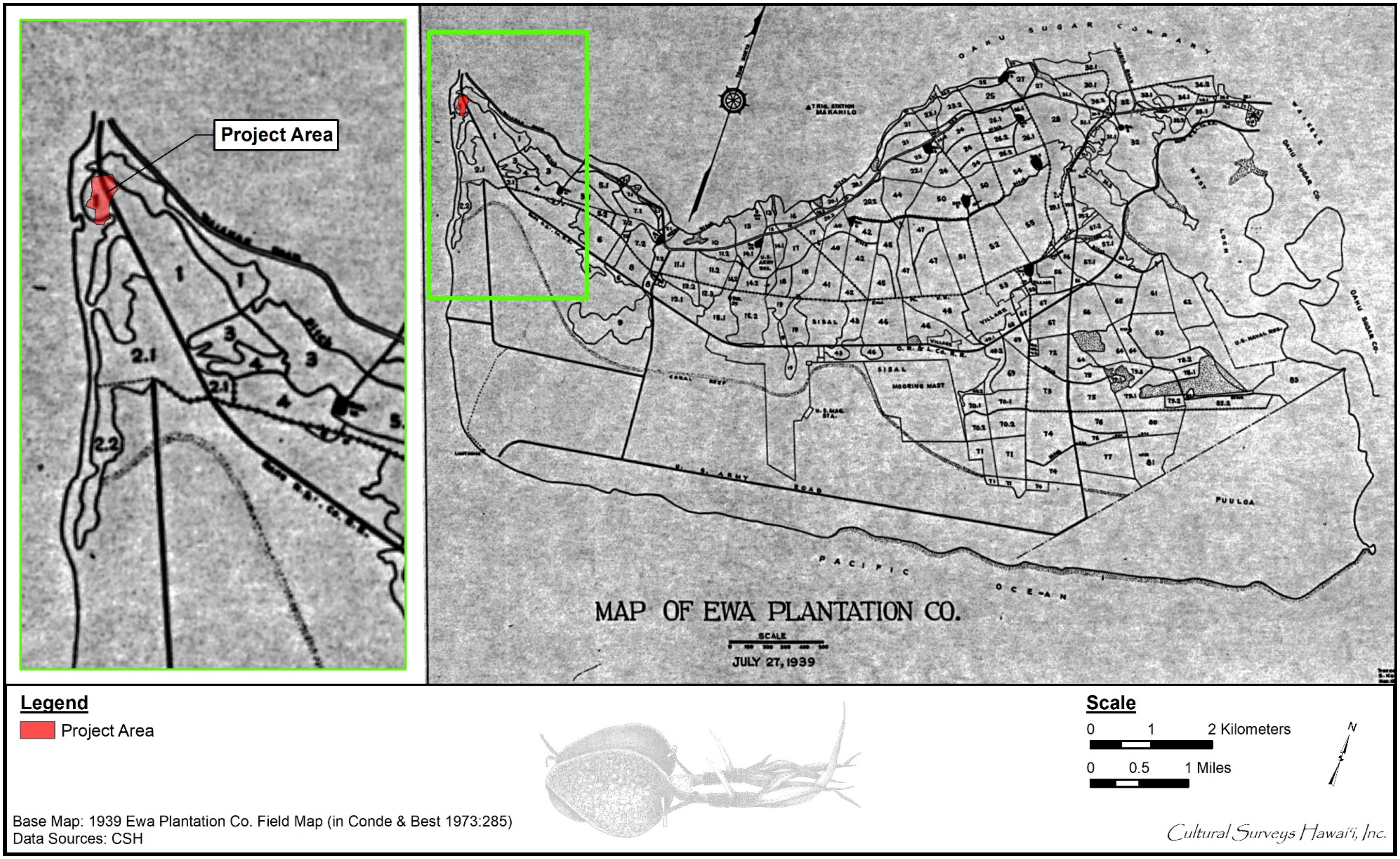


Figure 15. 1939 field map of Ewa Plantation Company, showing the location of the Paradise Cove Redevelopment project area as mostly within sugarcane cultivation Field 1 (Condé and Best 1973:285)

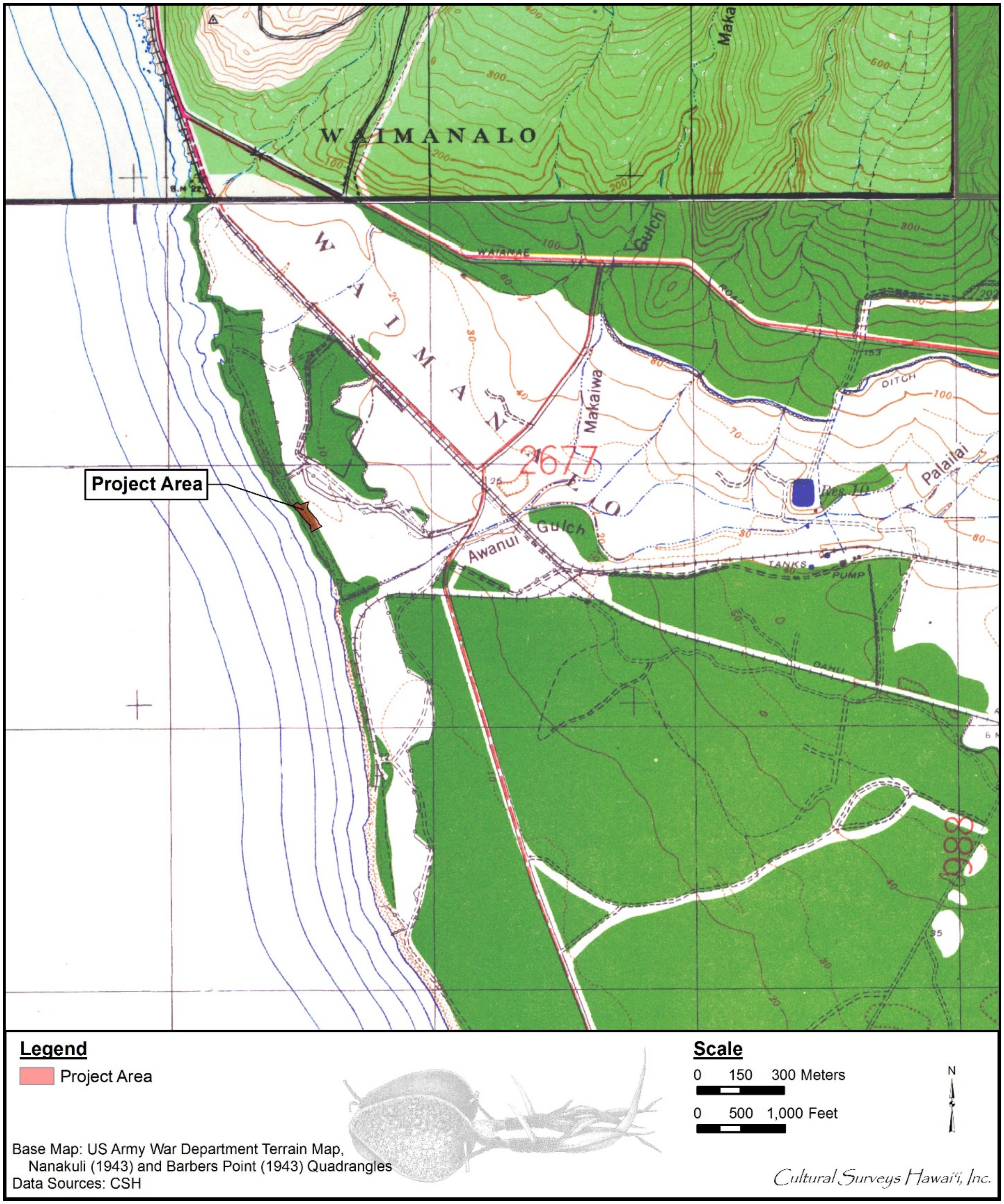


Figure 16. Portion of 1943 U.S. Army War Department terrain map, Nanakuli and Barbers Point quadrangles, showing the location of the project area (the white area east of the project area is likely sugarcane lands)

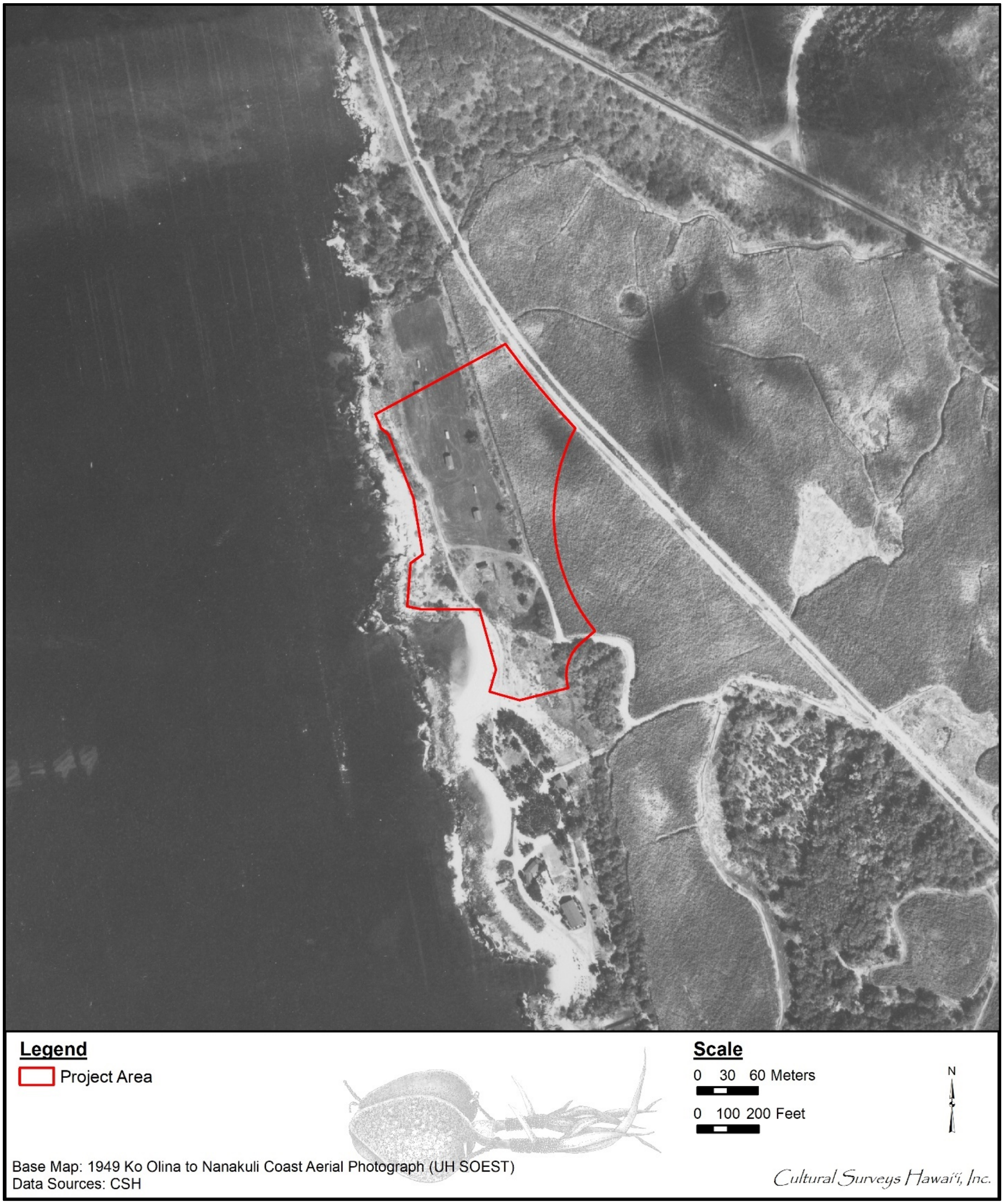


Figure 17. 1949 Ko Olina to Nanakuli Coast Aerial Photograph (UH SOEST), showing development of a few dwellings in the project area

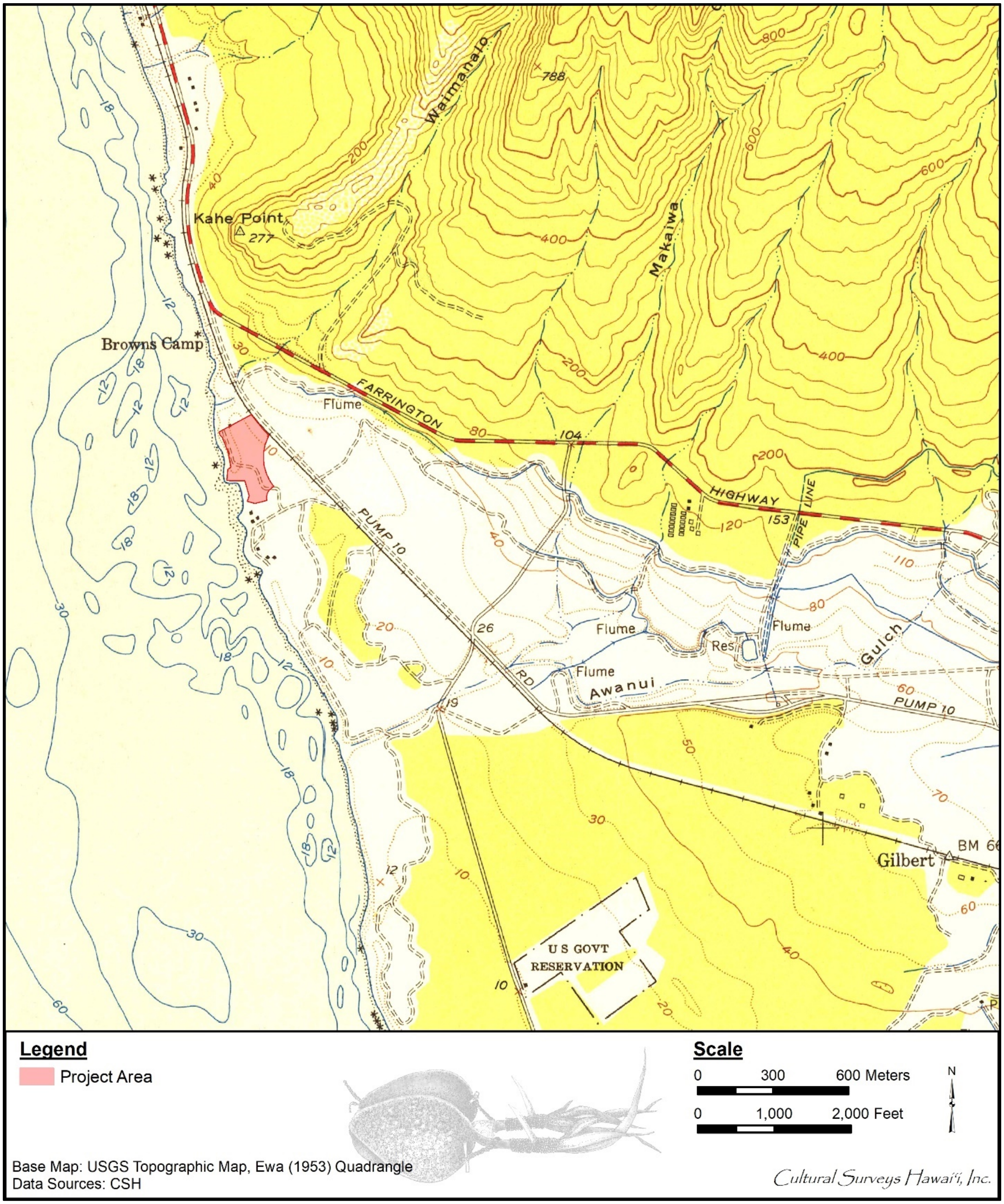


Figure 18. Portion of the 1953 Ewa USGS topographic quadrangle map showing the location of the Paradise Cove Redevelopment project area

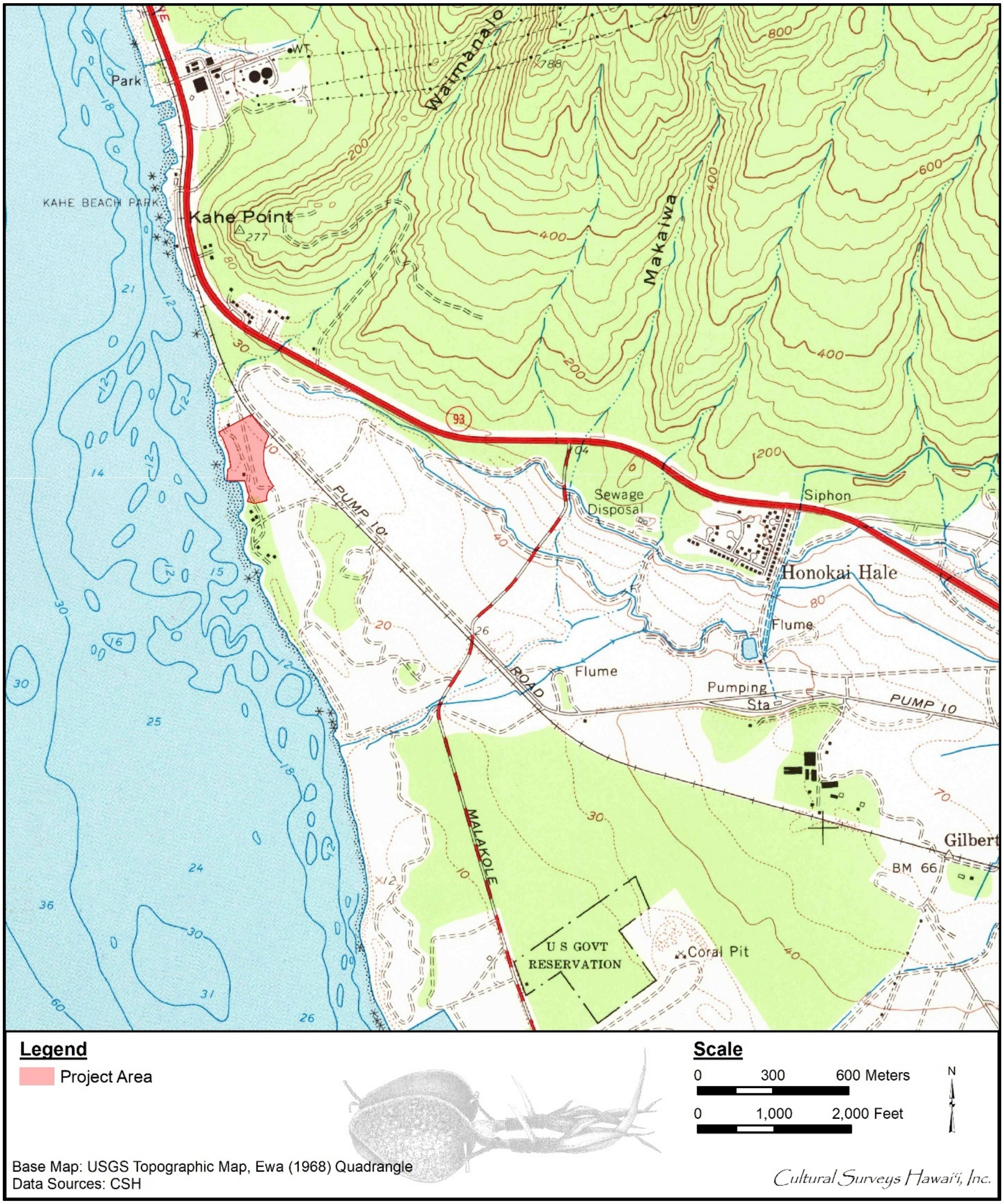


Figure 19. Portion of the 1968 Ewa USGS topographic quadrangle map showing the location of the Paradise Cove Redevelopment project area

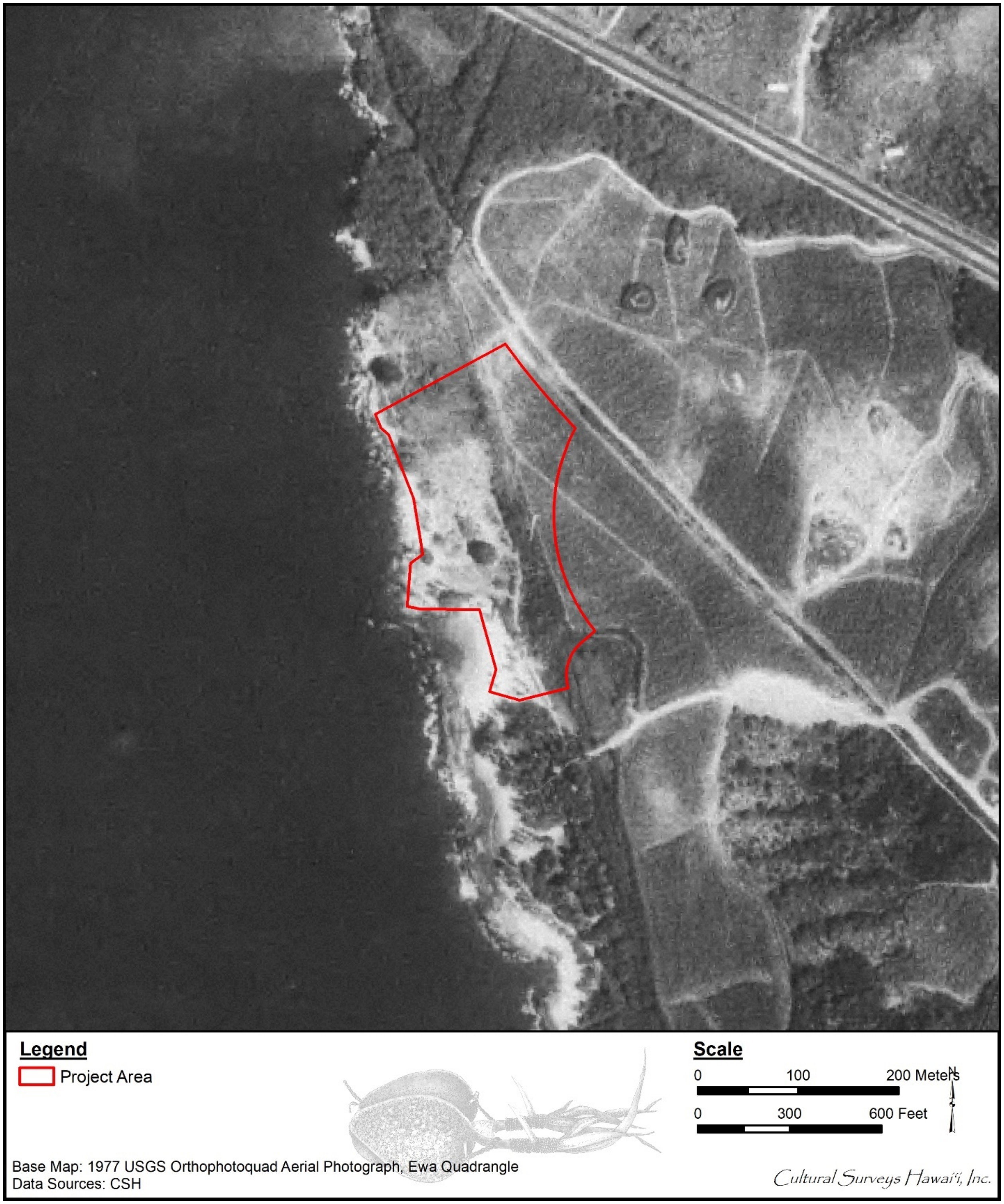


Figure 20. 1977 USGS Orthophotoquad aerial photograph, Ewa quadrangle, depicting no dwellings or development in the project area

public school as well as a Japanese School. Additional settlement was in Waipahu, centered around the Waipahu sugar mill, operated by the Oahu Sugar Company.

In 1939, Alice Kamokilaikawai Campbell, daughter of James and Abigail Kuaihelani Maipinepine Campbell, resided in Lanikūhonua, adjacent to the project area for nearly 30 years. Mrs. Campbell named the area Lanikūhonua which means “where the heavens meet the earth” (Lanikūhonua Cultural Institute 2019). Cultural descendant Nettie Fernandez Tiffany, current caretaker of the Lanikūhonua Institute, stated that her mother, Leilani Fernandez, was a close friend of Alice Campbell (personal communication October 2019). Mrs. Fernandez owned a beach home within the current project area and was the previous caretaker of the Campbell Estate property (see Figure 20).

Major land use changes came to western Honouliuli when the U.S. military began development in the area. Military installations were constructed both near the coast and in the foothills and upland areas (Figure 21). Barbers Point Military Reservation (a.k.a. Battery Barbers Point from 1937–1944) at Barbers Point Beach was used beginning in 1921 as a training area for firing 155 mm guns (Payette 2003). Also in the vicinity were Camp Malakole Military Reservation (a.k.a. Honouliuli Military Reservation), used from 1939, and Gilbert Military Reservation, used from 1922–1944. The 1919 U.S. Army war map (see Figure 12) indicates the Gilbert Station, understood as the site of a very small Gilbert Camp associated with the railway and Ewa Plantation, and Waimanalo Camp in the vicinity but well outside the project area.

Barbers Point Naval Air Station, in operation from 1942 to the 1990s, was the largest and most significant base in the area. It housed numerous naval and defense organizations, including maritime surveillance and anti-submarine warfare aircraft squadrons, a U.S. Coast Guard Air Station, and components of the U.S. Pacific Fleet. Fort Barrette (a.k.a. Kapolei Military Reservation and Battery Hatch) atop Puʻu Kapolei was in use from 1931–1948 for housing four 3-inch anti-aircraft batteries (Payette 2003). In the 1950s, the site was used as a Nike missile base. Palailai Military Reservation was built in 1921 atop Puʻu Palailai in Makakilo and housed Battery Palailai and Fire Control Station B (Payette 2003).

The OR&L railroad alignment is northeast/northwest of the project area (see Figure 15). Passenger totals on the OR&L railroad line increased throughout the first half of the twentieth century. In 1908, 446,318 people rode on the line. This total rose to approximately 1,200,000 by 1922 and hit an all-time high of 2,642,516 passengers in 1943. Throughout World War II, the railway served a critical function in transporting military personnel and equipment. However, the development of an improved road system and increasing numbers of cars on the island began to cut into passenger totals on the OR&L. According to the National Register of Historic Places (NRHP) inventory forms on file at SHPD, on 12 December 1947, all operations outside Honolulu ceased.

In 1950, the U.S. Navy purchased the track and right-of-way from Pearl Harbor to the Naval Ammunition Depot (NAD) access road in Nānākuli for $1.00 in the name of “National Defense.” The NAD maintained this 25.5-mile stretch of track until the early 1950s, when a 6.5-mile stretch from Pearl Harbor to Waipahu was ceded to the Territory of Hawaii. A further 6 miles was ceded to the Territory in 1954 after a heavy flood. The final 13-mile stretch was in use until 1968, when it too was ceded to the state. In 1970, the Hawaiian Railway Society was formed to preserve and restore remaining portions of the OR&L. The Society restored 6.5 miles of track from ʻEwa to

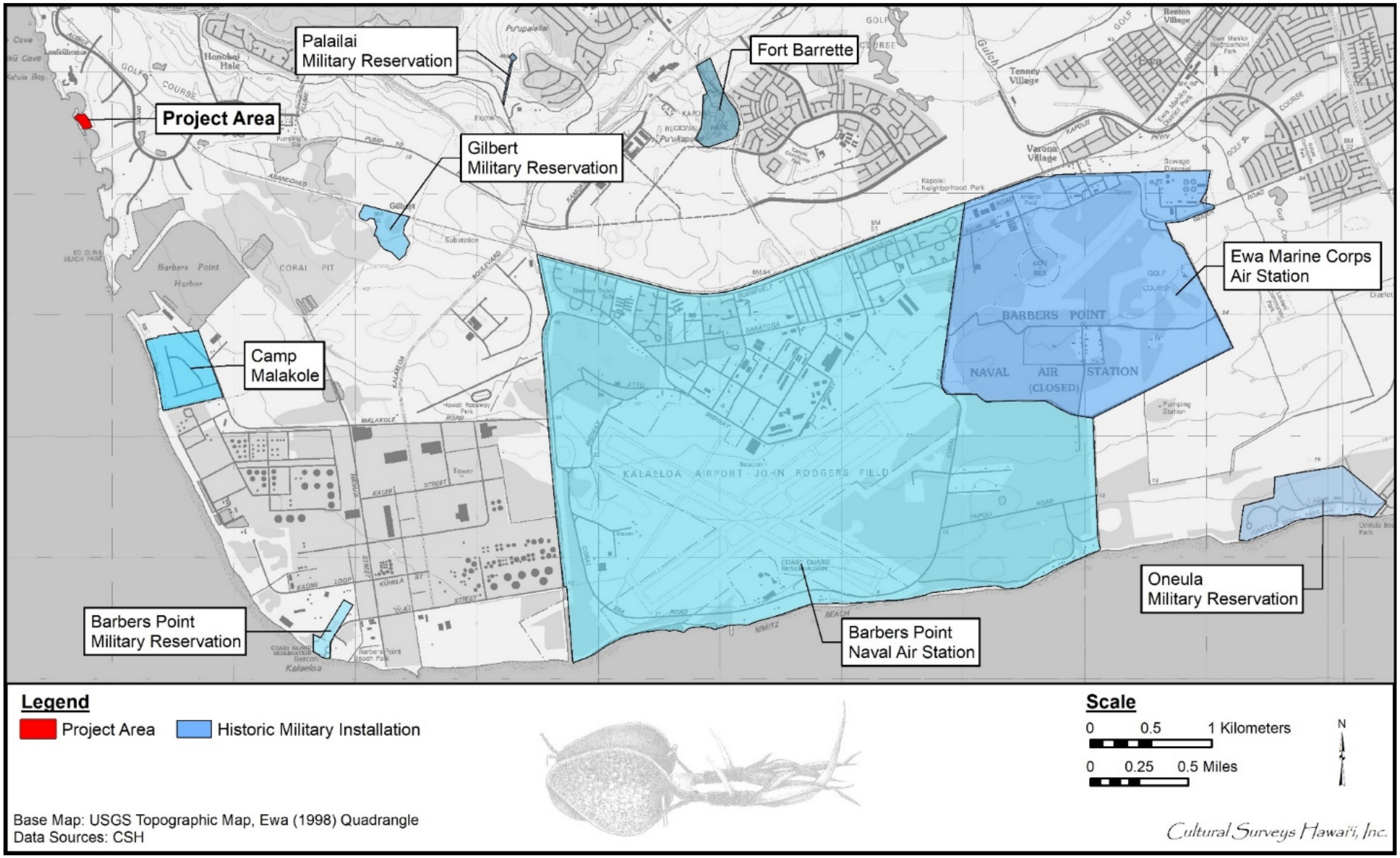


Figure 21. Portion of the 1998 Ewa USGS topographic quadrangle, showing the project area with an overlay of the locations of historic military installations

Nānākuli, including the portion adjacent to the current project area, and continues to use and maintain the railroad for historical tours.

The 1980s saw a joint venture between Japanese construction giant Kumagai Gumi and Hawai‘i developers Horita Corporation and TSA International for the development of a $6 billion resort (*The Age*, 3 December 1986:34). The development was originally called “West Beach,” and construction began on the lagoon and harbor in November 1986 (Figure 22 and Figure 23). Four man-made lagoons were constructed, as well as an 18-hole golf course, luxury condominiums, and a hotel (*Honolulu Star-Bulletin*, 20 August 1998). In 1991, the developers of West Beach, West Beach Estates, purchased Paradise Cove Luau (*Honolulu Advertiser*, 16 November 1991). The project stalled as a result of the Japanese investment bubble bursting in the early 1990s (*Honolulu Star-Advertiser*, 24 December 2010). The area is now known officially as Ko Olina and has recently seen a reinvigoration of development.

3.2 Previous Archaeological Research

The project area and its vicinity has been the subject of many archaeological and paleo-ecological studies, which are summarized below. Previously conducted modern archaeological studies are depicted in Figure 24 and are listed in Table 1. These studies identified numerous historic properties, which are depicted in Figure 25 and listed in Table 2.

The first effort to record historic properties in Honouliuli was made by Thrum (1906:46), who references “a *heiau* on Kapolei hill, ‘Ewa—size and class unknown. Its walls thrown down for fencing.” The former *heiau* was on Pu‘u Kapolei, approximately 5.5 km southeast of the current project area.

In his 1930 surface survey of the island of O‘ahu, archaeologist J. Gilbert McAllister recorded the specific locations of important archaeological and cultural sites, and the general locations of some sites of lesser importance. McAllister (1933:107–108) recorded seven sites at Honouliuli (McAllister Site #s 133 through 139/ SIHP #s 50-80-08-133 through -138 and 50-80-13-139), and these became the first seven sites in the Bishop Museum’s Site Numbering System (50-Oa-B6-1 through 50-Oa-B6-7). The nearest of these specific sites to the project area is McAllister Site 138, which includes the Pu‘u Kapolei Heiau and an adjacent rock shelter located far east of the project area. Additionally, McAllister (1933:109) designated Site 146, which comprises archaeological features covering a large but poorly defined area along the coast. His impressions of Site 146 are recorded as follows:

> ‘Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near the Pu‘uloa Salt Works belongs to the ranching period of about 75 years ago [ca. 1850s]. It is probable that the Hawaiians formerly used the holes and pits in the coral. Frequently the soil on the floor of larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here. [McAllister 1933:109]

These archaeological sites of the ‘Ewa coral plains would be the subject of some 50 or so archaeological studies conducted in the 1970s and 1980s and another score by the end of the century.

Figure 22. Aerial photo of early Ko Olina development with project area in upper left (Ko Olina Development, LLC, n.d.)

Figure 23. Aerial photo of early Ko Olina development with the project area in the middle left (Ko Olina Development, LLC, n.d.)

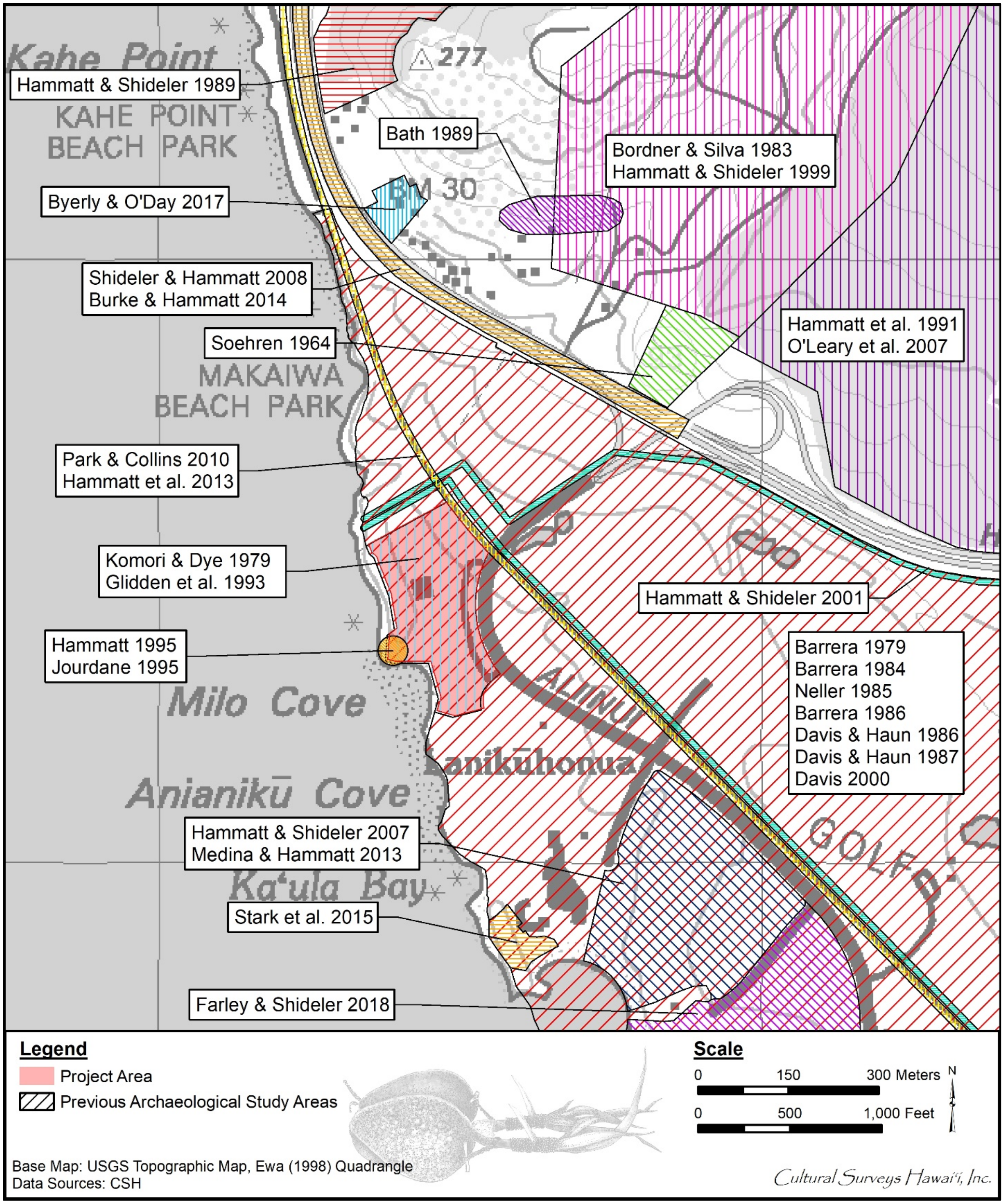


Figure 24. Portion of a 1998 Ewa USGS 7.5-minute topographic quadrangle depicting previous archaeological studies in the vicinity of the project area

Table 1. Previous archaeological studies in the vicinity of the project area

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Soehren 1964	Archaeological field investigation	Waimānalo Gulch	Documented one house site (SIHP # -2317)
Barrera 1979	Archaeological survey	West Beach	Recorded ten historic properties, none in project area per se; properties documented included walls, enclosures, midden scatters, and a fishing shrine
Komori and Dye 1979	Archaeological testing	West Beach	Excavated six small (0.5 sq m) test pits in two transect lines; substantial historic disturbance already in much of area; no traditional Hawaiian features noted
Bordner and Silva 1983	Archaeological reconnaissance and historical documentation	Proposed Waimānalo Gulch landfill site	One possible WWII-era encampment identified
Barrera 1984	Archaeological status report	West Beach	Reviewed and summarized work back to 1979 and second phase of work completed in July 1984; within and in vicinity of project area
Neller 1985	Review and evaluation	West Beach	Neller, finding fault in previous archaeological work, called for more work to address “inadequacies of the historic preservation measures being taken and proposed for the West Beach project”
Barrera 1986	Archaeological investigations	West Beach	Summary of archaeological investigations spanning six years clearly trying to respond to Neller’s (1985) critiques; gives formal SIHP numbers for Neller-numbered sites
Davis and Haun 1986	Archaeological status report	West Beach	Reviewed and summarized archaeological field work completed in 1986
Davis and Haun 1987	Intensive survey and test excavations	West Beach	Detailed historic property descriptions in vicinity and a radiocarbon date from a hearth feature at SIHP # -3352-2 with a range of AD 1235-1420
Bath 1989	Site visit report	Waimānalo Gulch	Three petroglyphs (SIHP # -4110) documented
Hammatt and Shideler 1989	Archaeological reconnaissance	TMK: [1] 9-2-003:027	One pre-Contact agricultural terrace observed

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Hammatt et al. 1991	Archaeological inventory survey	Makaīwa Hills project site, TMKs: [1] 9-1-015:005 and 017; 9-2-003:002, 005, and 084	Identified 34 sites, including prehistoric habitation and agricultural features, rock shelters, petroglyphs, *ahu* (altar), and various sugarcane cultivation infrastructure
Glidden et al. 1993	Data recovery excavations	Paradise Cove	Bernice Pauahi Bishop Museum (BPBM) Applied Research Group conducted subsurface backhoe testing at Paradise Cove, excavating nine backhoe trenches; Trenches 1–6 lacked a cultural component and were basically sterile; Trenches 7–9 showed post-Contact cultural activity; Trench 7 indicated traditional Hawaiian activity
Hammatt 1995	Response to inadvertent discovery of human remains	Paradise Cove	Following initial burial find of SIHP # -4968 by Jourdane (1995), five burials documented in a gas line excavation
Jourdane 1995	Burial documentation	Paradise Cove	Documents discovery of human remains (minimum # of individuals [MNI] 1) disturbed during excavation for gas lines at Paradise Cove; little specific information could be determined; assigned SIHP # -4968
Hammatt and Shideler 1999	Archaeological inventory survey	Waimānalo Gulch Sanitary Landfill	No historic properties observed within proposed project area, however, two sites in Waimānalo Gulch property, but not proposed project area including a WWII and Civil Defense complex known as “Battery Arizona” and a contemporary Hawaiian shrine incorporating “sacred stones”; additional petroglyph site also reported on property
Davis 2000	Data recovery	West Beach	Four-volume data recovery study completes data recovery work carried out in 1980s; identified several historic properties in or very close to present project area

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Hammatt and Shideler 2001	Archaeological inventory survey	North of Barbers Point	Two historic properties confirmed: SIHP # -1433, a *ko‘a* or traditional Hawaiian fishing shrine, and SIHP # -1434, related to a complex of walls and an enclosure (Barrera 1979; Davis and Haun 1987:D-6); six other previously reported properties in vicinity include SIHP #s -1435, a historic retaining wall; -1464, a remnant historic wall (ranching or sugar); -3358, a shell midden deposit; -3359, an agricultural cairn; -3360, a habitation (midden) deposit; and -3361, another habitation (midden) deposit searched for but not confirmed
Hammatt and Shideler 2007	Archaeological literature review and field inspection	Ko Olina	Four historic properties (two traditional Hawaiian habitation deposits and two WWII sites) previously identified within approx. 21.2-acre project area but had been addressed to satisfaction of SHPD (now either obliterated or buried)
O’Leary et al. 2007	Archaeological inventory survey	Makaīwa Hills	Identified two historic properties: SIHP # -6870, a terrace, three springs, and a small rock shelter; and SIHP # -6871, a paved area situated on a ridge top
Shideler and Hammatt 2008	Letter report	Farrington Hwy and Haleakalā Rd to Ali‘i Nui Dr	Letter addressing architectural concerns including historic bridges post-dating 1940 needing assessment for historical significance; includes a culvert north of Nānāikapono School, Piliokoe Bridge, and bridge crossing Keone‘ō‘io Gulch at Tracks Beack Park
Park and Collins 2010	Archaeological monitoring	Kahe Water Pipeline project, TMKs: [1] 9-1-015:002 and 9-2-003:011	Although trenching took place within OR&L railway right-of-way (ROW), no portion of railway structure (tracks) impacted; no subsurface human remains or cultural deposits observed during archaeological monitoring, although modern garbage and several historic-period bottle fragments and ceramic fragments observed within fill materials

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Hammatt et al. 2013	Archaeological inventory survey	Tracks Beach Park, TMK: [1] 9-2-003:011	Addressed 13.4-km (8.3-mile), 12.2 m (40-ft wide) corridor (40.4 acres total) project area, but subsurface testing limited to six test excavations in Tracks Beach area; no new significant historic properties; discusses OR&L, SIHP # -9714, previously placed on NRHP
Medina and Hammatt 2013	Archaeological monitoring	Aulani Walt Disney Resort, Ko Olina	No historic properties identified
Burke and Hammatt 2014	Archaeological monitoring	Farrington Hwy between Haleakalā Rd and Ali‘i Nui Dr	No historic properties identified
Stark et al. 2015	Archaeological assessment (no finds AIS)	Four Seasons Resort at Ko Olina	No historic properties identified
Byerly and O’Day 2017	Archaeological inventory survey	1.83-acre area on *mauka* (inland) side of Farrington Hwy where it meets the sea (Hawaiki Submarine Cable Landing project), TMKs: [1] 9-2-049:001, 002, and 005; 9-2-051:001 por., 010, and 011; and Farrington Hwy	No historic properties identified on surface of terrestrial parcels; however, one NRHP listed historic property identified intersecting route of subterranean horizontal directional drilling (HDD) bore: OR&L ROW (SIHP # -97l4); because HDD bore will run 45 to 50 m below surface, reasonably concluded project would have no effect on the OR&L ROW

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Farley and Shideler 2018	Archaeological literature review and field inspection	Atlantis Resort and Residence, Ko Olina	Background research indicates five previously identified historic properties in project area including SIHP # -1436, a lime kiln; SIHP # -1438, a four component beach midden with Feature 3 comprising of a subsurface cultural layer containing shell midden, faunal remains, traditional Hawaiian artifacts, pit features, and a human burial; SIHP # -1453, a cave/unmodified sinkhole with a midden deposit; SIHP # -3351, habitation complex comprising seven relatively distinct surface deposits and a shelter cave; and SIHP # -3362, which comprises entirety of low ground behind coastal sand dunes including a former coastal marsh; evidence of only SIHP # -1436 observed during field inspection; preservation plan for SIHP # -1436 recommended along with archaeological monitoring at locations of SIHP #s -1438 and -3351

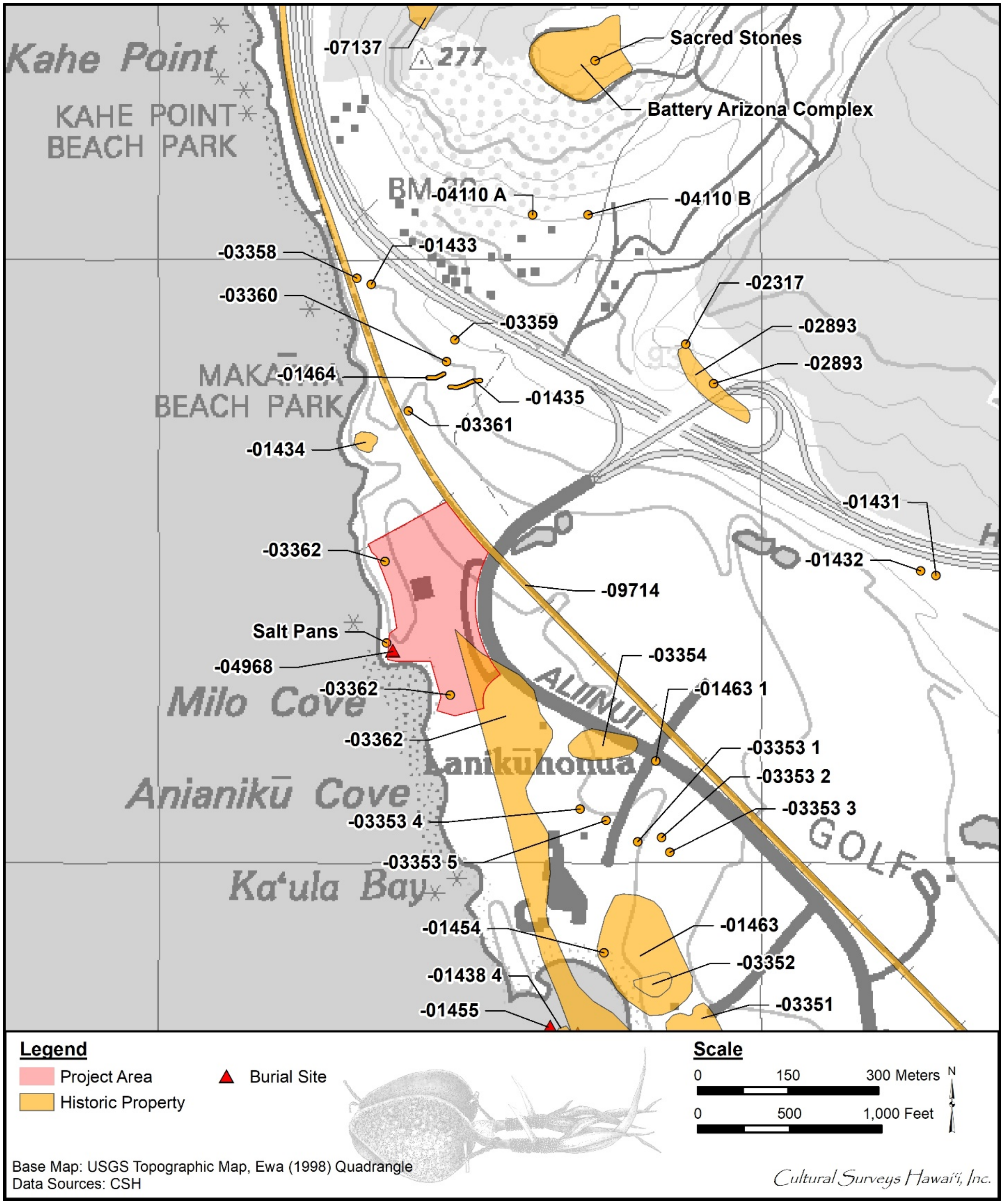


Figure 25. Portion of a 1998 Ewa USGS 7.5-minute topographic quadrangle map depicting previously identified historic properties in the vicinity of the project area

Table 2. Previously identified historic properties in the vicinity of the project area

SIHP # 50-80-12-	Type	Source	Comments
1431	Wall	Davis 2000	Indeterminate age; dry masonry
1432	Wall	Davis 2000	Indeterminate age; likely related to animal control functions
1433	*Koa* (shrine)	Hammatt et al. 2013	Pre-Contact
1434	Habitation complex	Davis 2000	Both pre- and post-Contact; includes two enclosure/platforms and a wall
1435	Retaining wall	Davis 2000	Post-Contact, possible erosion control wall
1438-4	Subsurface cultural deposit	Barrera 1979, Davis and Haun 1987, Davis 2000	Four-component midden; Feature 3 comprises charcoal-stained sand on back slope of dune without any visibly associated architectural features; testing revealed numerous fire pits, trash pits, midden, and traditional Hawaiian artifacts
1454	Military revetment (wall)	Davis 2000	Associated with twentieth century military activity (WWII); described by Davis (2000:132) as “an open emergency bunker”
1455	Burial (human)	Neller 1985, Barrera 1986, Davis and Haun 1987, Davis 2000	Davis (2000: III:60) regarded this as Neller Site N-20; human bones exposed by fishermen (antiquity uncertain)
1463	Military coastal defense complex	Neller 1985, Barrera 1986, Davis and Haun 1987, Davis 2000	Davis (2000) associates this with Neller Site N-17; concrete slabs and cast boxes; inferred function: fire control and support center for coastal defense batteries; 15 features (numbered SIHP #s -1463:1 through -1463:15)
1463-1	Military defense structure	Davis and Haun, 1987, Davis 2000	Post-Contact, fire-control/ammunition storage and auxiliary support facility possibly associated with armament at Coastal Gun Battery 3363
1464	Remnant wall	Davis and Haun, 1987, Davis 2000	Post-Contact; probable erosion control
2317	Habitation site	Soehren 1964	Waimanalo Gulch house site, age indeterminate

SIHP # 50-80-12-	Type	Source	Comments
2893	Overhang shelter and petroglyphs	Davis and Haun 1987, Davis 2000	Pre-Contact, eight sub-features including two rock shelters, two platforms, a thin surface midden scatter, and three sets of petroglyphs
3351	Habitation complex	Davis and Haun 1987, Davis 2000	Cluster of eight relatively distinct surface deposits and a shelter cave in one of more than a dozen sinkholes and shallow depressions scattered over an area of moderately sloping terrain; habitation deposits numbered SIHP #s -3351:1 through 5, 7, and 8; a structurally unmodified sinkhole/cave identified as -3351:6
3352	Habitation complex	Davis and Haun 1987, Davis 2000	Area of exposed cultural deposits scattered over moderately sloping terrain with an estimated area of 2,100 sq m; identified 21 hearths
3353-1	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre-Contact, estimated site age AD 1593-1793, subsurface cultural deposit with a thin scattering of shell midden and a few artifacts including a bone fishhook-shank fragment, a coral abrader, and eight pieces of volcanic glass (Davis and Haun 1987: B-613)
3353-2	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre-Contact, estimated site age AD 1640-1794, subsurface cultural deposit with a thin scattering of shell midden and volcanic glass (Davis and Haun 1987: B-164)
3353-3	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre-Contact modified sinkhole
3353-4	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre- and post-Contact, subsurface deposit described by Davis (2000:75) as “extremely disturbed”; consists of four relic deposits and possible habitation cave, up to 100 m apart from one another
3353-5	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre- and post-Contact, subsurface deposit disturbed (Davis and Haun 1987:50)
3354	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age, open area composed of exposed coral bedrock scattered with cultural material (Davis and Haun 1987: B-168)
3358	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age, subsurface deposit containing shell midden, fire-cracked rock, and broken bowl of clay smoking pipe (Davis and Haun 1987: D-21).

SIHP # 50-80-12-	Type	Source	Comments
3359	Cairn	Davis and Haun 1987, Davis 2000	Indeterminate age, roughly piled basalt cobble and boulder structure
3360	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age; disturbed subsurface cultural layer containing shell midden, coral and fire-cracked rock, bird and rat bone, volcanic glass, a basalt flake, and piece of possibly worked stone (Davis and Haun 1987: D-24)
3361	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age; subsurface deposit containing shell midden, fire-cracked rock, charcoal, corroded metal, bottle glass, various fragments of corroded metal, and two brass cartridge casings (Davis and Haun 1987: D-25)
3362	Coastal marshland (subsurface wetland deposit)	Davis and Haun 1987, Davis 2000	Feature 1, within current project area, described as coastal backwater marshland with no apparent cultural function prior to nineteenth century cultivation; Feature 2, outside current project area, is cultural deposit indicative of habitation
4110 A	Petroglyph	Bath 1989	Pre-Contact
4110 B	Petroglyph	Bath 1989	Pre-Contact
4968	Burial (human)	Jourdane 1995, Hammatt 1995	Five burials (designated SIHP # -4968: Burials 1 through 5); at least two burials post-Contact based on associated artifacts (button associated with Burial 2 and two gold earrings associated with Burial 3)
7137	Military complex	Yucha and Hammatt 2012	Post-Contact, defensive position/observation post complex consisting of 15 features
9714	OR&L ROW	NRHP Form (1975)	Narrow-gauge steel rails (36 inches) on raised roadbed of mixed materials for length of 15 miles; passes on northeast edge of current project area
No SIHP assigned	Sacred stones	Hammatt and Shideler 1999	Indeterminate age
No SHIP assigned	Battery Arizona Complex	Hammatt and Shideler 1999	Post-Contact
No SIHP assigned	Salt pans	Komori and Dye 1979	Pre-Contact

From the period between McAllister's 1930 study and the flurry of work that began in 1969, there are only a few sporadic pieces of poorly documented research.

"In 1933, Dr. Kenneth P. Emory examined a well-preserved house site and a possible *heiau* in the western part of the coral plain; these sites were later destroyed by sugar-cane planting" (Sinoto 1976:1). In 1959, William Kikuchi removed several burials from a burial cave (Bishop Museum Site 50-Oa-B6-10/SIHP # 50-80-12-2317) at the Standard Oil Refinery; the cave was subsequently destroyed (Barrera 1975:1). Kikuchi recovered 12-16 incomplete primary and/or secondary burials cached in a sinkhole or crevice exposed during construction activities near the big bend of Malakole Street, southeast of the project area (Kikuchi 1959; Davis 1990:146–147). In 1960, Yosi Sinoto and Elspeth Sterling made note of a house site (Bishop Museum Site 50-Oa-B6-8/SIHP # 50-80-08-1176). Davis (1990:147) stated that "In 1962, Lloyd Soehren recorded another secondary human burial in a sinkhole at the Barbers Point Naval Air Station." In 1966, Lloyd Soehren "carried out salvage excavations at a possible fishing shrine (BPBM Site # 50-Oa-B6-13/SIHP # -9645)." The site was reported as destroyed by construction (Barrera 1975:1), but Davis (1990:148) confirmed the shrine and performed additional excavations in 1982. In 1969, artifacts were recovered by Roger Green from a beach midden site (50-Oa-B6-14/SIHP # 50-80-12-2722) south of the barge harbor.

3.2.1 West Beach Studies

Studies conducted for the West Beach development include field surveys to extensive data recovery projects. In the West Beach Study Area (see Figure 24), numerous identified historic properties include paleoecological sites (e.g., sinkholes), traditional Hawaiian sites including burials and habitation complexes, plantation-era infrastructure (e.g., the OR&L ROW), and military infrastructure. Of particular concern to developers in Hawaiʻi, as well as the community, is the prospect of finding human remains in the course of development. Documented finds of human remains are summarized in Table 3, and the approximate geographic locations of burial finds are depicted in Figure 26. In general, there appears to be a pattern of burial interment immediately adjacent (within 100 m) to the (former, natural) coast. However, scattered burials have been reported from more inland locations. Approximately 26 burials are known to have been encountered in the greater West Beach/Ko Olina project area. One burial, SIHP # -4968, is within the southeastern portion of the project area (see Figure 25).

Studies conducted for the West Beach development are described below.

3.2.1.1 Barrera 1979

William Barrera, Jr. (1979) carried out the first archaeological survey of what would eventually become the Ko Olina Resort area, but which was known at the time as "West Beach." His introductory remarks under his "Conclusion and Recommendations" merit relating:

> When compared with the archaeological remains discovered during the various surveys of the deep draft harbor site on the south side of the project area, the West Beach remains are rather sparse and, to the untrained eye, unimpressive. This is not an indication of lack of interest on the part of the aboriginal population, but is more a function of the extensive clearing of large areas for sugarcane production […] The remains reported in this volume, then, represent only a small fraction of what once existed at West Beach, and therefore assume added significance. [Barrera 1979:14]

Table 3. West Beach burials

SIHP # 50-80-12-	Burial #	Source
1437:1b	Davis #5	Davis 2000:4:6.1
1438:1A	Davis #6	Davis 2000:4:6.2
1438:1B	Davis #8	Davis 2000:4:6.2
1438:3A	Davis #7	Davis 2000:4:6.2
1438:4A	Davis #9	Davis 2000:4:6.2
1438:4B	Davis #10	Davis 2000:4:6.2
1438:4C	Davis #11	Davis 2000:4:6.2
1446:1D	Davis #16	Davis 2000:4:6.3
1446:2	Davis #2	Davis 2000:4:6.1
1446:2	Davis #14	Davis 2000:4:6.2
1446:2	Davis #15	Davis 2000:4:6.3
1450:1	Davis #21	Davis 2000:4:6.3
1455:1	Davis #12	Davis 2000:4:6.2
1458:7	Davis #17	Davis 2000:4:6.3
2717:31	Davis #3	Davis 2000:4:6.1
2718:23	Davis #18	Davis 2000:4:6.3
2718:23	Davis #19	Davis 2000:4:6.3
2719:4	Davis #4	Davis 2000:4:6.1
2721:2	Davis #13	Davis 2000:4:6.2
2721:3	Davis #20	Davis 2000:4:6.2
3355:2	Davis #1	Davis 2000:4:6.1
4968	–	Jourdane 1995; Hammatt 1995

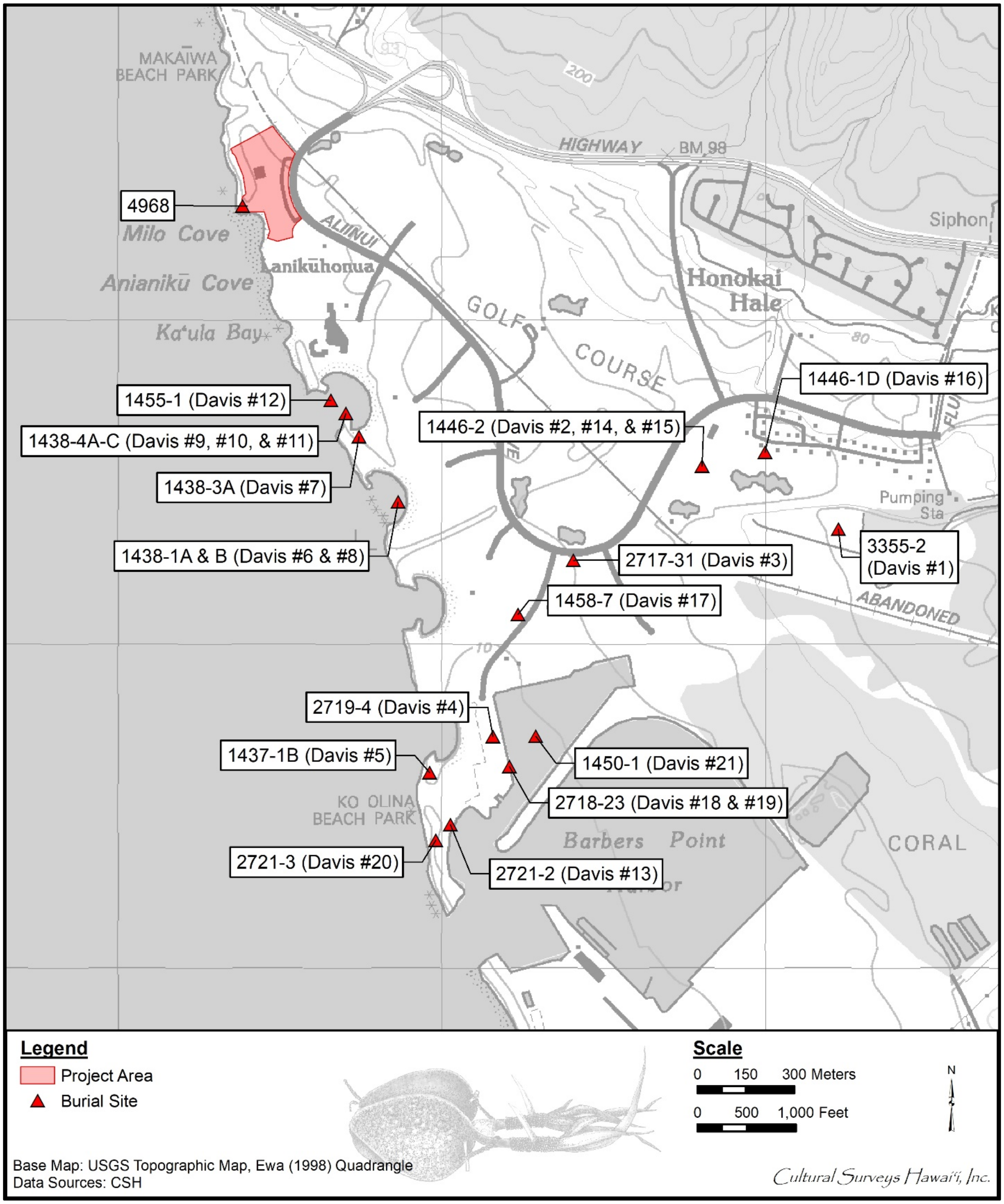


Figure 26. Portion of the 1998 Ewa USGS topographic quadrangle showing the approximate locations of previously identified human burials within and near the project area

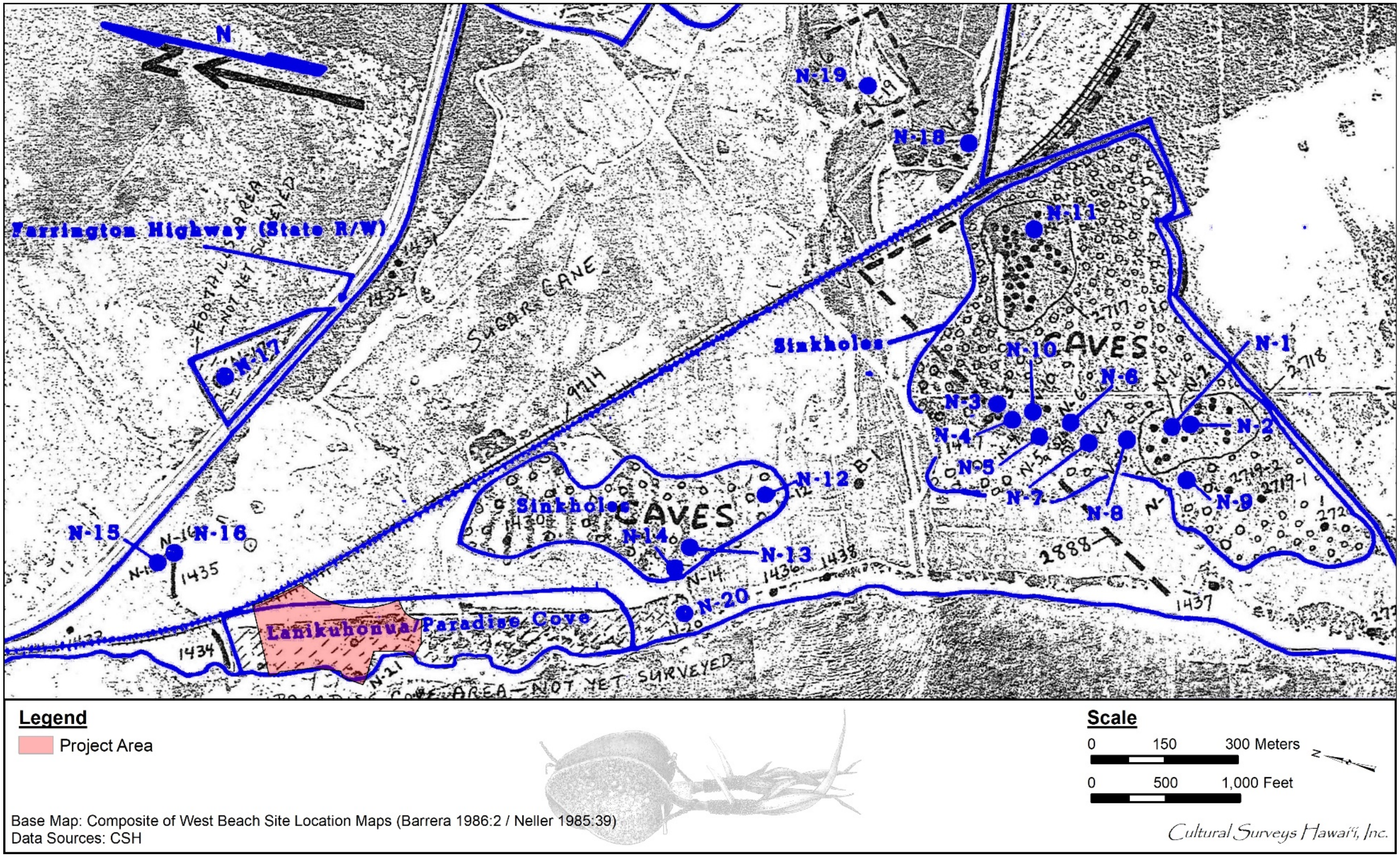


Figure 27. Composite of West Beach site location maps (Neller 1985 and Barrera 1986) in relation to the project area

Barrera recorded ten historic properties (SIHP #s 50-80-12-1430 through -1438 and -2721) in his study. These included walls, enclosures, midden scatters, and a fishing shrine (the shrine is still preserved well north of the current project area). None of the historic properties are within the project area.

3.2.1.2 Komori and Dye 1979

Eric Komori and Thomas Dye (1979) carried out archaeological testing at Lanikūhonua (the present location of Paradise Cove Luau) within the current project area. Six small (0.5 sq m) test pits were excavated in two transect lines. Komori and Dye (1979) noted substantial historic disturbance had already disturbed much of the area and noted no traditional Hawaiian features. However, they did note the presence of charcoal flecks indicated early human activity and therefore recommended archaeological monitoring.

3.2.1.3 Barrera 1984

William Barrera, Jr. produced an archaeological status report (1984) that reviewed and summarized work going back to 1979, as well as a second phase of work completed in July 1984. Much of the work reported on was south of the present project area, but the results of further study of the SIHP # 50-80-12-1438 midden deposit are presented (Barrera Jr. 1984:25–29). Barrera’s report also includes a brief study by architect Glen Mason (1984) on the SIHP # 50-80-12-1436 lime kiln.

3.2.1.4 Neller 1985

Earl Neller, then of SHPD, produced a preliminary review and evaluation of archaeological studies and recommendations (Neller 1985). Neller found much to fault in the status of archaeological work up to that time and called for more archaeological work to address “the inadequacies of the historic preservation measures being taken and proposed for the West Beach project” (Neller 1985:6). Neller also produced a sketch of historic properties and cave concentrations (see Figure 27) that indicates the caves are east and southeast of the project area. However, it should be noted that Neller’s fieldwork in the West Beach area was quite brief, comprising only a day or two, and that his location of historic properties and caves was probably not intended to be highly accurate. Neller’s (1985) sites are given as temporary site numbers prefixed with an “N” for “Neller Number.”

3.2.1.5 Barrera 1986

William Barrera, Jr. (1986) produced a summary of his archaeological investigations spanning six years, clearly in response to the critiques of Neller’s (1985) review. Barrera also gave formal SIHP number designations for the Neller-numbered sites.

3.2.1.6 Davis and Haun 1986

Bertell Davis and Alan Haun (1986) produced a *Preliminary Report Upon Completion of Field Work* summarizing Phase 2 intensive survey and test excavation work at West Beach. They include no maps but relate, largely in tabular form, data regarding historic properties and the work accomplished. During Phase 2 excavations, four spatially separate activity areas were recorded as component features of SIHP # 50-80-12-1438, numbered 1 through 4 from south to north. Excavation at SIHP # -1438:3, which is south of the project area, included three test units. In 1987, Davis and Haun followed up their preliminary report on survey and test excavations with an

"Interim Report." The interim report includes information on all three historic properties east of the project area, including the results of test excavation at SIHP #s -1438 and -3362 (within the project area). The interim report would not be followed by a final report for more than 13 years (see Davis 2000 discussion below).

3.2.1.7 Glidden et al. 1993

Subsurface backhoe testing consisting of nine trenches at Paradise Cove was conducted by Glidden et al. (1993). Trenches 1 through 6 lacked a cultural component and were determined to be sterile. Trenches 7 through 9 indicated post-Contact cultural activity, and Trench 7 indicated traditional Hawaiian activity. This study is within the current project area.

3.2.1.8 Jourdane 1995 and Hammatt 1995

Jourdane (1995) documented the discovery of human remains disturbed during excavation for gas lines at Paradise Cove within the current project area. Little specific information could be determined, and the remains were designated as SIHP # 50-80-12-4968. Jourdane suggested a private CRM firm should investigate the findings, and this was completed by CSH in 1995 (Hammatt 1995). CSH documented an excavation associated with a gas line wrapping around the main stage at Paradise Cove that included five burials (designated SIHP # -4968: Burials 1 through 5). It was documented that at least two of the burials were post-Contact based on associated artifacts (a button associated with Burial 2 and two gold earrings associated with Burial 3). SIHP # -4968 is in the southwest portion of the project area.

3.2.1.9 Davis 2000

The data recovery work at West Beach was largely carried out in the 1980s but was not completed until Davis' four-volume data recovery study came out in 2000. Davis (2000) is a culmination of the previous studies for West Beach, which cumulatively recorded 157 historic properties within six eco-zones. These properties were distributed throughout the West Beach Study Area, and their type and function vary greatly within both traditional Hawaiian and post-Contact contexts. Based on the results of the Phase 2 survey and test excavations reported by Davis and Haun (1987), Phase 4 data recovery excavations were recommended for two sites (SIHP #s 50-80-12-1438 and -3362). During these excavations, a new feature component of SIHP # -3362 was identified and designated as SIHP # -3362:2; however, this feature component was outside the project area. The results of Phase 2 intensive survey and test excavations, initially reported by Davis and Haun (1986, 1987; see discussion above), as well as subsequent Phase 4 data recovery investigations, are presented by Davis (2000).

3.2.2 Other Modern Archaeological Studies

In more recent times, archaeological studies have been conducted for smaller and more discrete project areas. These studies are primarily within the West Beach and/or Barbers Point Harbor study areas and were conducted for recent developments.

3.2.2.1 Bordner and Silva 1983

An archaeological reconnaissance of Waimānalo Gulch was conducted by Bordner and Silva in 1983. One possible World War II-era encampment was identified "at roughly the 175-foot mark" within the study area (Bordner and Silva 1983:C-3). No further work was recommended.

3.2.2.2 Bath 1989

In 1989, the SHPD was notified of petroglyphs located in the lower elevations at the mouth of Waimānalo Gulch. Three petroglyphs were observed “pecked into black lava rock” (Bath 1989). Two of the petroglyphs were anthropomorphic, while one petroglyph consisted of abstract symbols. The site was briefly documented and designated SIHP # 50-80-12-4110.

3.2.2.3 Hammatt and Shideler 1989

In 1989, CSH conducted an archaeological reconnaissance for a proposed Hawaiian Electric Company (HECO) training facility located on the Kahe Power Plant property (Hammatt and Shideler 1989). One small rock terrace was documented and designated SIHP # 50-80-12-4221. The terrace was thought to be associated with pre-Contact agricultural activities.

3.2.2.4 Hammatt et al. 1991

In 1991, CSH conducted an AIS of the Makaīwa Hills development project (Hammatt et al. 1991). The project area included a 1,915-acre parcel in Honouliuli Ahupua‘a, located between the town of Makakilo and Waimānalo Gulch, and bounded to the south by Farrington Highway and to the north by Pālehua Road. A total of 34 historic properties were identified, including prehistoric habitation structures (temporary and permanent), agricultural features (terraces and mounds), rock shelters, petroglyphs, *ahu* (altar), and various sugarcane cultivation infrastructure. Within the Makaīwa Hills project area, habitation sites were found to be clustered in higher elevations above 1,000 ft and in lower elevations below 500 ft (Hammatt et al. 1991). The higher elevations would have contained ample forest subsistence resources for gathering on both a continual basis, as well as during times of famine and drought. The lower elevations would be close to the shoreline and bountiful coastal resources.

3.2.2.5 Hammatt and Shideler 1999

In 1999, CSH conducted and AIS for the approximately 200-acre Waimānalo Gulch Sanitary Landfill property (Hammatt and Shideler 1999). No historic properties were observed within the proposed project area, however, two sites were in the Waimānalo Gulch property, but not the proposed project area including a World War II and Civil Defense complex known as “Battery Arizona” and a contemporary Hawaiian shrine incorporating “sacred stones.” An additional petroglyph site was also reported on the property.

3.2.2.6 Hammatt and Shideler 2001

The field investigation conducted by Hammatt and Shideler (2001) indicated cable corridors going through areas intensively disturbed by prior sugarcane cultivation, modern construction activity associated with transportation infrastructure, and by recent Ko Olina development. Based on background research and fieldwork results, no further archaeological research was recommended. Only two historic properties were identified within 50 m (164 ft) of a proposed fiber optic cable alignment: the OR&L railroad (SIHP # -9714) and Ewa Plantation Sugar Company irrigation infrastructure (SIHP # -4341).

3.2.2.7 O’Leary et al. 2007

In 2006 CSH conducted an addendum AIS for the Makaīwa Hills project (O’Leary et al. 2007). The project’s original AIS was completed by CSH in 1991 (Hammatt et al. 1991). The original

AIS documented 17 historic properties, five of which were recommended for preservation. Due to the time gap, CSH conducted a reconnaissance to relocate the 17 historic properties and found two additional historic properties. The two historic properties include SIHP # 50-80-12 -6870, a terrace, three springs, and a small rock shelter; and SIHP # -6871, a paved area situated on a ridge top.

3.2.2.8 Park and Collins 2010

Pacific Consulting Services, Inc. (Park and Collins 2010) reported on archaeological monitoring in support of a Kahe Reverse Osmosis Water Pipeline project (TMKs: [1] 9-1-015:002 and 9-2-003:011) along a 4-mile portion of the OR&L's ROW. A variety of stratigraphic sequences were observed and documented in 13 profile locations along the pipeline corridor, but no new subsurface archaeological features or deposits were encountered.

3.2.2.9 Hammatt et al. 2013

CSH (Hammatt et al. 2013) reported on AIS testing at Tracks Beach Park for a proposed Leeward Bikeway project (TMK: [1] 9-2-003:011). A 13.4-km (8.3-mile) long, 12.2-- (40 ft) wide corridor (total area of 40.4 acres) project area was addressed but subsurface testing was limited to six test excavations in the beach park area. No new significant historic properties were identified; however, the OR&L (SIHP # 50-80-12-9714), previously placed on the NRHP, is discussed.

3.2.2.10 Medina and Hammatt 2013

The report produced by Medina and Hammatt (2013) regarding archaeological monitoring for the Aulani Disney Resort and Spa at Ko Olina indicates no cultural materials were identified. Stratigraphic profiles included a series of mixed fills over coral shelf. Interestingly, a dark brown clay loam was observed resting on the coral shelf. This was interpreted as natural alluvial sediments by Medina and Hammatt (2013:58).

3.2.2.11 Burke and Hammatt 2014

CSH produced an archaeological monitoring report for the Farrington Highway Part 1, Phases A and B, 12-inch and 24-inch Water Main Installation project (Burke and Hammatt 2014). No historic properties were identified.

3.2.2.12 Byerly and O'Day 2017

Garcia & Associates (Byerly and O'Day 2017) produced an AIS report for a 1.83-acre area on the *mauka* side of Farrington Highway where it meets the sea for a Hawaiki Submarine Cable Landing project, TMKs: [1] 9-2-049:001, 002, and 005; 9-2-051:001 por., 010, and 011; and Farrington Highway. No historic properties were identified on the surface of the terrestrial parcels. However, one National and Hawaiʻi Register of Historic Places-listed historic property was identified intersecting the route of the subterranean HDD bore: the OR&L ROW (SIHP # -97l4). Because the HDD bore will run 45 to 50 m below surface, however, it was reasonably concluded that the project would have no effect on the OR&L ROW.

3.3 Background Summary and Predictive Model

Documentary evidence suggests the present project area is located in a region that was populated by Hawaiians inhabiting the western coast of Oʻahu before the nineteenth century. Maps and historic documentation indicate the Honouliuli area was utilized by Hawaiians for fisheries, marine resources, rich alluvial soils, sinkholes with large populations of avifauna, and an extensive upland forest.

Ko Olina was also a popular vacation destination for *aliʻi* such as Chief Kakūhihewa and the priest Napuaikamao, who was also the caretaker of the area.

Archaeological studies have recorded the presence of subsurface historic properties of both pre- and/or early post-Contact traditional Hawaiian and post-Contact western-related cultural deposits and human burials. Some of these historic properties appear relatively intact despite the years of plantation activity that have altered portions of these areas.

3.3.1 Human Burials

Previous archaeological investigations have documented both pre-Contact and post-Contact human burials throughout the greater Honouliuli area along the shoreline. In general, there appears to be a pattern of burial interment immediately adjacent (within 100 m) to the (former, natural) coast. However, scattered burials have been reported from more inland locations. Isolated burials and burial clusters have been found just above the water table and below historic-era fill materials, primarily within sand deposits.

Human burial discoveries were reported by at least three previous studies (Jourdane 1995, Hammatt 1995, and Davis 2000). Approximately 26 burials are known to have been encountered in the greater West Beach/Ko Olina project area (SIHP #s 50-80-12-1737, -1438, 1446, -1450, -1455, -1458, 2717, -2718, -2719, -2721, and -3355). Five burials, SIHP # 50-80-12-4968, are within the southeastern portion of the project area consisting of at least two post-Contact burials based on associated artifacts. The burials were found in association with a Jaucas sand environment, sinkholes, cists, pits, and caches.

The prospect for human burials within the project is area is generally regarded as low in *mauka* areas, and high for *makai* shoreline areas. Other than the finds in the immediate vicinity of the West Beach burials and project area, there have been relatively few burial finds in *mauka* areas. The majority of the project area was subject to grading and agricultural activities related to the Ewa Plantation Company. The soil profiles recorded in *mauka* areas and in the vicinity of SIHP # -4968 appear unlikely to be associated with burials.

3.3.2 Pre-Contact and Early Post-Contact Agricultural and Habitation Deposits

The southeastern portion of the project area appears to be in what was once a marshy wetland plain of Honouliuli. This area likely provided ancient Hawaiians with the environment needed for the cultivation of taro. The features expected from these cultural activities include berms, saltpans, *loʻi* (taro ponds), pond banks, and *ʻauwai* (ditch) levee remnants. Following the initial years of European Contact, westerners engaged in new massive agricultural ventures. Cattle grazing was popular in the area and later the Ewa Plantation Company used the area for sugarcane cultivation.

3.3.3 Potential for Other Finds

The fact that Ko Olina was a very substantial vacation destination for *aliʻi* raises the prospect of subsurface finds such as cultural deposits, trash deposits, or privies. However, much of the land has been moderately altered by cattle grazing and plantation activities.

There is a moderate probability there will be subsurface finds such as a remnant wetland deposits and remnant plantation and historic era land use as well as pre-Contact burials and cultural deposits.

Section 4 Results of Fieldwork

Fieldwork was conducted between 21 October and 12 November 2019 by CSH archaeologists under the general supervision of Principal Investigator Hallett H. Hammatt, Ph.D. Fieldwork consisted of a 100% pedestrian inspection of the 10.85-acre AIS project area. Following the pedestrian survey, the historic property identification effort focused on a subsurface testing program where 16 test excavations were excavated, documented, and sampled.

The subsurface testing plan was based on the combination of three previous studies' test locations, the documentation of known historic properties within the project area (Komori and Dye 1979, Davis and Haun 1987, and Glidden et al. 1993), and consultation from SHPD and cultural descendant Nettie Fernandez Tiffany. Previous archaeological studies show extensive investigation within the existing parking lot areas in the western portion of the project area consisting entirely of fill material. Due to previously conducted extensive testing and no archaeological findings, one test excavation was placed in the parking lot area in the northwestern portion of the project area (T-3). Six previous test excavations were conducted near the shoreline and yielded three previously identified historic properties including salt pans (no SIHP assigned), coastal marshlands (SIHP # 50-80-12-3362), and human burials (SIHP # 50-80-12-4968). Current AIS test excavations were placed based on targeting the previously identified historic properties within areas not previously investigated. The remainder of the test excavations were placed for representative distribution. Some trenches were reoriented based on known subsurface utilities via the maintenance crew and concerns from Ms. Tiffany.

The subsurface testing plan originally consisted of 19 subsurface test excavations (T-1 through T-19) (Figure 28). The subsurface testing plan was modified per the request of SHPD in a meeting held on 24 May 2018 excluding three proposed test excavations (T-1 through T-16). Subsurface testing within existing structures was not viable. Two test excavations, T-11 and T-14, were abandoned due to the presence of an active sewer drain line and a fire sprinkler line that both broke during excavation activities.

All but two test excavations were excavated by a backhoe excavator to sterile material between 0.52 and 2.14 mbs, or the coral shelf observed between 0.75 and 1.75 mbs. Two test excavations (T-10 and T-12) were hand excavated to 3 ftbs or sterile material as requested by Ms. Tiffany in avoidance of any possible voids in the coral shelf and proximity to known human burials. The following paragraphs provide an overview and summary of the subsurface testing results. For detailed information regarding each of the test excavations, please refer to the profiles, stratigraphic descriptions, and photographs that follow this more general summary discussion.

The general observed stratigraphy from open trenching primarily consists of imported and locally procured fill deposits (Stratum I) overlying the coral shelf. The imported fill deposits ranged throughout test excavations and include landscaped topsoil fill, crushed coral fill, and in one test excavation basalt gravel base course fill. The locally procured fill deposits consist of a series of sand fills observed primarily near the shoreline and silty clay loam deposits observed in most test excavations. The southern portion of the project area contained a silty clay wetland deposit (Stratum II). These observations are consistent with the USDA soil data for the project area and its vicinity (Foote et al. 1972). All excavations were backfilled after completion of documentation.

Figure 28. 2013 Google Earth Aerial Imagery depicting project area and locations of test excavations (T-1 through T-16)

The silty clay loam alluvial fill observed in the majority of test excavations likely represents the soil runoff from plantation drainage activities during the operation of Ewa Plantation Company, from the early 1900s through the 1920s. According to Immish (1964) approximately 373 acres of coral wasteland was reclaimed by plantation draining. These fill deposits typically overlay the undulating coral shelf and range in depths between 0.11 and 2.14 mbs.

In coastal/western areas, locally procured sand fills were typically observed overlying the silty clay loam alluvial fills ranging between 0.10 and 0.95 mbs. Most of the test excavations containing sand fills were used during utility installation and landscaping activities.

The *mauka*/eastern areas contained crushed coral fill ranging between 0 and 0.45 mbs. The imported crushed coral fill was likely utilized to prepare and maintain the surface following the development of Paradise Cove in the late 1970s.

One previously identified historic property was identified consisting of coastal wetlands (SIHP # -3362). SIHP # -3362 was identified in three excavations (T-14 through T-16) located in the southern portion of the project area and designated as Stratum II. Sub-strata designations occurred in one test excavation (T-14) as here were separate deposits. According to previous documentation, field results, and the lack of evidence on historic maps, the silty clay material is related to coastal wetland deposits with no apparent evidence of land use prior to agriculture in the nineteenth century. According to an 1873 Alexander map, the wetlands were possibly present in the southern portion of the project area extending south into Lanikūhonua Institute, and *makai*/west to an outlet into the Pacific Ocean (see Figure 9). The wetlands appear to be filled in by the early 1900s as it was no longer depicted on historic maps. Additionally, the Glidden et al. (1993) report stated that Nettie Fernandez Tiffany and Walter Kamana noted the presence of a “riverbed” in the southern portion of the project area (Glidden et al. 1993:10–12). Stratum II is considered a component of SIHP # -3362.

Based on testing, the majority of the project area appears to be moderately disturbed from multiple phases of land altering activities including the plantation, ranching, and the development of Paradise Cove. The northern portion of the project area is significantly shallower in comparison to the central and southern portions of the project area.

4.1.1 Test Excavation 1 (T-1)

T-1 is in the northwest portion of the project area, west of the wedding chapel in a landscaped lawn area (see Figure 28). According to historic maps, the area was within a low-lying area near the shoreline. An 1825 Malden map depicts T-1 just east of a settlement and within two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat sandy area until its present use as a landscaped area (see Figure 20). T-1 is oriented northwest-southeast and measures 6.0 m long and 0.75 m wide. The base of excavation was determined by the presence of the coral shelf at 1.15 mbs.

The stratigraphy observed within T-1 consists of a sandy clay loam fill (Stratum Ia), a very gravelly sandy clay loam fill (Stratum Ib), sand fill (Stratum Ic), overlying a silty clay loam fill (Stratum Id) and the coral shelf (Figure 29, Figure 30, and Table 4).

Strata Ia and Ib are imported fill deposits related to landscaping activities for Paradise Cove. Stratum Ic is composed of a locally procured sand fill intermixed with the underlying silty clay loam, likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. Stratum Id is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s.

No historic properties or cultural materials were identified.

4.1.2 Test Excavation 2 (T-2)

T-2 is in the northwest portion of the project area, *makai*/west of the wedding chapel in a landscaped lawn area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-2 just east of a settlement and north of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s the area was left as an undeveloped flat area, west of the boundary of land utilized for sugar cane cultivation until its present use as a landscaped area (Figure 20). T-2 is oriented northeast-southwest and measures 6.0 m long and 0.6 m wide. The base of excavation was determined by the presence of the coral shelf at 0.58 mbs.

The stratigraphy observed within T-2 consists of a gravelly silt loam fill (Stratum Ia), an extremely gravelly sandy loam fill (Stratum Ib), overlying a silty clay loam fill (Stratum Ic) and the coral shelf (Figure 31, Figure 32, and Table 5).

Strata Ia and Ib are imported fill deposits. Stratum Ia is related to landscaping activities for the existing grassy lawn area. Stratum Ib is a crushed coral fill observed in most *mauka* test excavations, likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. A possible inactive irrigation PVC pipe was observed at the southeast end of T-2 running west-southeast at the interface of Strata Ia and Ib between 0.25 to 0.30 mbs. A 1.0-m portion of the trench was hand unexcavated due to safety concerns and to avoid further damage. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s.

No historic properties or cultural materials were identified.

Figure 29. Photograph of T-1 southwest sidewall, view to west

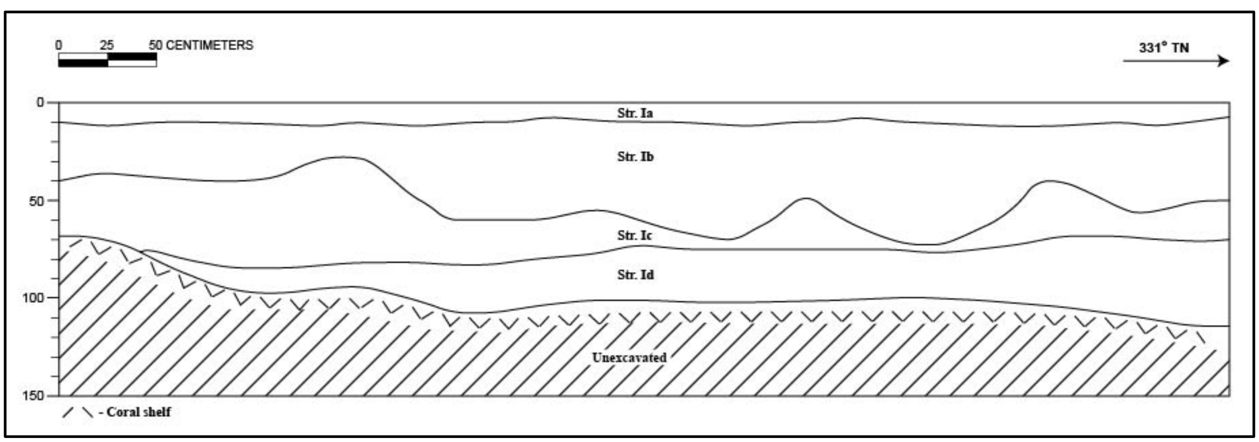


Figure 30. Profile of T-1 southwest sidewall

Table 4. T-1 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–10	Fill; 7.5YR 3/3, dark brown; sandy clay loam; weak, fine, granular structure; moist, friable consistence; no cementation; slightly plastic; mixed origin; clear, smooth lower boundary; fine to medium roots common; landscaped top soil
Ib	10–75	Fill; 10YR 3/2, very dark grayish brown; gravelly sandy clay loam; weak, fine, granular structure; moist, friable consistence; no cementation; slightly plastic; mixed origin; abrupt, wavy lower boundary; fine to medium roots common; coral gravel and several sand inclusions; fill utilized to raise the surface
Ic	28–83	Fill; 10YR 7/4, very pale brown; sand; single-grain (structureless); moist, loose consistence; no cementation; non-plastic; marine origin; abrupt, discontinuous lower boundary; no roots observed; fill utilized to raise the surface
Id	70–115 (BOE)	Fill; 10YR 2/2, very dark brown; silty clay loam; moderate, fine, granular structure; moist, friable consistence; no cementation; plastic; terrigenous origin; lower boundary not visible; no roots observed; fill likely accumulated from plantation activities

Figure 31. Photograph of T-2 west sidewall, view to southwest

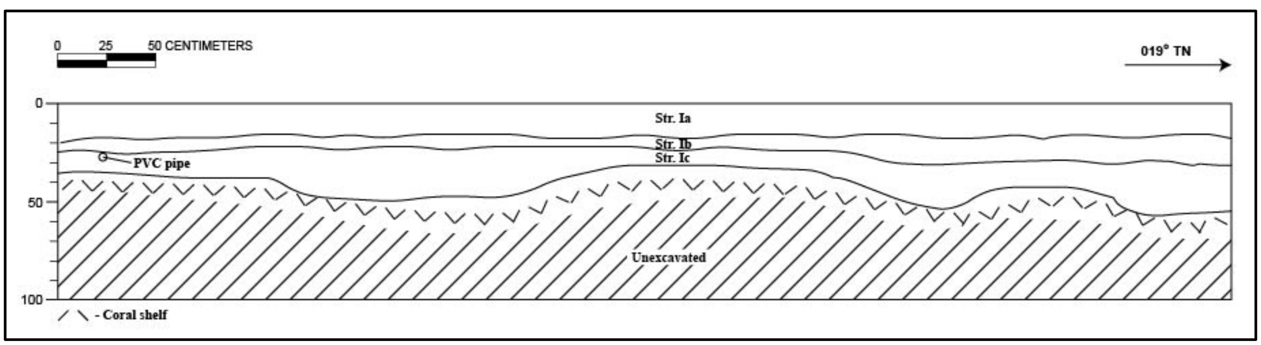


Figure 32. Profile of T-2 west sidewall

Table 5. T-2 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–18	Fill; 10YR 3/3, dark brown; gravelly silt loam; weak, fine, granular structure; moist, friable consistence; no cementation; slightly plastic; terrigenous origin; clear, smooth lower boundary; fine roots common; landscape top soil
Ib	15–30	Fill; 10YR 7/4, very pale brown; extremely gravelly sandy loam; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; marine origin; clear, smooth lower boundary; few medium roots; crushed coral fill
Ic	32–58 (BOE)	Fill; 10YR 2/2, very dark brown; silty clay loam; moderate, fine, granular structure; moist, friable consistence; no cementation; plastic; terrigenous origin; lower boundary not visible; no roots observed; fill likely accumulated from plantation activities

4.1.3 Test Excavation 3 (T-3)

T-3 is in the northeast portion of the project area, east of the wedding chapel in an asphalt-paved parking lot (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-3 east of a settlement and north of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s the area was left as an undeveloped flat area, within the western boundary of land utilized for sugarcane cultivation until its present use as a parking lot (Figure 20). T-3 is oriented northeast-southwest and measures 6.0 m long and 0.75 m wide. The base of excavation was determined by the presence of the coral shelf at 0.73 mbs.

The stratigraphy observed within T-3 consists of asphalt (Stratum Ia), an extremely gravelly sandy loam fill (Stratum Ib), overlying a silty clay loam fill (Stratum Ic) and the coral shelf (Stratum II) (Figure 33, Figure 34, and Table 6).

Strata Ia and Ib are imported fill deposits related to the construction of the existing parking lot near the chapel in the late 1970s. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s.

No historic properties or cultural materials were identified.

4.1.4 Test Excavation 4 (T-4)

T-4 is located at the northeast portion of the project area, south of the wedding chapel in an open grassy area near the shoreline (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-4 south of a settlement and south of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, west of the boundary utilized for sugarcane cultivation and west of a former house until its present use as a landscaped area (see Figure 17 and Figure 20). T-4 is oriented east-west and measures 6.0 m long and 0.60 m wide. The base of excavation was determined by the presence of the coral shelf at 1.20 mbs.

The stratigraphy observed within T-4 consists of a sandy clay loam fill (Stratum Ia), overlying a silty clay loam fill (Stratum Ib) and the coral shelf (Figure 35, Figure 36, Figure 37, and Table 7).

Stratum Ia is related to landscaping activities for the existing grassy lawn area for Paradise Cove likely established in the late 1970s. Stratum Ib is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s. A PVC irrigation line was encountered in the western end of T-4 at approximately 20 cmbs within Stratum Ib. The pipe was broken during excavation. A 3.0-m portion was left unexcavated due to safety issues and to avoid further damage.

Two glass bottles (Acc. #s 1 and 2) were identified within Stratum Ib between 100 to 120 cmbs.

Figure 33. Photograph of T-3 northeast sidewall, view to east

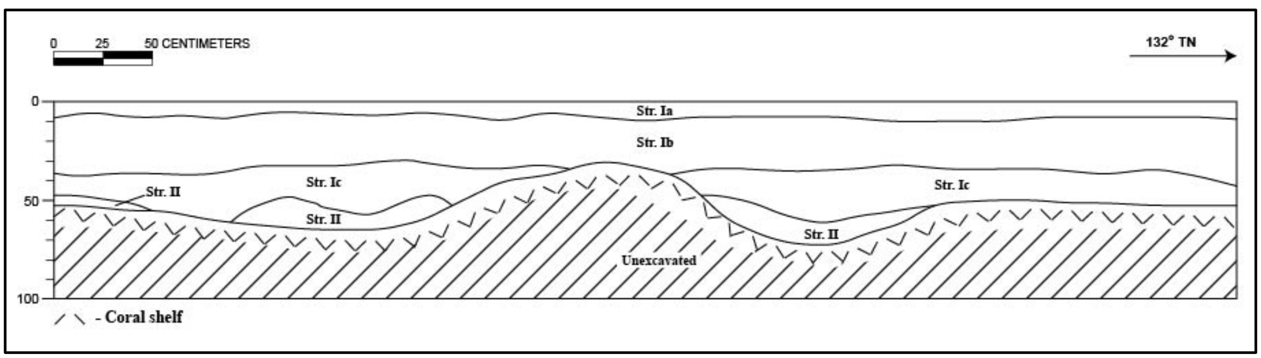


Figure 34. Profile of T-3 northeast sidewall

Table 6. T-3 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–6	Asphaltic concrete
Ib	6–42	Fill; 10YR 6/1, gray; extremely gravelly sandy loam; weak, fine, granular structure; moist, friable consistence; terrigenous origin; abrupt, smooth lower boundary; imported basalt gravel base course
Ic	35–60	Fill; 10YR 2/2, very dark brown; silty clay loam; moderate, fine, granular structure; moist, friable consistence; no cementation; plastic; terrigenous origin; lower boundary not visible; no roots observed; fill likely accumulated from plantation activities
II	47–73 (BOE)	Coral shelf

Figure 35. Photograph of T-4 north sidewall, view to north

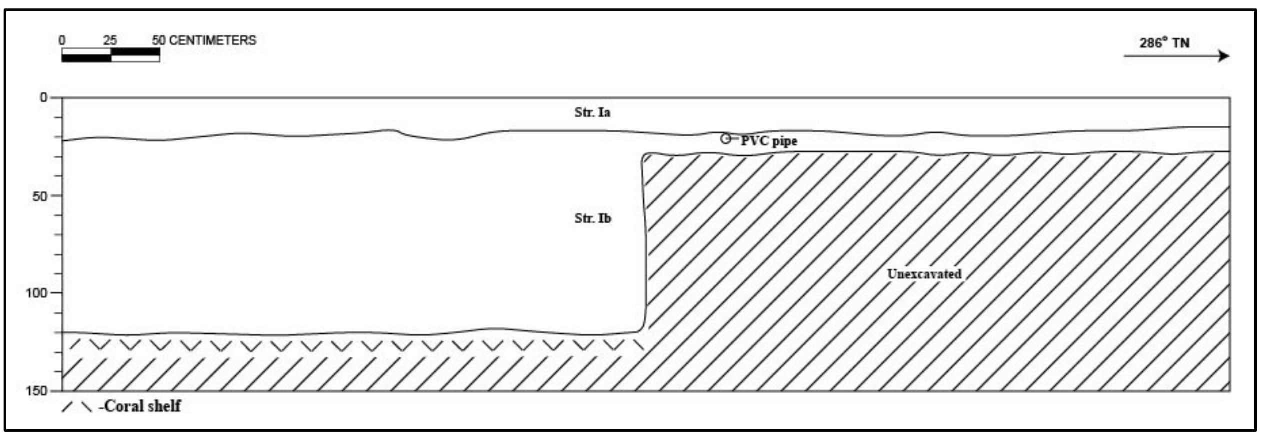


Figure 36. Profile of T-4 north sidewall

Figure 37. Profile of T-4 overview at BOE depicting water line and unexcavated area; view to east

Table 7. T-4 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–20	Fill; 10YR 3/2, very dark grayish brown; sandy clay loam; moderate, medium, granular structure; moist, firm consistence; no cementation; plastic; mixed origin; many, fine roots; diffuse, smooth lower boundary
Ib	20–120 (BOE)	Fill; 10YR 2/2, very dark brown; silty clay loam; moderate, fine, granular structure; moist, friable consistence; no cementation; plastic; terrigenous origin; lower boundary not visible; no roots observed; fill likely accumulated from plantation activities

4.1.5 Test Excavation 5 (T-5)

T-5 is in the central northern portion of the project area, in a sandy pathway (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-4 southeast of a settlement and near one of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, within the boundary utilized for sugarcane cultivation and east of a former house until its present use as a landscaped area (see Figure 17 and Figure 20). T-5 is oriented northwest-southeast and measures 6.0 m long and 0.75 m wide. The base of excavation was determined by the presence of the coral shelf at 1.90 mbs.

The stratigraphy observed within T-5 consists of a very gravelly sand fill (Stratum Ia), overlying a silty clay loam fill (Stratum Ib) and the coral shelf (Figure 38, Figure 39, and Table 8).

Stratum Ia is a composed of a thin compacted sandy surface overlying imported crushed coral fill. The sandy surface is currently utilized as a pathway near restrooms in the northeastern portion of the project area. The crushed coral fill is observed in most *mauka* test excavations, likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. Stratum Ib is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s. An inactive copper utility pipe was encountered within the upper portion of Stratum Ib at 0.34 mbs with no discernable utility pit. A large coral cobble was encountered at 1.14 mbs measuring 0.60 m long and extending 0.3 m out of the northwest sidewall. No discernable pit was noted surrounding the coral cobble. The coral cobble is likely a result from the soil runoff.

No cultural materials or historic properties were identified.

Figure 38. Photograph of T-5 southeast sidewall, view to south

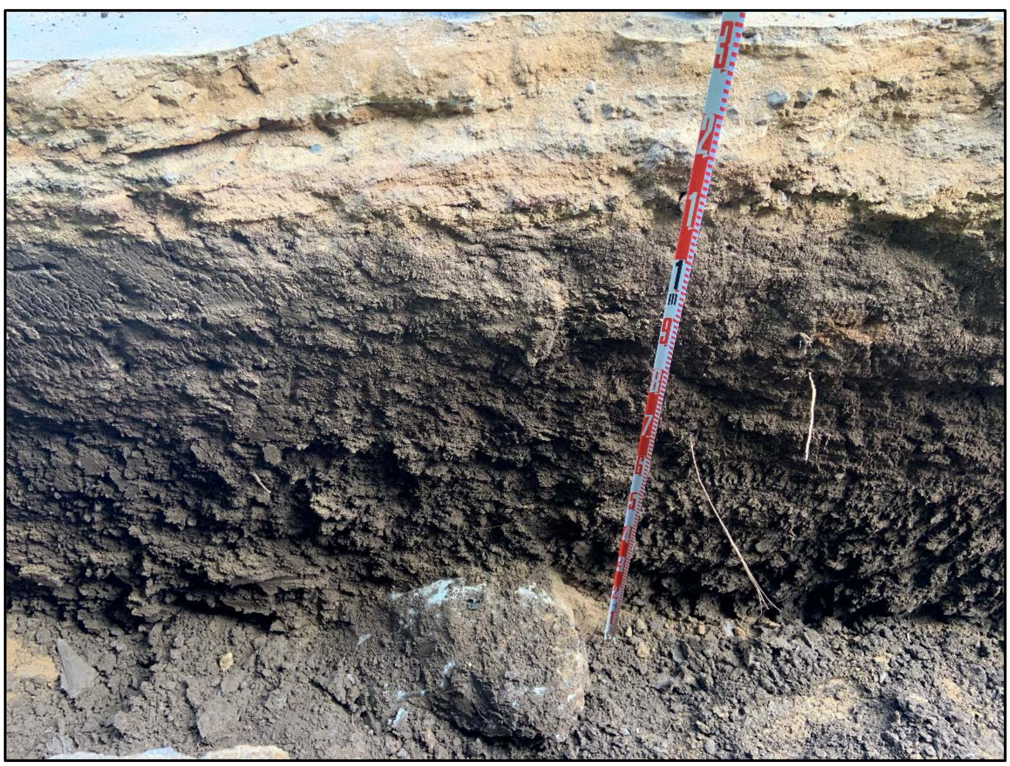


Figure 39. Photograph of T-5 northwest wall showing large coral cobble; view to northwest

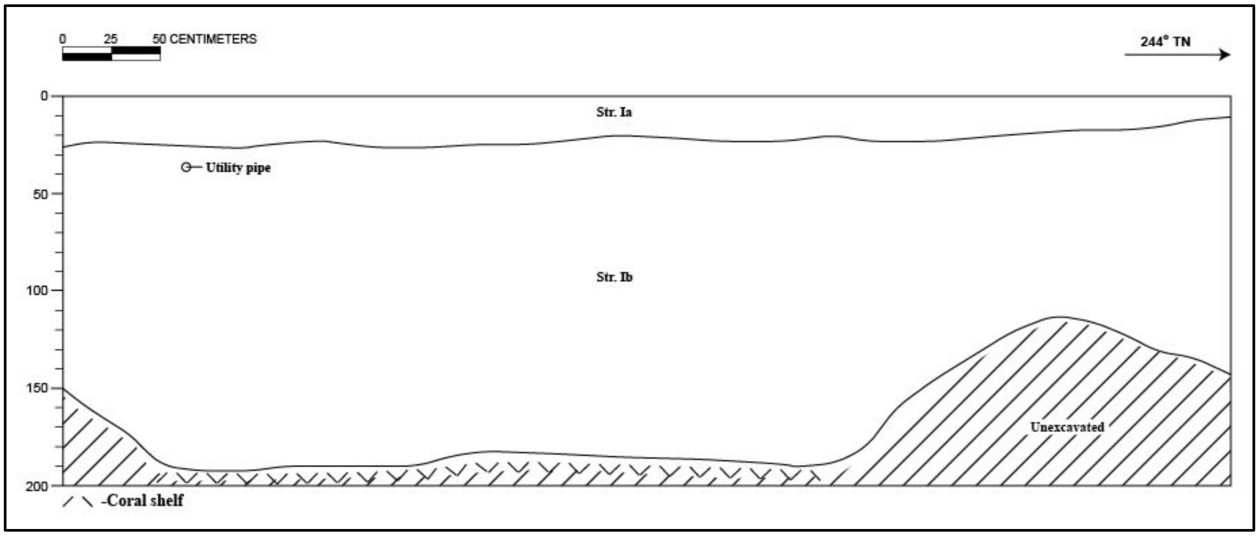


Figure 40. Profile of T-5 southeast sidewall

Table 8. T-5 stratigraphic description

Stratum	**Depth (cmbs)**	**Description**
Ia	0–25	Fill; 10YR 6/6, brownish yellow; very gravelly sand; structureless (single-grain); moist, loose consistence; weak cementation; non-plastic; mixed origin; no roots observed; very abrupt, smooth lower boundary
Ib	11–190 (BOE)	Fill; 10YR 2/2, very dark brown; silty clay loam; moderate, fine, granular structure; moist, friable consistence; no cementation; plastic; terrigenous origin; lower boundary not visible; no roots observed; fill likely accumulated from plantation activities

4.1.6 Test Excavation 6 (T-6)

T-6 is in the northwestern portion of the project area, in a grassy area just east of the *imu* (earth oven) area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-6 southeast of a settlement and south of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, west of the boundary utilized for sugarcane cultivation and east of a former house until its present use as a landscaped area (see Figure 17 and Figure 20). T-6 is oriented north-south and measures 6.1 m long and 0.80 m wide. The base of excavation was determined by the presence of sterile material at 1.44 mbs.

The stratigraphy observed within T-6 consists of a very gravelly sandy clay loam fill (Stratum Ia), a crushed coral extremely gravelly sandy loam fill (Stratum Ib), a cobbly silty clay loam (Stratum Ic), overlying a silty clay loam fill (Stratum II) (Figure 41, Figure 42, and Table 9).

Strata Ia and Ib are imported fill deposits. Stratum Ia is related to landscaping activities for the existing grassy lawn area. Stratum Ib is a crushed coral fill observed in most *mauka* test excavations. Stratum Ib was likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s. The upper portion of Stratum Ic showed evidence of modern disturbance from the development of Paradise Cove containing small glass fragments, asphalt pieces, coral cobbles, PVC pipe fragments, ceramic fragments, a playing card, plastic knife, and aluminum can remnant. None of these artifacts were diagnostic and were considered modern material, and thus were not collected (Figure 43).

No historic properties or cultural materials were identified.

Figure 41. Photograph of T-6 west sidewall, view to southwest

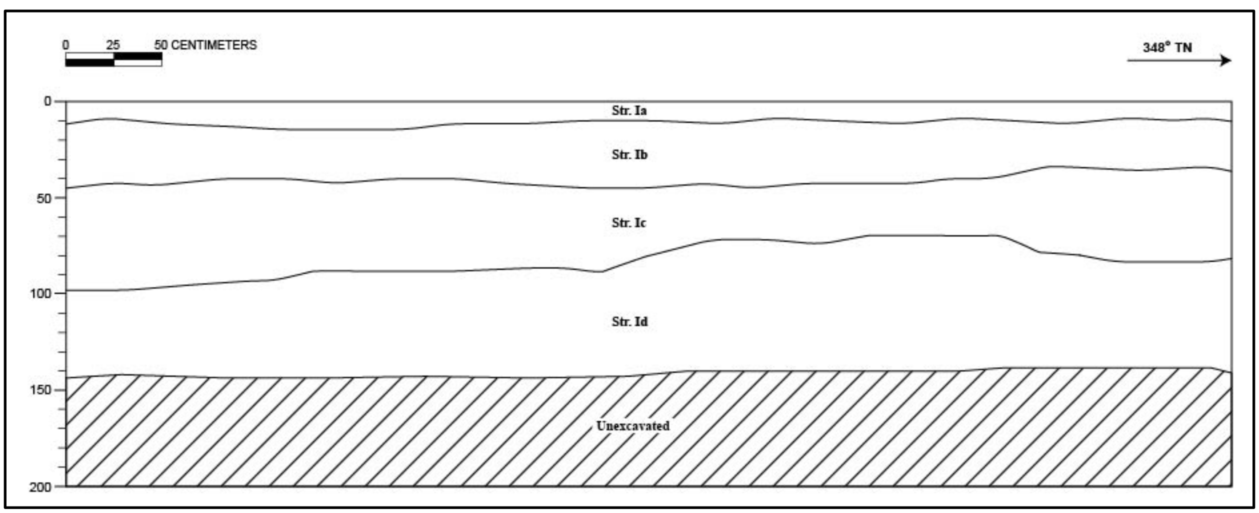


Figure 42. Profile of T-6 west sidewall

Table 9. T-6 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–14	Fill; 7.5YR 3/4, dark brown; very gravelly sandy loam; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; terrigenous origin; many, fine roots; clear, smooth lower boundary
Ib	10–45	Fill; 10YR 5/4, yellowish brown; extremely gravelly sandy loam; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary; imported crushed coral
Ic	35–98	Fill; 10YR 3/2, very dark grayish brown; cobbly silty clay loam; moderate, medium, granular structure; moist, friable consistence; no cementation; slightly plastic; mixed origin; few, fine roots; clear, smooth lower boundary
Id	70–144 (BOE)	Fill; 10YR 3/2, very dark grayish brown; silty clay loam; weak, medium, blocky structure; moist, friable consistence; no cementation; plastic; terrigenous origin; no roots observed; lower boundary not visible; fill likely accumulated from plantation activities

Figure 43. Artifacts observed but not collected from Stratum Ic

4.1.7 Test Excavation 7 (T-7)

T-7 is in the central portion of the project area, in a sandy pathway at a portable building area for Paradise Cove personnel (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-7 southeast of a settlement and south of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, just west of the boundary utilized for sugarcane cultivation and east of a former house until its present use as a landscaped and pathway area (see Figure 17 and Figure 20). T-7 is oriented north-south and measures 6.0 m long and 0.60 m wide. The base of excavation was determined by the presence of sterile material at 2.04 mbs.

The stratigraphy observed within T-7 consists of a sandy loam fill (Stratum Ia), very gravelly sandy loam crushed coral fill (Stratum Ib), overlying a cobbly silty clay loam fill (Stratum Ic) (Figure 44, Figure 45, and Table 10).

Stratum Ia is a composed of a thin compacted sandy surface overlying imported crushed coral fill (Stratum Ib). Stratum Ia is currently utilized as a pathway near portable buildings in the north central portion of the project area. Stratum Ib is observed in most *mauka* test excavations, likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. A metal wire was observed in the eastern portion of T-7 within Stratum Ib at 0.55 mbs. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s. The upper portion of Stratum Ic appears to have been reworked or disturbed as it contains coral gravel, a small amount of concrete debris, and a wire extending out of the east wall. A sand lens was observed at the base of this disturbed portion in the center of the trench in both sidewalls, but not continuous.

No historic properties or cultural materials were identified.

Figure 44. Photograph of T-7 east sidewall, view to east

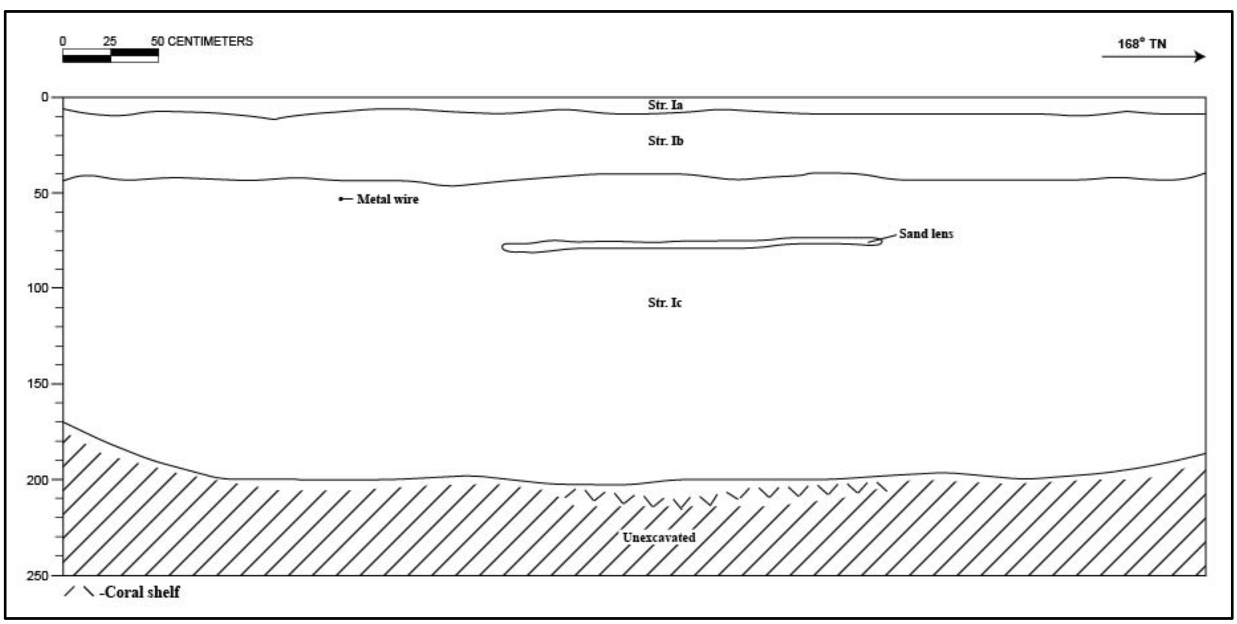


Figure 45. Profile of T-7 southwest sidewall

Table 10. T-7 stratigraphic description

Stratum	**Depth (cmbs)**	**Description**
Ia	0–9	Fill; 10YR 7/4, very pale brown; sandy loam; weak, fine, granular structure; moist, friable consistence; weak cementation; non-plastic; mixed origin; no roots observed; clear, smooth lower boundary
Ib	5–44	Fill; 10YR 4/4, dark yellowish brown; very gravelly sandy loam; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; terrigenous origin; no roots observed; clear, smooth lower boundary; imported crushed coral
Ic	37–204 (BOE)	Fill; 10YR 3/2, very dark grayish brown; cobbly silty clay loam; moderate, medium, granular structure; moist, friable consistence; no cementation; slightly plastic; mixed origin; few, fine roots; lower boundary not visible; fill likely accumulated from plantation activities

4.1.8 Test Excavation 8 (T-8)

T-8 is in the west central portion of the project area, between the *imu* area and main *lū‘au* seating area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-8 southeast of a settlement and south and southeast of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, west of the boundary utilized for sugarcane cultivation and west of a former dwelling until its present use as the *imu* and pathway area (see Figure 17 and Figure 20). T-8 is oriented east-west and measures 6.0 m long and 0.75 m wide. The base of excavation was determined by the presence of the coral shelf at 2.14 mbs.

The stratigraphy observed within T-8 consists of a sand fill (Stratum Ia), extremely gravelly sandy loam fill (Stratum Ib), sand fill (Stratum Ic), overlying a silty clay loam fill (Stratum Id) (Figure 46, Figure 47, and Table 11).

Stratum Ia is a composed of a thin compacted sandy surface overlying imported crushed coral fill (Stratum Ib). Stratum Ia is currently utilized as a pathway between the *imu* and *lū‘au* areas in the west central portion of the project area. Stratum Ib is observed in most *mauka* test excavations and was likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. A PVC pipe containing four wires from an inactive speaker was observed within Stratum Ib at 0.25 mbs. Due to safety concerns and to avoid further damage, approximately 1.4 m of the west portion of T-8 was unexcavated below 0.4 mbs. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s.

No historic properties or cultural materials were identified.

Figure 46. Photograph of T-8 west sidewall, view to southwest

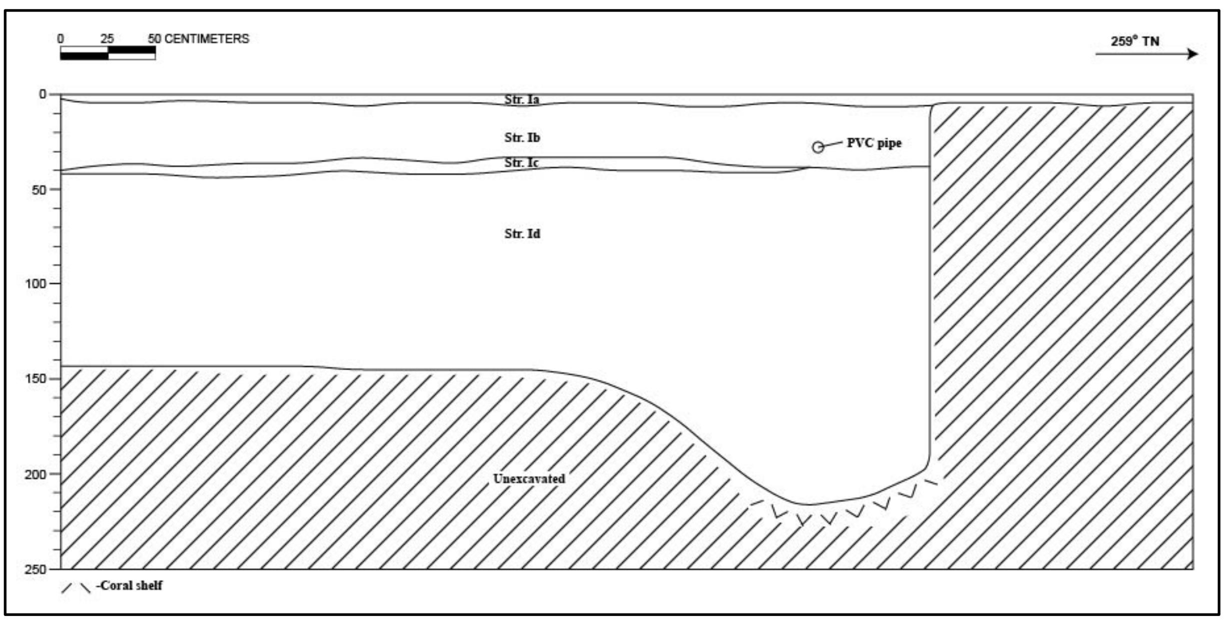


Figure 47. Profile of T-8 southwest sidewall

Table 11. T-8 stratigraphic description

Stratum	**Depth (cmbs)**	**Description**
Ia	0–4	Fill; 10YR 7/4, very pale brown; sand; structureless (single-grain); moist, friable consistence; no cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary
Ib	4–38	Fill; 10YR 7/4, very pale brown; extremely gravelly sandy loam; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary; imported crushed coral
Ic	33–41	Fill; 10YR 7/4, very pale brown; sand; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary
Id	38–214 (BOE)	Fill; 10YR 3/4, dark yellowish brown; silty clay loam; weak, fine, blocky structure; moist, friable consistence; no cementation; plastic; terrigenous origin; no roots observed; lower boundary not visible; fill likely accumulated from plantation activities

4.1.9 Test Excavation 9 (T-9)

T-9 is in the east central portion of the project area, at the main ticket entrance (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-9 southeast of a settlement and south and east of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, within the boundary utilized for sugarcane cultivation and east of two dwellings until its present use as a landscaped area (see Figure 17 and Figure 20). T-9 is oriented east-west and measures 3.0 m long and 0.70 m wide. The base of excavation was determined by the presence of the coral shelf at 1.70 mbs.

The stratigraphy observed within T-9 consists of a silty clay loam fill (Stratum Ia), gravelly sandy clay loam crushed coral fill (Stratum Ib), overlying a silty clay loam fill (Stratum Id) (Figure 48, Figure 49, Table 12).

Strata Ia and Ib are imported fill deposits. Stratum Ia is related to landscaping activities for the existing grassy lawn area. Stratum Ib is a crushed coral fill observed in most *mauka* test excavations. Stratum Ib is likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s. A metal pipe was observed within the upper portion of Stratum Ic at 1.10 mbs in the southwest portion of the trench and was abandoned at this depth. Additionally, a concrete square block measuring 0.40 m long, 0.40 m wide, and 0.05 m thick was observed within Stratum Ic from the backdirt pile.

No historic properties or cultural materials were identified.

Figure 48. Photograph of T-9 west sidewall, view to northwest

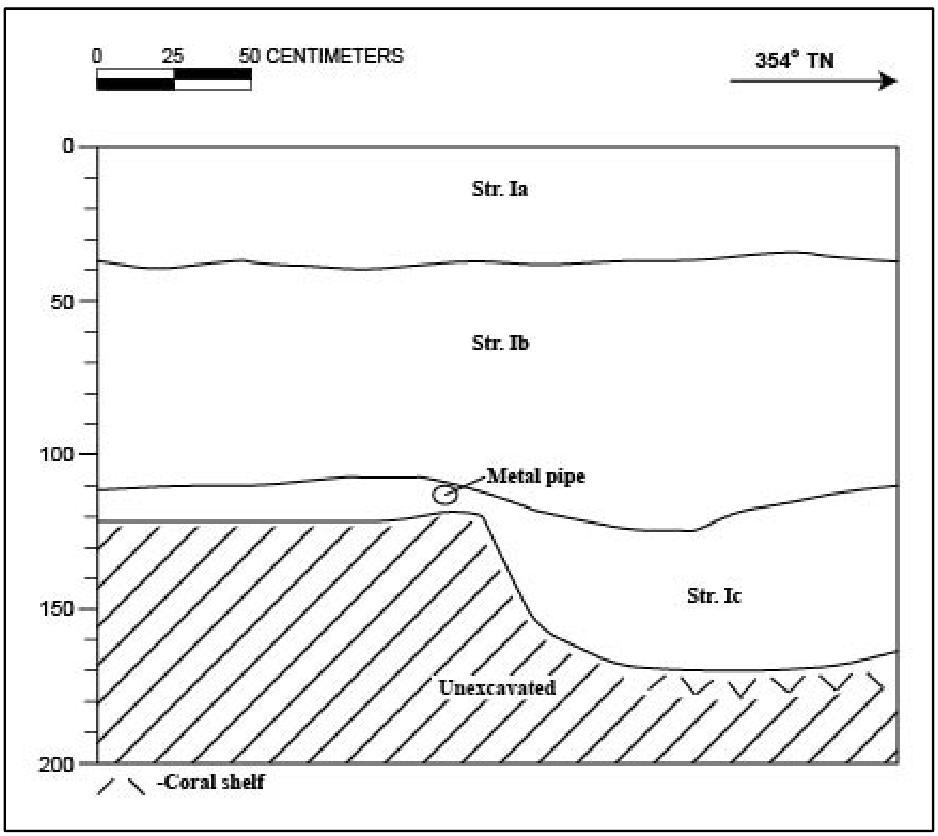


Figure 49. Profile of T-9 west sidewall

Table 12. T-9 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–37	Fill; 10YR 3/2, very dark grayish brown; silty clay loam; moderate, coarse, granular structure; moist, firm consistence; no cementation; very plastic; terrigenous origin; many, medium roots; clear, smooth lower boundary; top soil
Ib	37–120	Fill; 10YR 5/4, yellowish brown; gravelly sandy clay loam; moderate, medium, granular structure; moist, firm consistence; no cementation; very plastic; mixed origin; no roots observed; clear, smooth lower boundary; imported crushed coral
Ic	108–170 (BOE)	Fill; 10YR 3/2, very dark grayish brown; silty clay loam; moderate, coarse, granular structure; moist, firm consistence; no cementation; plastic; terrigenous origin; few, medium roots; lower boundary not visible; fill likely accumulated from plantation activities

4.1.10 Test Excavation 10 (T-10)

T-10 is in the southeast portion of the project area, at the northern portion of the main *lū‘au* stage and dining area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-10 southeast of a settlement and south and southeast of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, west of the boundary utilized for sugarcane cultivation and west of a former dwelling until its present use as the *lū‘au* dining area (see Figure 17 and Figure 20). T-10 is oriented northwest-southeast and measures 6.0 m long and 0.60 m wide. The base of excavation was determined by safety concerns (i.e., void) at 0.85 mbs.

Due to high cultural sensitivity in this area, and at the request of cultural descendant Nettie Fernandez Tiffany, the entirety of T-10 was hand excavated. Due to safety issues, the northwest end of T-10 was excavated to 0.40 mbs, as the softness of the area suggested that further excavation may cause a void.

The stratigraphy observed within T-10 consists of gravelly loamy sand fills (Strata Ia and Ib), overlying a disturbed sandy loam A horizon (Stratum II) (Figure 50, Figure 51, and Table 13).

Strata Ia and Ib consist of locally procured sand deposits related to construction activities for utility installation for Paradise Cove. One PVC irrigation line was observed within the northern portion of T-10 at 0.12 mbs within Stratum Ia. Three inactive gas lines and two metal wires were observed within Stratum Ib. The gas lines were observed between 0.38 and 0.47 mbs in the southern portion of T-10. The metal wires were observed in the northern portion of T-10 at 0.20 mbs and 0.40 mbs. Stratum Ic is a disturbed A horizon observed in the southern portion of T-10 between 0.50 and 0.85 mbs. The disturbance likely occurred during utility installation and construction activities related to Paradise Cove.

Hand excavations yielded field-collected basalt and marine shell observed throughout Strata Ib and Ic. Stratum Ib contained sparse charcoal, fire-affected rock (FAR) and water-rounded basalt cobbles (Acc. #s 11–15), glass fragments, and marine shell (Acc. #s 8–10). Artifacts collected from Stratum Ic included FAR and water-rounded basalt cobbles (Acc. #s 35–30) and marine shell (Acc. #s 16–24).

Figure 50. Photograph of T-10 west sidewall, view to northwest

Figure 51. Photograph of T-10 west wall, view to southwest

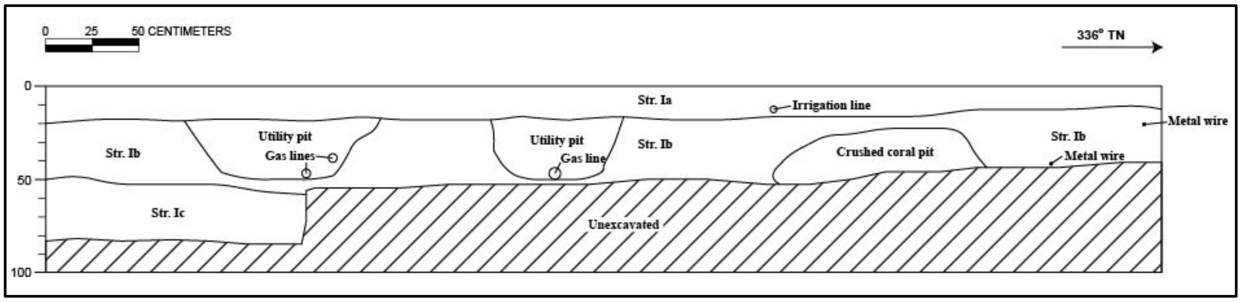


Figure 52. Profile of T-10 southwest sidewall

Table 13. T-10 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–19	Fill; 10YR 5/2, grayish brown; gravelly loamy sand; structureless (single-grain); moist, firm consistence; weak cementation; non-plastic; mixed; no roots observed; abrupt, smooth lower boundary
Ib	10–58	Fill; 10YR 5/3, brown; gravelly loamy sand; structureless (single-grain); moist, loose consistence; no cementation; non-plastic; mixed origin; few, medium roots; abrupt, smooth lower boundary
Ic	50–85 (BOE)	Fill; 10YR 3/2, very dark grayish brown; sandy loam; weak, very fine, granular structure; moist, friable consistence; no cementation; non-plastic; terrigenous origin; few, medium roots; lower boundary not visible; disturbed A horizon

4.1.11 Test Excavation 11 (T-11)

T-11 is in the southeast portion of the project area, at the northern portion of the main *lū‘au* stage and dining area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-11 southeast of a settlement and south and southeast of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s the area was left as a semi-undeveloped flat area, west of the boundary utilized for sugarcane cultivation and west of a former dwelling and roadway until its present use as the dining area (see Figure 17 and Figure 20). T-11 is oriented east-west and measures 6.0 m long and 0.70 m wide. The base of excavation was determined by a broken sewer drain pipe at 0.78 mbs.

The stratigraphy observed within T-11 consists of a loamy sand fill (Stratum Ia), gravelly sandy clay loam fill (Stratum Ib), and a sand fill (Stratum Ic) (Figure 53, Figure 55, and Table 14).

Strata Ia through Ic consist of locally procured sand fills. Locally procured sand deposits were typically observed in coastal/western areas of the project area. These fills were likely used during the utility installation for Paradise Cove. A PVC irrigation pipe was encountered within Stratum Ib at 0.25 mbs in the south wall and east end of T-11. Additionally, a PVC sewer drain pipe was encountered and cracked in the eastern half of T-11 within Stratum Ic at 0.49 mbs, extending to the center of T-11. Due to safety concerns (i.e., biohazard) the trench was abandoned at this depth.

No historic properties or cultural materials were identified.

Figure 53. Photograph of T-11 south sidewall, view to south

Figure 54. Plan view of T-11 showing broken PVC sewer drain pipe; view to south

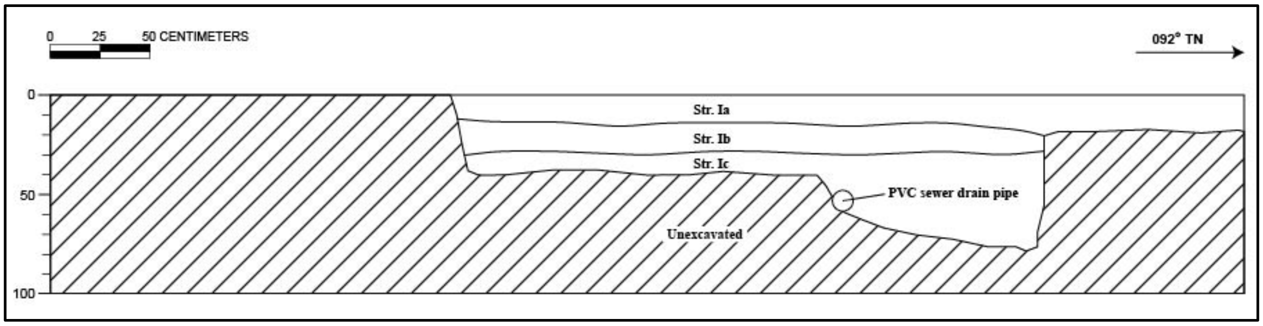


Figure 55. Profile of T-11 north sidewall

Table 14. T-11 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–20	Fill; 10YR 7/3, very pale brown; loamy sand; strong, medium, granular structure; moist, extremely firm consistence; strong cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary
Ib	15–30	Fill; 10YR 3/2, very dark grayish brown; gravelly sandy clay loam; moderate, medium, granular structure; moist, firm consistence; no cementation; plastic; mixed origin; no roots observed; clear, smooth lower boundary
Ic	30–78 (BOE)	Fill; 10YR 5/6, strong brown; sand; structureless (single-grain); moist, loose consistence; no cementation; non-plastic; marine origin; no roots observed; lower boundary not visible

4.1.12 Test Excavation 12 (T-12)

T-12 is in the southwest portion of the project area, at the southern portion of the main *lūʻau* seating area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-12 southeast of a settlement and south and east of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as an undeveloped flat area, west of the boundary utilized for sugarcane cultivation and within the vicinity of a former dwelling (likely the former caretaker's home) until its present use as the *lūʻau* dining area (see Figure 17 and Figure 20). T-12 is oriented northwest-southeast and measures 6.0 m long and 0.60 m wide. The base of excavation was determined by the presence of sterile material at 0.75 mbs.

Due to high cultural sensitivity in this area, and at the request of cultural descendant Nettie Fernandez Tiffany, the entirety to T-12 was hand excavated in an effort to avoid possible burial finds.

The stratigraphy observed within T-12 consists of very gravelly loamy sand crushed coral fill (Stratum I), overlying a cobbly sandy clay loam fill (Stratum Ic) (Figure 50, Figure 51, and Table 13).

Stratum Ia is an imported fill deposit consisting of crushed coral fill observed in most *mauka* test excavations. Stratum Ia was likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. Stratum Ia contained glass and ceramic fragments and one corroded metal nail. These items were not diagnostic and were not collected (Figure 58). Stratum Ib is a locally procured fill deposit. The upper portion of Stratum Ib contained a small amount of charcoal flecking and one faunal medium mammal bone fragment.

No other cultural materials or historic properties were identified.

Figure 56. Photograph of T-12 northwest sidewall, view to north

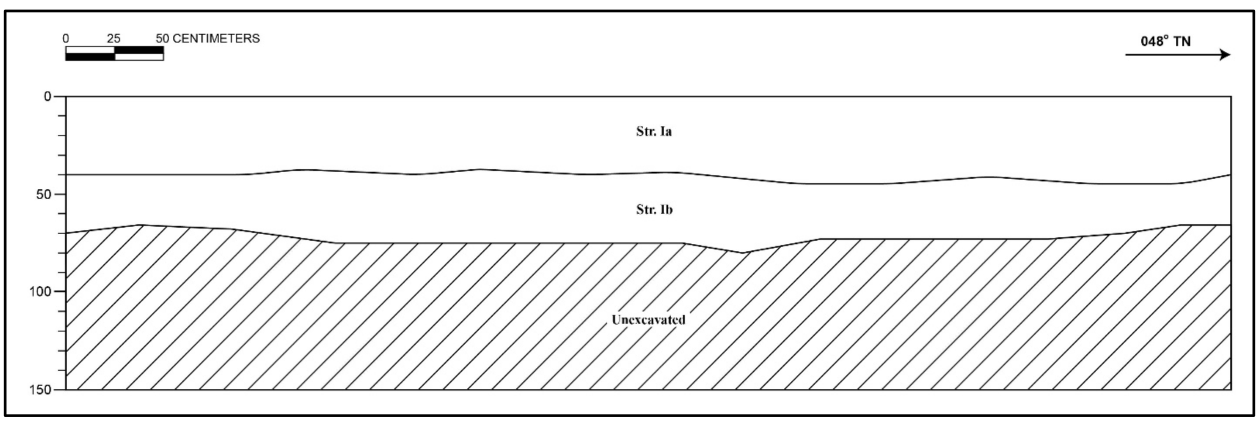


Figure 57. Profile of T-12 northwest sidewall

Table 15. T-12 stratigraphic description

Stratum	Depth (cmbs)	Description
I	0–40	Fill; 10YR 6/3, pale brown; very gravelly loamy sand; structureless (single-grain); moist, loose consistence; no cementation; non-plastic; marine origin; no roots observed; abrupt, smooth lower boundary
Ic	37–75 (BOE)	Fill; 10YR 3/2, very dark grayish brown; cobbly sandy clay loam; moderate, very fine, granular structure; moist, firm consistence; no cementation; slightly plastic; mixed origin; no roots observed; lower boundary not visible

Figure 58. Artifacts observed not collected from T-12 Stratum Ia

4.1.13 Test Excavation 13 (T-13)

T-13 is in the south central portion of the project area, in an open sandy walkway area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-13 southeast of a settlement and south and east of two former trails in which a portion was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as a semi-undeveloped flat area, west of the boundary utilized for sugarcane cultivation and south of a former dwelling and roadway until its present use as a walkway near a current bar area (see Figure 17 and Figure 20). T-13 is oriented northeast-southwest and measures 5.1 m long and 0.80 m wide. The base of excavation was determined by the breakage of an active PVC fire sprinkler line at 1.60 mbs.

The stratigraphy observed within T-13 consists of loamy sand fill (Stratum Ia), a gravelly sandy clay loam fill (Stratum Ib), fine sand fill (Stratum Ic), sandy clay loam fill (Stratum Id), extremely gravelly loamy sand fill (Stratum Ie), silty clay loam fill (Stratum If), sandy clay loam fill (Stratum Ig), and a silty clay loam fill (Stratum Ih) (Figure 59, Figure 61, and Table 16).

Stratum Ia is composed of a locally procured thin compacted sandy surface utilized for the existing sandy walkway area. Stratum Ib through Ig consists of imported fill deposits. These fill deposits were likely utilized to raise the surface for construction purposes including utility installation for Paradise Cove from the late 1970s. Stratum Ib contained an abandoned metal utility pipe observed in the southeast wall at 0.44 mbs. A PVC fire sprinkler line was encountered within Stratum Ic in the southwest end of T-13 at 1.13 mbs. The excavation was abandoned as water filled the trench before the fire sprinkler line was able to be shut off. Following the water shut off, water was removed via the excavator bucket for repair of the fire sprinkler line. The sidewall was exposed and was documented. Stratum Ih is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s. Several glass bottle fragments (Acc. #s 3–5) were collected from the spoils pile from Stratum Ih.

No other historic properties or cultural materials were identified.

Figure 59. T-13 northwest sidewall, view to north

Figure 60. Southwest end of T-13 showing broken PVC fire sprinkler line at 1.13 mbs

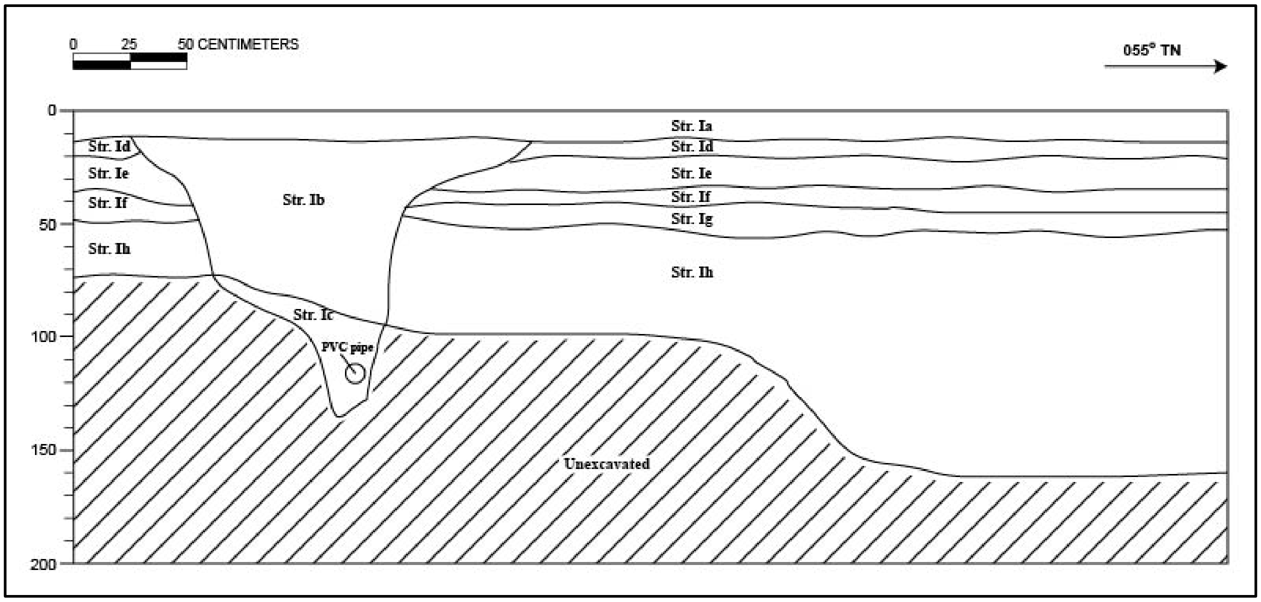


Figure 61. Profile of T-13 northwest sidewall

Table 16. T-13 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–12	Fill; 10YR 5/6, yellowish brown; loamy sand; moderate, medium, granular structure; moist, firm consistence; weak cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary
Ib	12–95	Fill; 10YR 2/2, very dark brown; gravelly sandy clay loam; moderate, medium, granular structure; moist, firm consistence; no cementation; plastic; mixed origin; no roots observed; lower boundary not visible
Ic	73–135	Fill; 10YR 5/8, yellowish brown; fine sand; structureless (single-grain); moist, loose consistence; no cementation; non-plastic; marine origin; no roots observed; lower boundary not visible
Id	12–20	Fill; 10YR 2/2, very dark brown; sandy clay loam; moderate, medium, granular structure; moist, firm consistence; no cementation; plastic; terrigenous origin; no roots observed; clear, smooth lower boundary
Ie	20–42	Fill; 10YR 6/3, pale brown; extremely gravelly loamy sand; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary; imported crushed coral
If	33–48	Fill; 5YR 3/3, dark reddish brown; silty clay loam; moderate, medium, granular structure; moist, friable consistence; no cementation; plastic; terrigenous origin; no roots observed; clear, smooth lower boundary
Ig	40–55	Fill; 10YR 4/2, dark grayish brown; sandy clay loam; moderate, medium, granular structure; moist, firm consistence; no cementation; plastic; mixed origin; no roots observed; clear, smooth lower boundary
Ih	48–160 (BOE)	Fill; 10YR 2/2, very dark brown; silty clay loam; moderate, medium, blocky structure; moist, firm consistence; no cementation; very plastic; terrigenous origin; few, coarse roots; lower boundary not visible; fill likely accumulated from plantation activities

4.1.14 Test Excavation 14 (T-14)

T-14 is in the southwest portion of the project area, in an open sandy walkway area (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-14 southeast of a settlement and south and east of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as a undeveloped flat area, west of the boundary utilized for sugarcane cultivation and south of a former dwelling and west of a roadway until its present use as a walkway near a current bar area (see Figure 17 and Figure 20). T-14 is oriented north-south and measures 6.0 m long and 0.60 m wide. The base of excavation was a 1.56 mbs and was determined upon reaching the water table at 1.51 mbs.

The stratigraphy observed within T-14 consists of loamy sand fill (Stratum Ia), a silty clay fill (Stratum Ib), sandy clay loam fill (Stratum Ic), silty clay fill (Stratum Id), overlying naturally occurring silty clay (Strata IIa and IIb), and natural sandy clay loam (Stratum III) (Figure 62, Figure 64, and Table 17).

Stratum Ia is a composed of a locally procured thin compacted sandy surface utilized for the existing sandy walkway area. Strata Ib and Ic are imported fill deposits. Strata Ib and Ic were likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. Stratum Ib contains basalt and coral gravel, and discontinuous sand lenses at the base of the layer.

Strata IIa and IIb are wetland deposits evidenced by gleyed silty clay material containing organic rootlets. Stratum IIa was observed between 1.22 and 1.35 mbs. Stratum IIb was observed between 1.30 and 1.35 mbs. Three bulk sediment samples were collected from Strata II. One bulk sample was collected from Strata IIa/IIb from the east wall between 1.26 to 1.37 mbs, one bulk sample was collected from Strata IIa/IIb from the spoils pile, and one bulk sample was collected from Stratum IIb from the backdirt pile. One sample from the Stratum IIb backdirt pile was sent for pollen analysis. Based on previous documentation, field results, and the lack of evidence on historic maps, Stratum II is related to coastal wetland deposits with no apparent evidence of land or agricultural use prior to the nineteenth century, designated as SIHP # -3362 (see Figure 9). For additional information please refer to Section 7 Historic Property Descriptions.

Stratum III consists of a naturally occurring marine deposit.

Figure 62. Photograph of T-14 east sidewall, view to southeast

Figure 63. T-14 close-up of east sidewall showing Strata IIa though III

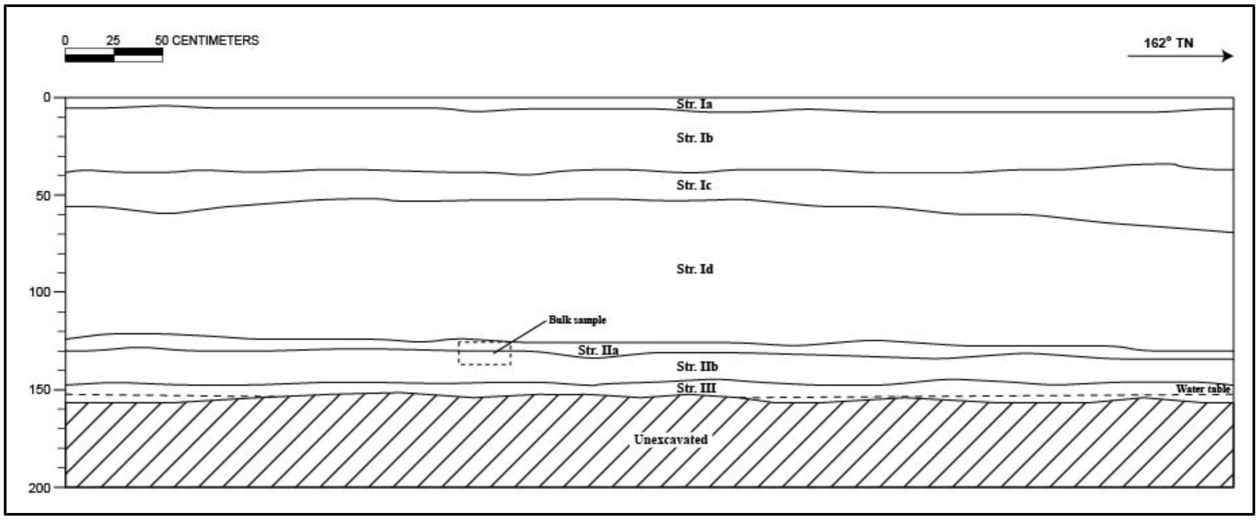


Figure 64. Profile of T-14 east sidewall

Table 17. T-14 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–7	Fill; 10YR 7/4, very pale brown; loamy sand; weak, very fine, granular structure; moist, loose consistence; weak cementation; non-plastic; marine origin; no roots observed; clear, smooth lower boundary
Ib	5–38	Fill; 5YR 3/3, dark reddish brown; silty clay; strong, coarse, blocky structure; moist, extremely firm consistence; no cementation; very plastic; terrigenous origin; no roots observed; clear, smooth lower boundary
Ic	53–67	Fill; 10YR 3/2, very dark grayish brown; sandy clay loam; moderate, medium, granular structure; moist, friable consistence; no cementation; plastic; mixed origin; no roots observed; diffuse, smooth lower boundary
Id	52–130	Fill; 10YR 4/2, dark grayish brown; silty clay; moderate, medium, blocky structure; moist, friable consistence; no cementation; very plastic; terrigenous origin; few, fine roots; diffuse, smooth lower boundary; fill likely accumulated from plantation activities
IIa	122–135	Natural; 10YR 3/1, very dark gray; silty clay; structureless (massive); wet, sticky consistence; no cementation; very plastic; terrigenous origin; no roots observed; diffuse, smooth lower boundary; a component of SIHP # -3362
IIb	130–135	Natural; 10YR 2/1, black; silty clay; structureless (massive); wet, sticky consistence; no cementation; very plastic; terrigenous origin; no roots observed; diffuse, smooth lower boundary; a component of SIHP # -3362
III	145–156 (BOE)	Natural; N 3/, very dark gray; sandy clay loam; weak, fine, granular structure; wet, slightly sticky consistence; no cementation; slightly plastic; mixed origin; no roots observed; lower boundary not visible; lagoonal deposit

4.1.15 Test Excavation 15 (T-15)

T-15 is in the southwest portion of the project area, in an open grassy area immediately north of Lanikūhonua Institute (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-15 southeast of a settlement and south and east of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as a undeveloped flat area, far west of the boundary utilized for sugarcane cultivation, and south of a former dwelling until its present use as an open grassy area adjacent to the Paradise Cove beach (see Figure 17 and Figure 20). T-15 is oriented north-south and measures 6.20 m long and 0.60 m wide. The base of excavation was a 1.75 mbs and was determined upon reaching the water table at 1.60 mbs. The coral shelf was not observed.

The stratigraphy observed within T-15 consists of a silty clay loam fill (Stratum Ia), a sand fill (Stratum Ib), gravelly sandy clay loam fill (Stratum Ic), overlying a sandy clay loam fill (Stratum II) (Figure 65, Figure 66, and Table 18).

Stratum Ia is related to landscaping activities for the existing grassy lawn area for Paradise Cove likely established in the late 1970s. Stratum Ib is composed of a locally procured sand fill intermixed with the underlying silty clay loam. Locally procured sand deposits were typically observed in coastal/western areas of the project area. These fills were likely used during the utility installation for Paradise Cove. Stratum Ib contained two PVC pipes and one metal pipe in the northern portion of T-15 between 0.20 and 0.75 mbs. Fish and cut cow bone were also observed within Stratum Ib and collected at approximately 0.80 to 0.90 mbs. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s. The upper portion of Stratum Ic contained metal debris, brown and clear glass sherds, and rubber that was observed, but not collected as they were not diagnostic and considered modern material (Figure 67).

Stratum II is a wetland deposit evidenced by a reddish-brown sandy clay loam containing sparse aquatic snails and charcoal observed between 1.55 and 1.75 mbs. Stratum II differs in color and is closer to the shoreline than other test excavations (T-14 and T-16) containing SIHP # -3362, suggesting it represents an edge for the coastal wetlands. The color difference likely represents partial obliteration and disturbance from soil runoff from former plantation drainage activities in the preceding stratum (Stratum Ic). Coral boulders were observed at the north end of T-15. One bulk sediment sample was collected from Stratum II in the backdirt pile at approximately 1.50 and 1.70 mbs. A portion of the bulk sample from Stratum II was sent for pollen analysis. Based on previous documentation, field results, and the lack of evidence on historic maps, Stratum II is related to coastal wetland deposits with no apparent evidence of land or agricultural use prior to the nineteenth century, designated as SIHP # 50-80-12-3362 (see Figure 9). For additional information please refer to Section 6 Historic Property Descriptions.

Figure 65. Photograph of T-15 east sidewall, view to southeast

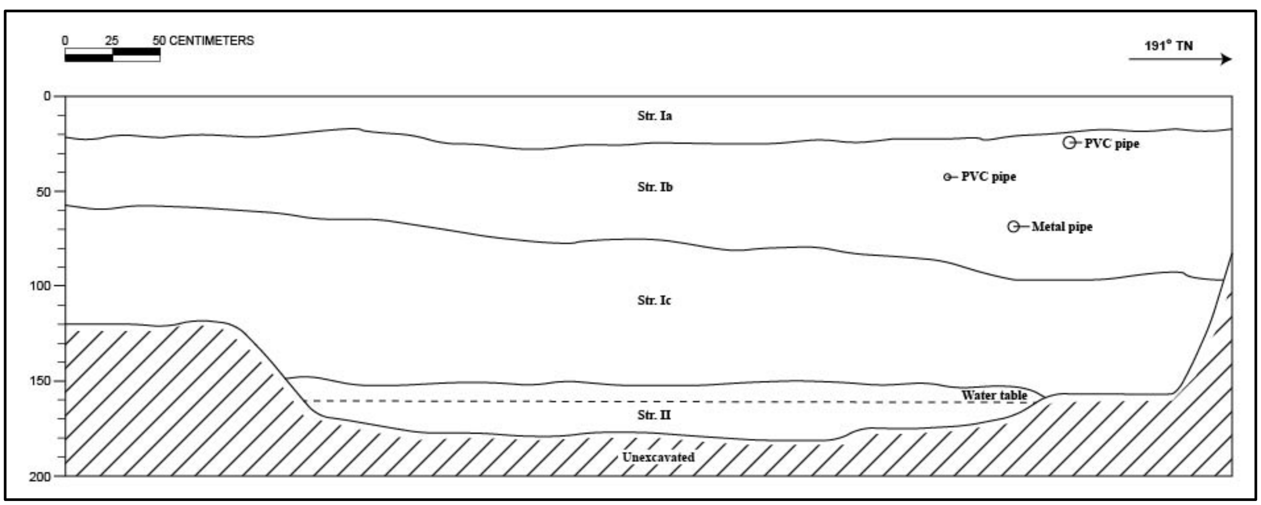


Figure 66. Profile of T-15 east sidewall

Table 18. T-15 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–25	Fill; 10YR 3/3, dark brown; silty clay loam; moderate, fine, granular structure; moist, friable consistence; no cementation; non-plastic; terrigenous origin; many, medium roots; clear, smooth lower boundary
Ib	22–95	Fill; 10YR 7/4, very pale brown; sand; structureless (single-grain); moist, loose consistence; no cementation; non-plastic; marine origin; few, medium roots; abrupt, smooth lower boundary
Ic	57–155	Fill; 10YR 3/2, very dark grayish brown; gravelly sandy clay loam; moderate, fine, granular structure; moist, friable consistence; no cementation; non-plastic; mixed origin; medium roots common; lower boundary not visible; fill likely accumulated from plantation activities
II	155–175 (BOE)	Fill; 5YR 3/2, dark reddish brown; sandy clay loam; moderate, fine, blocky structure; moist, firm consistence; no cementation; plastic; mixed origin; no roots observed; lower boundary not visible, a component of SIHP # -3362

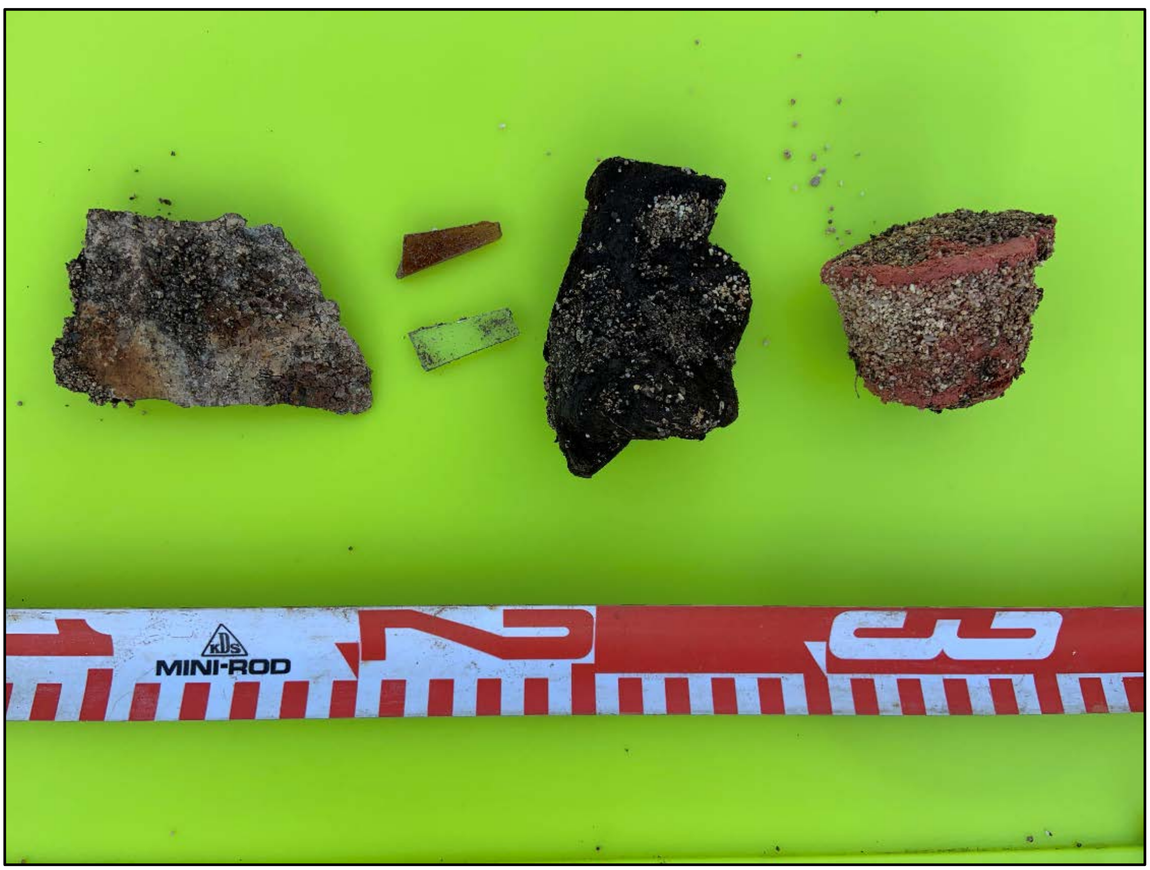


Figure 67. Non-diagnostic and modern artifacts from T-15 Stratum Ic

4.1.16 Test Excavation 16 (T-16)

T-16 is in the southeast portion of the project area, in an open grassy area adjacent to Lanikūhonua Institute (see Figure 28). According to historic maps the area was in a low-lying area near the shoreline. An 1825 Malden map depicts T-14 southeast of a settlement and east and west of two former trails, a portion of which was utilized until the 1950s (see Figure 8 and Figure 17). By the 1970s, the area was left as a undeveloped moderately vegetated area, west of the boundary utilized for sugarcane cultivation, south of a former dwelling, and west of a road until its present use as an open grassy area west of a mini putting green (see Figure 17 and Figure 20). T-16 is oriented north-south and measures 6.0 m long and 0.60 m wide. The base of excavation was determined upon reaching the coral shelf at 1.85 mbs in the northern portion of T-16.

The stratigraphy observed within T-16 consists of a gravelly silt loam fill (Stratum Ia), an extremely gravelly sandy loam crushed coral fill (Stratum Ib), a gravelly silty clay loam fill (Stratum Ic), overlying a natural silty clay wetland deposit (Stratum II), and a natural extremely gravelly sandy loam marine sand (Stratum III) (Figure 68, Figure 69, and Table 19).

Strata Ia and Ib are imported fill deposits. Stratum Ia is related to landscaping activities for the existing grassy lawn area. Stratum Ib is a crushed coral fill observed in most *mauka* test excavations. Stratum Ib was likely utilized to raise the surface during the development of Paradise Cove in the late 1970s. Stratum Ic is an alluvial fill that likely represents the soil runoff from plantation drainage activities of the Ewa Plantation Company that operated from the early 1900s through the 1920s.

Stratum II is a wetland deposit evidenced by the presence of a gleyed silty clay material containing sparse aquatic snails observed between 1.10 and 1.62 mbs. Stratum II is a component of SIHP # -3362, coastal wetlands. One bulk sediment sample was collected from the east wall between 1.25 and 1.40 mbs. A portion of the bulk sample from Stratum II was sent for pollen analysis. Based on previous documentation, field results, and the lack of evidence on historic maps, Stratum II is related to coastal wetland deposits with no apparent evidence of land or agricultural use prior to the nineteenth century, designated as SIHP # -3362 (see Figure 9). For additional information please refer to Section 6 Historic Property Descriptions.

Stratum III consists of a naturally occurring marine deposit overlying the coral shelf.

Figure 68. Photograph of T-16 east sidewall, view to northeast

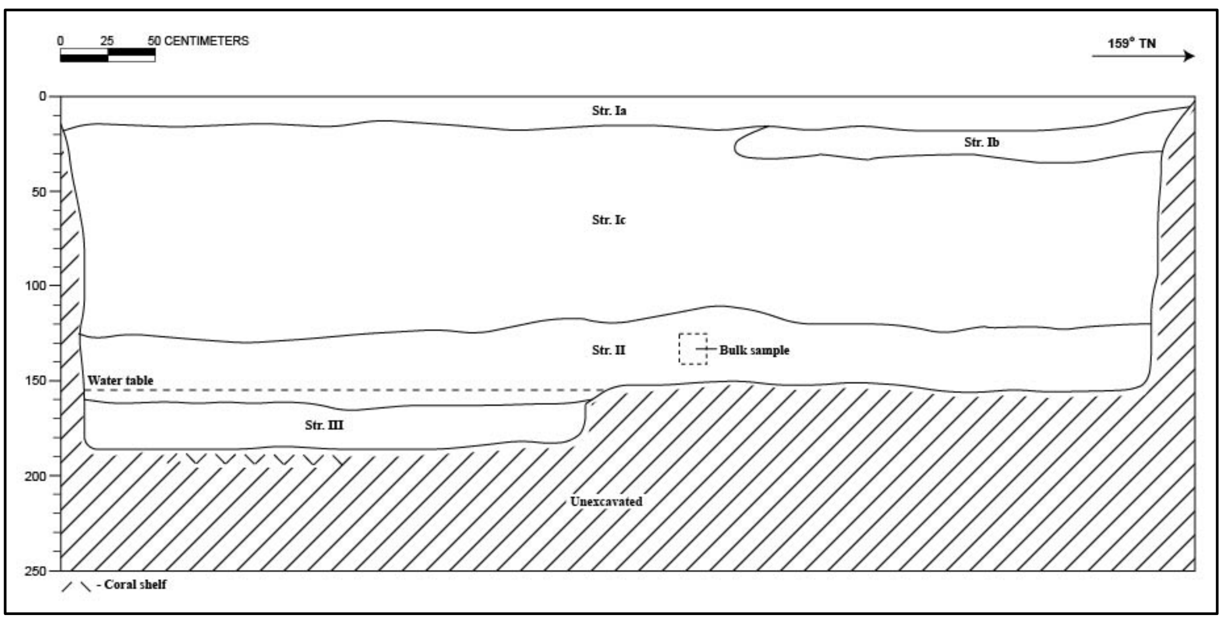


Figure 69. Profile of T-16 east sidewall

Table 19. T-16 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0–17	Fill; 10YR 3/3, dark brown; gravelly silt loam; weak, fine, granular structure; moist, friable consistence; weak cementation; slightly plastic; terrigenous origin; medium roots common; clear, smooth lower boundary; top soil
Ib	5–37	Fill; 10YR 7/4, very pale brown; extremely gravelly sandy loam; weak, fine, granular structure; moist, friable consistence; no cementation; non-plastic; terrigenous origin; no roots observed; clear, discontinuous lower boundary; imported crushed coral
Ic	15–128	Fill; 7.5YR 3/3, dark brown; gravelly silty clay loam; moderate, medium, blocky structure; moist, friable consistence; weak cementation; slightly plastic; terrigenous origin; few, fine roots; clear, wavy lower boundary; fill likely accumulated from plantation activities
II	110–162	Natural; 10Y 3/1, very dark greenish gray; silty clay; moderate, medium, blocky structure; moist, firm consistence; weak cementation; non-plastic; terrigenous origin; few, fine roots; clear, smooth lower boundary; a component of SIHP # -3362
III	160–187 (BOE)	Natural; 10YR 8/2, very pale brown; extremely gravelly sandy loam; weak, fine, granular structure; wet, slightly sticky consistence; no cementation; slightly plastic; marine origin; no roots observed; lower boundary not visible

Section 5 Results of Laboratory Analysis

Materials collected in the field were curated and analyzed by CSH personnel as described in Section 2.2. Laboratory analyses include historic artifact analysis conducted by Allison Hummel M.Sc., and faunal analysis conducted by Alison Welser, M.A.

5.1 Artifact Analysis

5.1.1 Historic Artifacts

Seven artifacts or artifact fragments consisting of seven glass bottles or bottle fragments (Acc. #s 1–7) were collected during the project (Table 20).

Artifacts were assessed for type, material, origin, and date. Origin was only identified more specifically than by country in the case of artifacts that could be positively identified as having originated or been made specifically for use in Hawaiʻi.

For dating purposes, artifacts were assessed to determine date of manufacture first and foremost. Date ranges may be very wide due to lack of diagnostic characteristics needed to narrow the range. Additionally, it is not expected that artifacts were always consumed and discarded immediately; many types of artifacts would have had long periods of use between manufacture and deposition. The artifact summary includes a discussion of *terminus ante quem* and *terminus post quem* limits for dates of deposition of artifacts, features, historic properties, and stratigraphic layers based on a combination of artifact manufacture/import dates and available land use information. Photographs of select artifacts are presented in Figure 70 through Figure 76.

All terminology used to describe bottle traits and all bottle dating information in this report section is based on information from the U.S. Department of Interior, Bureau of Land Management (BLM)/ Society of Historic Archaeology (SHA) "Historic Glass Bottle Identification and Information Website" (BLM/SHA 2019), unless otherwise noted. Research on historic bottles focused on the function and manufacturing dates of the items, using reference texts and online resources to identify glass manufacturers' marks on bottles and company histories of the content brands.

There are three stages in the evolution of glass bottle manufacture: free blowing, mold blowing, and machine manufacture. Since antiquity, bottles have been free blown with a blow-pipe. These types of bottles are usually asymmetrical, crudely made, and often have a pontil mark where a rod was used to hold the bottle during the last stages of manufacture. The lip of the bottle was finished by hand. In the United States, these types of bottle usually pre-date ca. 1865 (BLM/SHA 2019).

Around ca. 1800, glassworkers began to blow bottles into some type of mold, usually a metal mold. One of the first types of molds was the one-piece dip mold (1800–1870). Bottles made with this type of mold do not have seams and only rarely have embossing. Beginning in 1830, the one-piece dip mold was gradually replaced by the three-piece dip mold (1830–1870). A bottom mold was used to form the body of the bottle and a hinged top mold was used to form the shoulder, neck, and finish of the bottle. This resulted in a seam wrapping horizontally around the shoulder and two vertical side seams extending from the shoulder seam up the neck. There are no vertical side seams on the lower body. Turn mold bottles (1870–1920) became popular after 1870. They were made by turning the bottles inside the mold, which left the body of the bottles seamless and shiny. Unlike

Table 20. Glass bottle artifact assemblage

Acc. #	Provenience	Material	Type	Description	Origin	Age
1	T-4; Str. Ib; 100-120 cmbs	Glass	Bottle	Aqua glass bottle, base to heel fragments [2], round shape, flat base, unknown method of manufacture; embossing: “SUNRISE SODA [WATER WORKS] LTD” in arch on base	Hawai‘i	Post-1907
2		Glass	Bottle	Amber glass beer bottle (likely “Packie” bottle), base to heel fragment, stippled base and body, machine-made	United States	1939-ca. 1949
3	T-13; Str. Ih; spoils	Glass	Bottle	Colorless glass Bierley’s Orange Drink bottle, body to shoulder fragment, round shape, fluted shoulder and lower body, stippled body, machine-made; embossing: “TRADE[MARK] // […] . OZ.” horizontally below shoulder, “Birele[y’s] (script)” diagonally on body	United States	1950s-1960s
4		Glass	Bottle	Aqua glass bottle, body fragment, round shape, unknown method of manufacture	–	–
5		Glass	Bottle	Colorless glass bottle, body fragment, round shape, unknown method of manufacture	–	–
6	T-10; Str. Ib; 10-58 cmbs	Glass	Bottle	Colorless glass bottle, heel fragment, round shape, unknown method of manufacture	–	–
7		Glass	Bottle	Amber glass “Packie” beer bottle, body fragments [2] and body to shoulder fragment [1], round shape, stippled body, machine-made; embossing: “[NO DE]POSIT NO R[ETURN]”	United States	1939-ca. 1949

Figure 70. Acc. # 1, aqua glass Sunrise Soda Water Works bottle, unknown method of manufacture

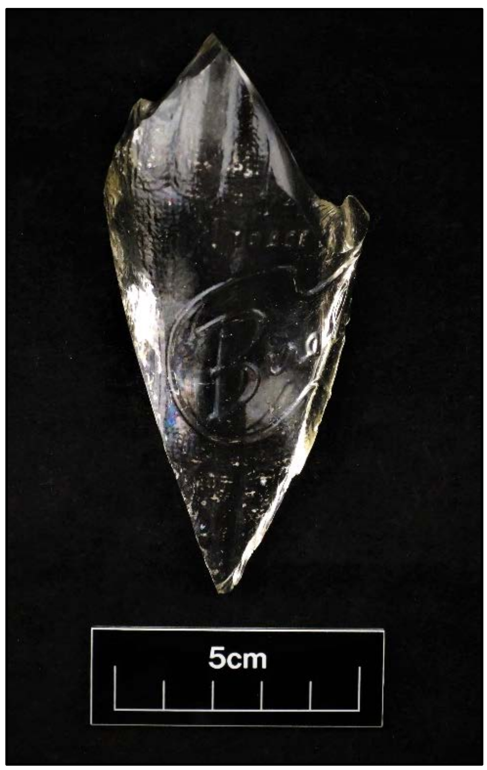


Figure 71. Acc. # 3, colorless glass Bierley’s Orange Drink bottle, fluted and stippled body, machine-made

Figure 72. Acc. # 7, amber glass “Packie” beer bottle fragments, stippled body, machine-made

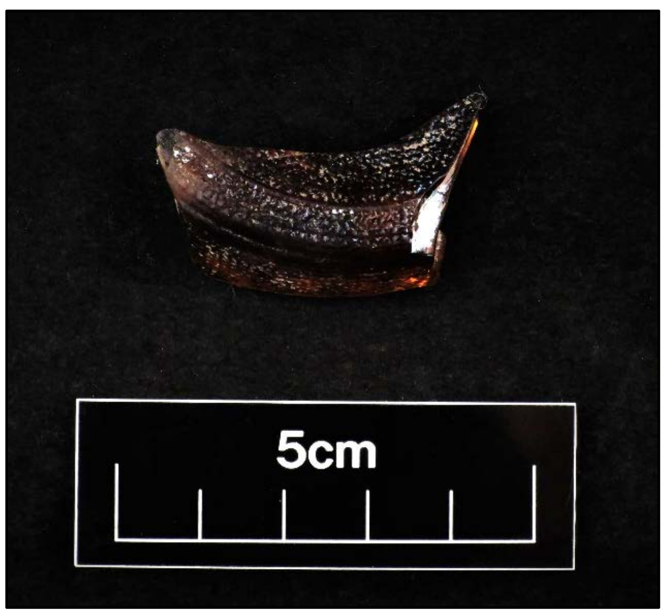


Figure 73. Acc. # 2, amber glass beer bottle (likely a “Packie” bottle), with stippled base and body, machine-made

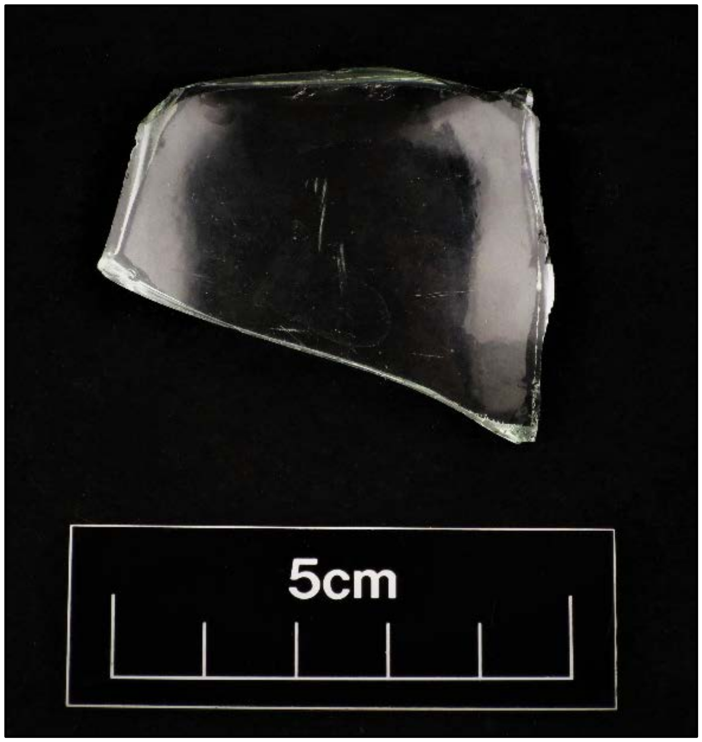


Figure 74. Acc. # 4, aqua glass bottle body fragment, unknown method of manufacture

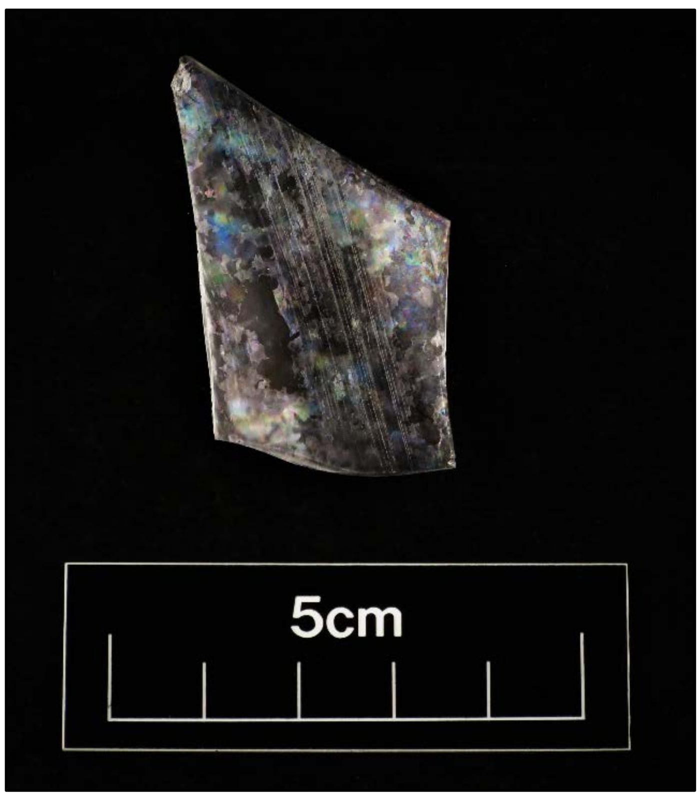


Figure 75. Acc. # 5, colorless glass bottle body fragment, unknown method of manufacture

Figure 76. Acc. # 6, colorless glass bottle heel fragment, unknown method of manufacture

free blown bottles, turn mold bottles are symmetrical and evenly proportioned. They can be identified by faint concentric rings around the heel and body of the bottle. Most do not have marking or embossing because it required the use of a secondary mold plate before the bottle had cooled and solidified. The bases are round and usually have a slightly indented or deeply indented "push-up" or "kick-up." A common feature on turn-mold bottles is a mamelon or "dot" in the center of the base, possibly from an air venting hole. The most common mold from the mid-nineteenth century into the twentieth century (1850–1920) was a two-piece mold with a separate bottom plate. These types of bottles have a mold seam around the base of the bottle, and two side seams that run vertically up the sides of the bottle. The side mold seams usually end on the neck, as the lip on mold-blown bottles was still finished by hand. Two-piece molds were the dominant form used in the post-1880 period.

Semi-automatic machines were introduced in the 1890s and were mainly used to make wide-mouth bottles/jars; glass still had to be manually fed into the machines by the glass workers. In 1903, Michael Owens invented a machine that did away with most of the skilled glass workers. The machine was used to blow wide-mouth bottles as early as 1905 and narrow-necked bottles (such as beverage bottles) as early as 1908. This Automatic Bottle Machine (ABM) blew a bottle from base to lip, usually using a two-piece cup-bottom mold. The two side seams extend to and over the lip of the bottle, or to a horizontal seam at the bottom of the bottle finish. The base of a bottle made by. early Owens ABM machines often had a round scar with feathered edges on the base. There are few ways, other than the presence of the Owens suction scar on the base, to distinguish a bottle made by a semi- versus a fully automatic machine, so both types of bottles are described in this report section simply as "machine-made."

Of the seven bottles in the collection, three are machine-made (Acc. #s 2, 3, and 7), and the method of manufacture could not be determined for four of the bottles (Acc. #s 1, 4, 5, and 6). None of the bottles were identified as free blown or mold blown.

Acc. # 1 (see Figure 70) is an aqua glass soda bottle, bottled by Sunrise Soda Water Works. The company opened on North King Street, Honolulu, in 1907, where it operated until it moved to Robello Lane in 1926 (Elliott 1971:31). It is unclear when the company ceased operations.

Acc. # 3 (Figure 71) is a colorless glass Bireley's Orange Drink bottle. The non-carbonated beverage was made in California and bottled around the country in bottles manufactured by Owens-Illinois Glass Company (Collector's Weekly 2018). The product was short-lived in the United States, sold only from the 1950s into the 1960s (Collector's Weekly 2018). In 1951, Asahi Bakushu acquired the rights to sell the product in Japan, where it is still sold today.

Acc. # 7 (see Figure 72) is an amber glass "Packie" beer bottle. A "Packie," also occasionally referred to as a "Brownie," is a type of non-returnable beer bottle with a stippled surface and a "no deposit, no return" notice (Schulz et al. 2019:12). The thin glass and body stippling made the bottle more difficult to clean and reuse (Schulz et al. 2019:12). The bottle was introduced by the Glass Container Association in 1939 and was used through ca. 1949 (Schulz et al. 2019:12). Acc. # 2 (see Figure 73) is an amber glass beer bottle fragment with body stippling and is likely also a "Packie" beer bottle.

Acc. #s 4, 5, and 6 (see Figure 74, Figure 75, and Figure 76) are unmarked glass bottle body fragments with no diagnostic dating characteristics.

5.1.2 Basalt

Ten basalt fragments and cobbles were collected during the project, all from T-10. The basalt fragments and cobbles were collected from hand excavations within Stratum Ib, a locally procured sand fill layer, and Stratum Ic, a disturbed A horizon layer. Eight of the fragments are fire-affected vesicular basalt, and three are water-rounded cobbles, one of smooth basalt and two of vesicular basalt. These may indicate cooking activities were taking place in the area, as vesicular basalt was often used in cooking (Nojima 2008: 238).

Table 21. Basalt artifact assemblage

Acc. #	Provenience	Type	Description	Dimensions (cm)	Weight (g)
11	T-10; Str. Ib; 10–58 cmbs	FAR	Fire-affected vesicular basalt	5.2 x 4.3 x 4.2	119.4
12		FAR	Fire-affected vesicular basalt	5.1 x 4.8 x 3.7	74.6
13		FAR	Fire-affected vesicular basalt	7.2 x 4.4 x 4.2	111.0
14		FAR	Fire-affected vesicular basalt	5.5 x 4.4 x 2.5	71.5
15		Cobble	Water-rounded basalt cobble	4.2 x 3.6 x 2.4	57.0

Acc. #	Provenience	Type	Description	Dimensions (cm)	Weight (g)
25	T-10; Str. Ic; 50–85 cmbs	FAR	Fire-affected vesicular basalt	6 x 4.9 x 3.5	116.3
26		FAR	Fire-affected vesicular basalt	6.4 x 4.2 x 4	61.7
27		FAR	Fire-affected vesicular basalt	4.3 x 3.9 x 3.1	48.1
28		FAR	Fire-affected vesicular basalt	5.7 x 3.3 x 3	51.5
29		Cobble	Water-rounded vesicular basalt cobble	6.8 x 3.2 x 3	93.1
30		Cobble	Water-rounded vesicular basalt cobble	6.6 x 6.4 x 4	243.1

5.1.3 Artifact Summary

Artifacts were recovered from T-4, T-10, and T-13. The majority of the artifacts were recovered from fill deposits. These include a locally procured sand fill layer associated with the late twentieth century construction of Paradise Cove (T-10, Stratum Ib) and an alluvial fill layer associated with runoff from plantation activities from the early 1900s into the 1920s (T-4, Stratum Ib; T-13, Stratum Ih). One artifact from the sand fill layer (T-10, Stratum Ib) dates to 1939-ca. 1949 (Acc. # 7), and one artifact from the alluvial plantation runoff fill dates to the 1950s to 1960s (Acc. # 3). These dates are inconsistent with the estimated deposition dates of the layers, indicating a high degree of disturbance.

5.2 Faunal Analysis

Archaeologists encountered a small amount of faunal osseous remains and marine shell during subsurface testing. The identified faunal remains (see Figure 20) include cow (*Bos Taurus*), fish (Osteichthyes), and one fragment belonging to a medium-sized mammal (inconsistent with human morphology; likely pig) (Table 22). The observed faunal remains were identified in the southwest and southern portions of the project area; no clustering is apparent.

All of the faunal materials appear consistent with food refuse. The fragment classified as medium mammal was identified in an A horizon deposit. This medium mammal rib fragment displays small cut marks on one edge of the bone, indicative of a sharp, precise instrument. The remaining osseous fragments were identified in a sand fill layer. All of the cow remains display evidence of butchering, identified by the uniform saw mark striations left behind on the cortical bone.

Twelve marine shells were collected during the project, all from T-10. The marine shells were hand collected from hand excavations within Stratum Ib, a locally procured natural sand layer, and Stratum Ic, a disturbed A horizon layer. Five different marine species were identified in the collection, all of which are known to have been consumed by humans in Hawaiʻi (Table 23). The density of the shells within both stratigraphic layers is low and is therefore insufficient to identify the shells as part of a midden. The marine shell is possibly related to traditional food preparation activities.

Table 22. Results of faunal analysis

Provenience	Species; Mass	Description
T-12 Str. II, 54 cmbs	Medium mammal; 1.5 g	Rib fragment, small cut marks on one edge indicative of a sharp, precise instrument
T-15 Str. Ib, 80–90 cmbs	Cow (*Bos Taurus*); 9.4 g	Saw-cut rib and long bone fragments
	Fish (Osteichthyes); 0.5 g	Vertebra

Table 23. Marine Shells Assemblage

Acc. #	Provenience	Type	Description
8	T-10; Str. Ib, 10–58 cmbs	*Nerita picea*	*Pipipi* shell
9		*Nerita picea*	*Pipipi* shell
10		*Cypraea caputophidii*	Small snakehead cowrie fragment
16	T-10; Str. II; 50–85 cmbs	*Nerita picea*	*Pipipi* shell
17		*Nerita picea*	*Pipipi* shell
18		*Nerita picea*	*Pipipi* shell
19		*Nerita picea*	*Pipipi* shell
20		*Cypraea caputophidii*	Small snakehead cowrie fragment
21	T-10; Str. Ic; 50–85 cmbs	*Cellana* sp.	White limpet shell
22		*Ctena bella*	Reticulate saucer shell half
23		*Pinctada* sp.	Mother of pearl interior fragment with partial hinge
24		Unknown	Unidentified white marine shell fragment

5.3 Pollen Analysis

Three pollen samples (Samples 1 through 3) extracted from three bulk sediment samples thought to be buried wetland soils (SIHP # -3362) were collected during the AIS investigation (Table 24). These samples were submitted for pollen analysis to Bruce G. Phillips, M.S., of EcoPlan Associates, Inc. on 17 February 2020 (see Appendix A for full report). Due to safety concerns upon entering the trench, two of the three pollen samples were extracted from bulk sediment samples via the backdirt pile. Analysis of Samples 1 through 3 involved the identification of pollen and charcoal content and the identification of a transitional sediment that might coincide with the cultural modifications associated with the creation of SIHP # -3362.

Sample 1 was collected from T-14 located in the southern portion of the project area from Stratum IIb from the backdirt pile. Sample 2 was collected from T-15 in the southern portion of the project area from Stratum II from the backdirt pile at approximately 150 to 170 cmbs. Sample 3 was collected from the east sidewall in Stratum II between 125 to 140 cmbs.

Table 24. Summary of pollen samples

Sample	Description
Sample 1	HONOULIULI 181, T-14, Str. IIb, backdirt (bulk sample 3)
Sample 2	HONOULIULI 181, T-15, Str. II, ~150-170 cmbs, backdirt pile
Sample 3	HONOULIULI 181, T-16, east sidewall, Str. II, 125-140 cmbs

All three samples contained enough material suitable for analysis. Ten types of pollen and spores were identified (Table 26 and Table 27). Dominant types included Cheno-Am and grass pollen. All three samples contained high proportions of degraded grains indicating poor preservation. Samples 1 and 2 were collected from the wetland deposits closer to the shoreline and had comparable concentrations suggesting a dry shrubland characterized by *aweoweo* and various grasses. Sample 3 was collected from inland wetland deposits and contained more pollen than degraded grains in comparison to Samples 1 and 2. Still lacking good preservation, the identified pollen reflected a marshland environment surrounded by dry landscape. Due to poor preservation, it is possible the degraded pollens from Samples 1 and 2 once resembled the similar marshland environment as reflected in the Sample 3 results.

Degraded pollen assemblages are not uncommon and are caused by several factors including but not limited to mechanical factors and chemical agents (Phillips 2020). Two possible factors for the poor preservation in these samples may be attributed to proximity to the ocean and soil chemistry as described below:

> It is possible that pollen in sediments at or near the water table have suffered deterioration due to fluctuations in groundwater level, caused by climatic (e.g., rainfall) and/or oceanic (e.g., sea levels) factors, or possibly even tides […] Soil chemistry can also cause pollen to degrade. For example, ancient soils in the American Southwest are highly basic, causing deterioration. It is possible that the calcareous limestone parent material of Stratum II contributed to pollen deterioration. [Phillips 2020:2]

The combination of degraded pollens, no observed cultural materials, previous archaeological studies, and land altering events from the time the area was a wetland environment suggests the area has been altered and holds little to no valuable information for further investigations for SIHP # -3362.

Table 25. Pollen data (adapted from Phillips 2000)

Sample	1	2	3
Trench	T-14	T-15	T-16
Stratum	IIb	II	II
Depth (cm)	130-135	~150-170	125-140
Concentration (grains per gram)	7,435	7,160	12,888
Types per sample	6	7	6
Sum	100	100	100
Count/%			
Degraded	34	31	25
Unknown		1	
Herbs and Shrubs			
Asteraceae, high-spine		1	
Asteraceae, low-spine	3	2	1
Cheno-Am	36	24	20
cf. Cyperaceae	1		16
Euphorbiaceae	1		
Fabaceae	2		
Poaceae	23	39	36
Ferns and Fern Allies			
Monolete spore, rough		1	1
Trilete spore, rough			1
Trilete spore, smooth		1	

Table 26. Pollen and spore types (adapted from Phillips 2020)

Type	**Common Name**	**Plant Community**
Herbs and Shrubs		
Asteraceae, high spine	Sunflower family, *Dubautia*-type	Disturbed habitats
Asteraceae, low spine	Sunflower family, *Ambrosia*-type	Disturbed habitats
Cheno-Am	*Aweoweo*	Coastal Dry Shrublands
cf. Cyperaceae	Sedge family	Coastal Dry Sedgelands
Euphorbiaceae	Spurge family	Lowland Dry Shrublands
Fabaceae	Pea family	Coastal Dry Grasslands and Shrublands
Poaceae	*Aki aki*; Grass family	Coastal Dry Grasslands, Sedgelands, and Mixed Communities
Ferns and Fern Allies		
Monolete spore, rough	Ferns	Coastal to Lowland Mesic Forests
Trilete spore, rough	Ferns and fern allies	Coastal to Lowland Mesic Forests
Trilete spore, smooth	Ferns and fern allies	Coastal to Lowland Mesic Forests

Section 6 Historic Property Descriptions

One previously identified historic property was identified within the current project area during this AIS, SIHP # 50-80-12-3362, coastal wetlands. One previously identified historic property is within the current project area but was not identified during this AIS, SIHP # - 4968, human skeletal remains. SIHP #s -3362 and -4968 are depicted on Figure 77.

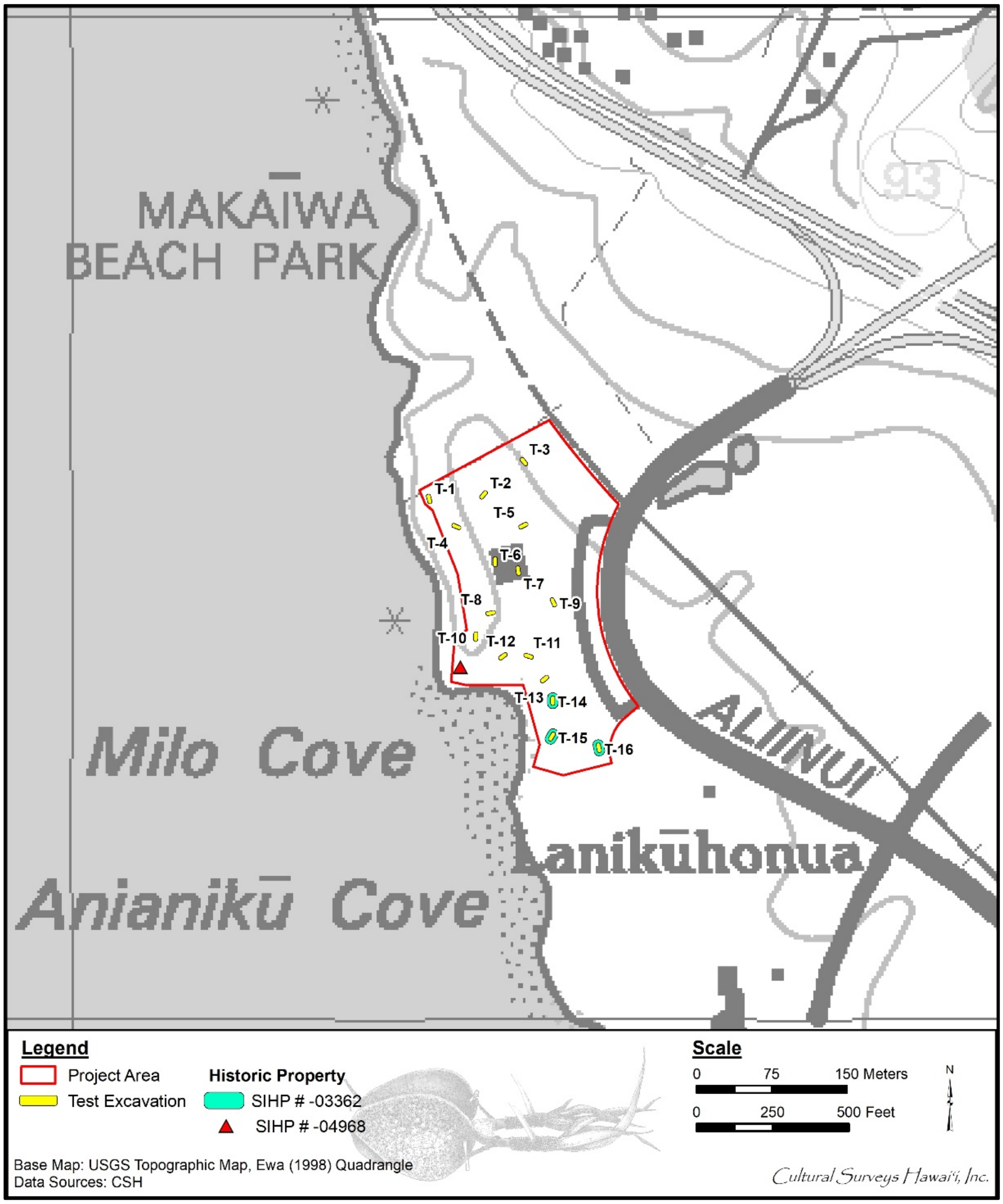


Figure 77. Portion of a 1998 Ewa USGS topographic quadrangle map depicting the project area, test excavations (T-1 through T-16), and identified historic properties SIHP #s -3362 and -4968

6.1 SIHP # 50-80-12-3362

FORMAL TYPE:	Coastal wetlands
FUNCTION:	Unknown
FEATURE TYPES:	Feature 1: within the current project area, described as coastal backwater marshland with no apparent cultural function prior to nineteenth century cultivation (Davis and Haun 1986 and Davis 2000); Feature 2: outside current project area, is a cultural deposit indicative of habitation (Davis 2000)
AGE:	Pre- to post-Contact (late nineteenth century)
DISTRIBUTION:	Observed in three test excavations (T-14 through T-16) within the southern portion of the current project area, and a total interpolated area of approximately 26.649 acres
DIMENSIONS:	0.009 acres (0.003 hectares) in project area
LOCATION:	Interpolated boundaries extend within the southern portion of the current project area and approximately 26.64 acres within Lanikūhonua Cultural Institute extending into two of the northern Ko Olina lagoons (Ko Olina Lagoon 1/Kohola Lagoon and Ko Olina Lagoon 2).
TAX MAP KEY:	[1] 9-1-057:027 (Davis and Haun 1986, Glidden et al. 1993, Davis 2000, and the current study); 9-1-057:001, 003, 006, 007, 008, 009, 010, 028, 029, 030, 031, and 047 (Davis and Haun 1986 and Davis 2000)
LAND JURISDICTION:	Alfred S. Harding, Campbell Hawaii Investor, LLC, City and County of Honolulu, James Campbell Company, LLC, Ko Olina Development, LLC, Ko Olina Parcel 11, LLC, Olani Partners, LLC, Oceanwide Resort Paradise Hawaii, LLC
PREVIOUS DOCUMENTATION:	Davis and Haun 1986, Glidden et al. 1993, and Davis 2000

SIHP # 50-80-12-3362 is a previously identified historic property consisting of coastal wetlands with two associated features. SIHP # -3362 dates from pre-Contact to post-Contact. Interpolated boundaries extend within the southern portion of the current project area and 26.64 acres within Lanikūhonua Cultural Institute and extending into two of the northern Ko Olina lagoons (Ko Olina Lagoon 1/Kohola Lagoon and Ko Olina Lagoon 2). The distribution of SIHP # -3362 within these studies is depicted on a 1998 Ewa USGS topographic quadrangle and an 1873 Alexander map of Honouliuli (Figure 78 an Figure 79). A summary of previous findings are presented below.

6.1.1 Previous Documentation

The coastal wetlands were initially studied by Davis and Haun (1986). Davis and Haun (1986) produced a *Preliminary Report Upon Completion of Field Work* summarizing Phase 2 intensive survey and test excavation work at West Beach. They include no maps but relate, largely in tabular form, data regarding historic properties and the work accomplished. In 1987, Davis and Haun

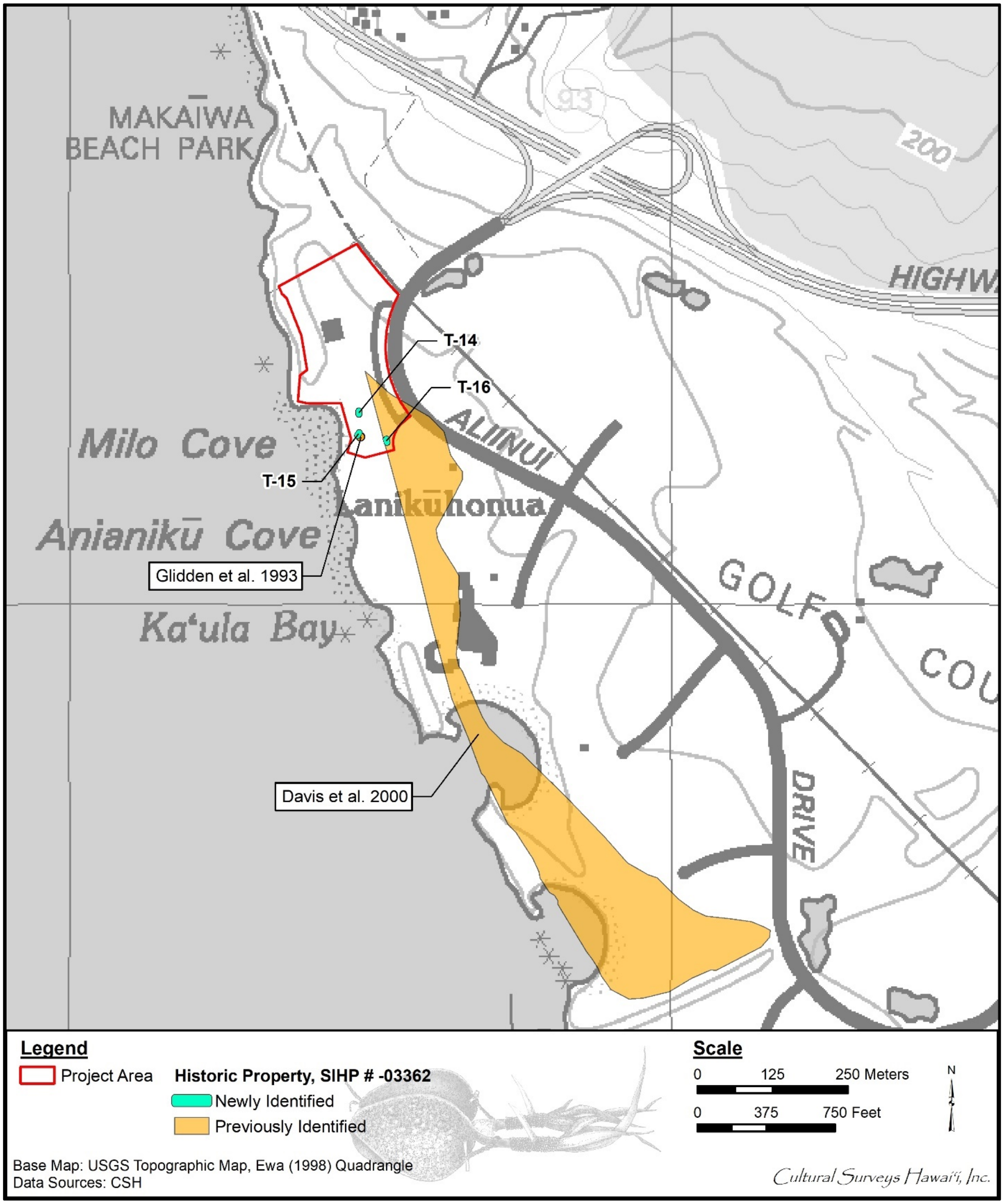


Figure 78. Portion of a 1998 Ewa USGS topographic quadrangle map depicting project area in relation to newly identified and previously identified portions of SIHP # 50-80-12-3362

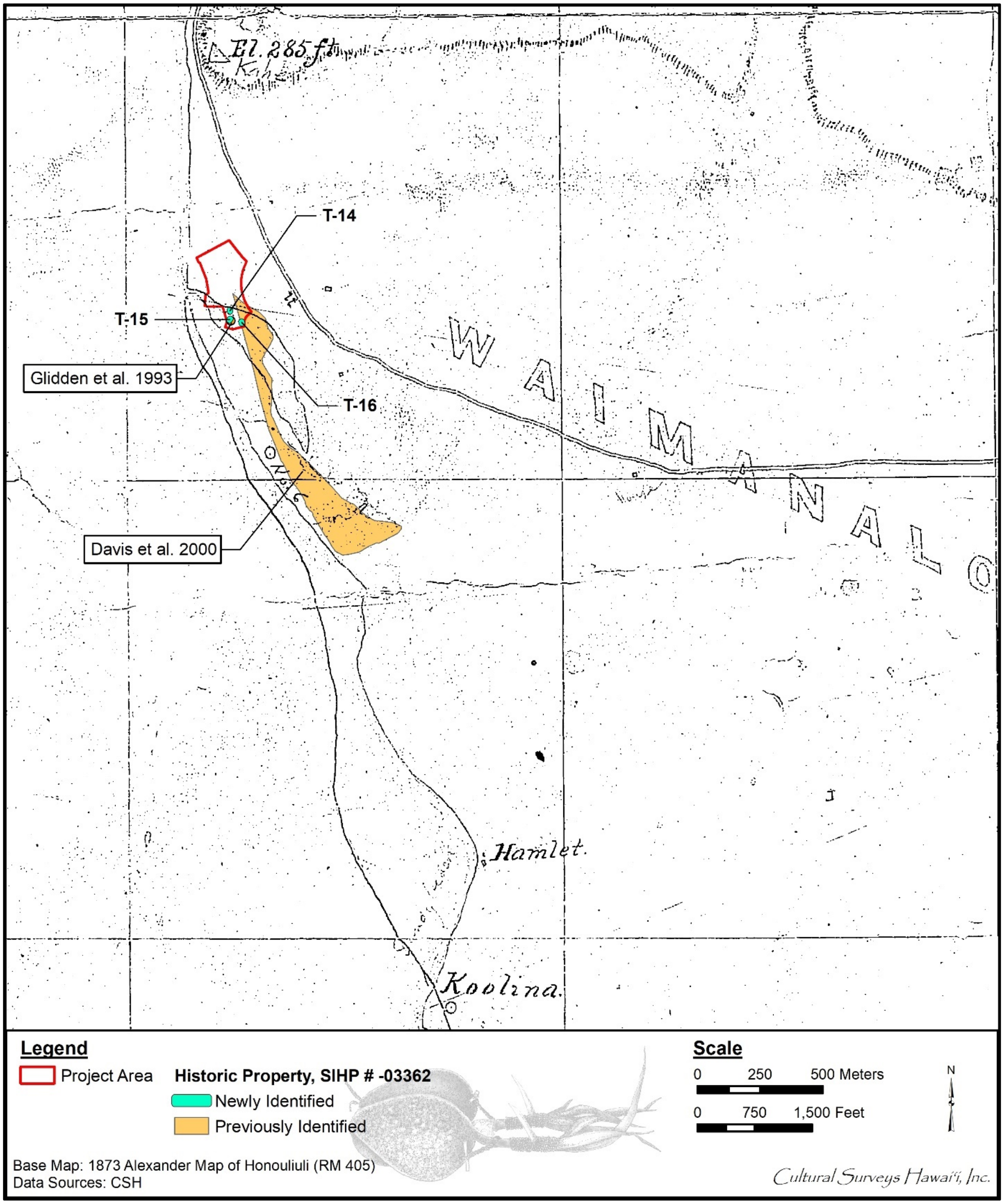


Figure 79. Portion of an 1873 Alexander map of Honouliuli (RM 405) depicting the project area in relation to newly identified and previously identified portions of SIHP # 50-80-12-3362 within a former wetland area

followed up their preliminary report on survey and test excavations with an “Interim Report.” The interim report includes information on all three historic properties east of the project area, including the results of test excavation at SIHP # -3362. The interim report would not be followed by a final report for more than 13 years. Davis’ four-volume data recovery study came out in 2000 and is a culmination of the previous studies for West Beach (Davis 2000). Testing included pollen analysis and radiocarbon dating of the upper layer preceding the coastal wetlands. Davis and Haun (1986) describe SIHP # 50-80-12-3362 as follows:

> An area of low-lying terrain paralleling the inland side of the coastal sand dunes, extending from Site 1438-1 northward c 1,250 m, ending behind Lanikuhonua. The landward area of the marsh varies from 60 to 150 m wide. Cultivation of sugar cane has altered most of this area, especially the higher southern ground. Areas of standing water, fresh to slightly brackish, are found in the lower northern end of the marsh, particularly during the rainy season. Expect for feral sugar cane, there is no surface evidence of past cultural use. [Davis and Haun 1986:A-25]

According to the Davis (2000) report, SIHP # 50-80-12-3362 was originally identified as a single component site, but a second feature was identified within the Phase 4 data recovery results. As a result, two features were designated SIHP # -3362. SIHP # -3362 Feature 1 is located within the current project area and described as coastal backwater marshland with no apparent cultural function prior to nineteenth century cultivation. SIHP # -3362 Feature 2 is located outside the current project area and is a cultural deposit indicative of habitation.

Davis (2000) describes SIHP # 50-80-12-3362 Feature 1 as follows:

> And Marsh 3362-1 was situated immediately inland of the coastal dunes and was conterminous with Ecozone Ib, where it covered an estimated area of 5.3 ha between 0.5 m and 1.5+ m amsl. This extended along the inland side of the sand dunes, from Beach Midden 1438-1 north 1,200 m to where it ends inland of Lanikuhonua, which was the former beach estate of Alice Kamokila Campbell. A somewhat smaller segment was also located inland of Beach Sites 1437-1 and 2721-1. It had no apparent cultural function prior to 19th century cultivation. Its status as a one-time marshland is indicated by standing water found in lower elevations at the northern end of the site. The south end was slightly higher in elevation where feral sugar cane was still most evident during the project. The cane-haul roads shown on the site map approximate the boundary of the former marsh with the coastal dunes seaward, Ecozone Ia, and the rocky high ground inland, variably identified as Ecozones II and III. Nine Backhoe trenches were excavated in three inland seaward transects during the Phase 2 survey. Fifteen backhoe trenches were excavated during the Phase-4 data recovery to collect stratigraphically sequenced soil samples from the coastal marsh and the marsh/dune interface to develop a more comprehensive sedimentary and palynological record of this environmental feature. [Davis 2000:1:112]

Davis (2000) describes SIHP # 50-80-12-3362 Feature 1 as follows:

> Floor 3362-2 was only a small remnant of what might have been a tamped floor surface containing only one subsurface feature—a rather large hearth, and an unspecified amount of midden-but it contained a total of 35 indigenous artifacts

> from an estimated 0.36 m of recovered cultural matrix. This is a rather high density, 100/m^3, for only some 2 m^2 of excavated surface, suggesting Floor 3362-2 very likely was an extension of contemporaneous activities on the dune. The predominant marine-orientation reflected in the artifact assemblage reinforces this posited association; only chronological confirmation is lacking. [Davis 2000:1:131]

Three trenches were sampled for pollen analysis (TR1 through TR3) in which TR2 yielded the best preserved sequence for analysis (Davis 2000). Pollen analysis for TR2 is described as follows:

> A continuous column of 14 samples collected at 10-cm intervals provided enough material for analysis. These samples were characterized by a relatively high diversity, with 33 pollen types including indeterminants: 16 in Layer I, 14 in Layer II, 13 in Layer III, 12 in Layer IV, and 27 in Layer V. For her tabular summary of the pollen, Cummings broadly categorizes the pollen as trees, small trees/shrubs, shrubs, herbs/lilies, grass, indeterminants, and spores. Shrubs are typically the largest group, of which Cheno-ams again dominate the assemblage. As already noted, Cheno-ams constitute a rather amorphous group, but they tend to be a relatively good bell-weather of the amount of pollen moving in the environment. In TR2, they account for about 55-65 percent of the assemblage (through the nine samples representing Layers V-III). They then decline to only about 22-33 percent of the assemblage (through three samples representing Layer II); with the beginning of Layer I they resurge to about 90% and then decline again in the near-surface sample to approximately 70% of the assemblage. [Davis 2000:1:120]

Based on pollen analysis and radiocarbon dates preceding SIHP # 50-80-12-3362, Davis (2000) concluded SIHP # 3362 likely originated within a ponded environment that eventually over time transformed into a wetland environment as follows:

> The transition from an open pond to a shallow, seasonal wetland probably occurred in the last 300-400 years: sometime about AD 1600. This is a slightly later than a date of AD 1385-1500 from charcoal that was collected from Layer IV in TE2. [Davis 2000:1:123]

Glidden et al. (1993) observed a gleyed deposit designated as Layer V in the southern portion of the current project area within Glidden et al. (1993) Trench 9. Glidden et al. (1993) referred to the gleyed deposit as a stratigraphic anomaly and described two possible explanations for its presence:

> First, given the location of Trench 9, just inland from the cove (see Figure 4), it is possible that the area immediately inland from the cove once encompassed a marsh, separate from the previously recorded marsh deposits (Site 50-80-12-3362). The possible second explanation is that Layer V represents part of the Site 50-80-12-3362, the buried marsh deposits extending parallel to the shore (see Figure 3), suggesting that this site extends into the Paradise Cove project area. In either case, the absence of any such deposits in Trenches 1 through 6 indicates that the probable buried marsh deposits do not extend north of the cove.

> Difficulties encountered during the excavation of the trench prevented further documentation. The unconsolidated nature of most of the deposit, when combined with the depth of the trench and the fact that it had reached the water table, caused collapse. [Glidden et al. 1993:22]

Due to the safety concerns upon entering the trench, no soil samples were collected. Additionally, due to trench collapse, the gleyed deposit was intermixed with other deposits, thus a clean sample was not retrieved.

6.1.2 Current study

The dimensions of SIHP # 50-80-12-3362 were expanded during AIS testing for the current project (see Figure 78). Within the current project area, coastal wetland remnants associated with SIHP # -3362 were identified in three of 16 test excavations including T-14 through T-16. SIHP # - 3362 was observed between 1.22 and 1.75 mbs, above natural marine deposits and the coral shelf. Within T-14 through T-16, SIHP # -3362 was capped by fill deposits associated with a combination of the Ewa Plantation Company and the construction of Paradise Cove.

SIHP # -3362 consists of two separate strata, Strata IIa and IIb in T-14. Stratum IIa consists of a dark gray silty clay ranging from 1.22 to 1.35 mbs. Stratum IIb consists of a black silty clay ranging from 1.30 to 1.35 mbs. Both strata contained many fine roots, sparse charcoal, and a few freshwater snails.

SIHP # -3362 consists of Stratum II in T-15. Stratum II consists of a dark reddish-brown sandy clay loam ranging from 1.55 to 1.75 mbs. Stratum II is a fill layer that likely represents an edge for the former coastal marshlands. Coral boulders were observed in the northern end of T-15. Many fine roots and a few freshwater snails were observed throughout.

SIHP # -3362 consists of Stratum II in T-16. Stratum II consists of a very dark greenish gray silty clay ranging from 1.10 to 1.62 mbs. Stratum II contained many fine roots and a few freshwater snails.

According to previous documentation, field results, and the lack of evidence on historic maps, the silty clay material is related to coastal wetland deposits with no apparent evidence of land use prior to agriculture in the nineteenth century. According to an 1873 Alexander map, the wetlands were possibly present in the southern portion of the project area extending south into Lanikūhonua Institute, and *makai*/west to an outlet into the Pacific Ocean (see Figure 9 and Figure 79). The wetlands appear to be filled in by the early 1900s as it was no longer depicted on historic maps. Additionally, the Glidden et al. (1993) report stated that Nettie Fernandez Tiffany and Walter Kamana noted the presence of a "riverbed" in the southern portion of the project area (Glidden et al. 1993:10–12).

6.1.3 Summary

SIHP # -3362 has been previously documented in the northern and southern portions of the current project area. This summary compiles certain aspects of the analyses to provide a clear understanding of the coastal wetlands in Ko Olina. SIHP # -3362 consists of coastal wetlands present at or very near the water table. The coastal wetlands were naturally deposited and formed on top of marine, primarily lagoonal, deposits and/or the coral shelf. In many studies, animal grazing lands and plantation activities were the first depositional events atop the wetlands. The soil described in previous studies as SIHP # 50-80-12-3362 is similar in texture, color, and content, although some variation does occur. The color of SIHP # -3362 deposits includes dark reddish brown, dark gray, greenish gray, and black with textures including silty clay, sandy clay loam, and clay loam. Analyses such as palynology and radiocarbon dating on preceding strata of SIHP # -3362 have been conducted in previous studies. SIHP # -3362 contains two features and no associated artifacts.

SIHP # 50-80-12-3362, coastal wetlands, is assessed as significant per HAR §13-284-6 under Criterion d (have yielded, or is likely to yield information important for research on prehistory or history) This was based on the potential to further understand the types of agricultural and aquacultural practices utilized and determine the boundaries of the coastal wetlands in Ko Olina. The historic property retains integrity of location and materials.

6.2 SIHP # 50-80-12-4968

FORMAL TYPE:	Human skeletal remains
FUNCTION:	Human interment
NUMBER OF FEATURES:	5+
AGE:	Post-Contact
DIMENSIONS:	Unknown
LOCATION:	Preserve area located in the western portion of the project area behind the main *lū‘au* stage
TAX MAP KEY:	[1] 9-1-057:027 (Jourdane 1995 and Hammatt 1995)
LAND JURISDICTION:	James Campbell Company, LLC
PREVIOUS DOCUMENTATION:	Jourdane 1995, Hammatt 1995

SIHP # 50-80-12-4968 was identified on 10 January 1995 during the excavation of a trench for the installation of gas lines at Paradise Cove *lū‘au* located in the western portion of the project area at the north, east, and west sides of the Paradise Cove stage facility (see Figure 77). SHPD was notified and identified the remains as human with a minimum number of one individual (MNI). SHPD recommended that a private archaeological firm be contracted for burial recovery work to determine number and type of burials represented. CSH was contracted and identified an additional five sets of human skeletal remains in the vicinity.

Jourdane (1995) describes Burial Find 1, now designated as SIHP # 50-80-12-4968 Feature 1 as follows:

> Human remains were disturbed and scattered along c. 20 feet of the makai trench by the backhoe during excavation for the gas lines. Although excavation stopped when remains were first noted, several bones were spread on the surface of the trench. A femur fragment, part of a sacrum, and arm bone were noted on the trench floor. Numerous other skeletal remains were also noticed in the “backdirt” piles along side the trench. Part of a what appeared to be a cranium was noted in the north face near the mid section of the trench. No burial pits or other features were apparent, however the trench walls were not cleared or faced to look for more burial remains. No remains appeared to be found in the trench that was dug along the W (Lanikuhonua) side of the facility. The burial is contained within a Jaucus sand matrix. [Jourdane 1995]

Hammatt (1995) is a field report in the form of field notes reporting on five separate burial finds within the same Jourdane (1995) gas line excavation at Paradise Cove *lū‘au* located in the western portion of the project area on the western portion of the main *lū‘au* stage from 11 through 13 January 1995. The burial finds were numbered Burial Finds 1 through 5. It is also unknown if SIHP # 50-80-12-4968 Feature 1 is included within the Hammatt (1995) field notes/report. Therefore, following sequential order from SIHP # -4968 Feature 1, the Hammatt (1995) Burial Finds 1 through 5 are now designated as SIHP # -4968 Features 2 through 6. A summary of SIHP # -4968 Features 2 through 6 is below.

SIHP # 50-80-12-4968 Feature 2 is a mostly in situ, semi-flexed burial located in proximity to the southwest corner of the main Paradise Cove *lūʻau* stage. The lower leg area appears to have been previously disturbed by the installation of a 2-inch irrigation line. According to a sketch drawing, SIHP # -4968 Feature 2 is between approximately 25 and 45 cmbs within a defined burial pit between an A horizon (Stratum I) and natural beach sand (Stratum II). SIHP # -4968 Feature 2 is on its side with the head facing west. Two bone buttons were observed in the neck area. SIHP # -4968 Feature 2 was disinterred on 12 January 1995. Temporary curation measures and reinternment activities are unknown, however, *kahu* Nettie Fernandez Tiffany has knowledged that all burials were reinterred in the same area, west of the Paradise Cove main *lūʻau* stage.

SIHP # 50-80-12-4968 Feature 3 is an in situ burial located in proximity to the southwest corner of the main Paradise Cove *lūʻau* stage, north of SIHP # -4968 Feature 2. According to a sketch profile and a sketch plan map drawing, SIHP # -4968 Feature 3 is between approximately 30 and 50 cmbs within a defined burial pit between an A horizon (Stratum II) and natural beach sand (Stratum III). Ten metal buttons were observed in situ at approximately 60 cmbs, and one metal button was recovered from screening of the backdirt material. A portion (foot bones) of SIHP # -4968 Feature 3 was disinterred on 11 January 1995, and all other remaining elements were disinterred on 12 January 1995. Temporary curation measures and reinternment activities are unknown, however, *kahu* Nettie Fernandez Tiffany has knowledge that all burials were reinterred in the same area, west of the Paradise Cove main *lūʻau* stage.

SIHP # 50-80-12-4968 Feature 4 is an in situ extended burial located in proximity to the southwest corner of the main Paradise Cove *lūʻau* stage, north of SIHP # -4968 Feature 3. The skull and lower thoracic region appeared to be disturbed from construction activities for the gas line. According to field notes, SIHP # -4968 Feature 4 was observed between 20 and 35 cmbs in a possible coffin. Fragments of a possible glass viewing hole were observed. Two crescent-shaped gold earrings were observed associated with the skull. One four-hole shell button was collected from screening of the backdirt material. SIHP # -4968 Feature 4 was disinterred on 12 January 1995. Temporary curation measures and reinternment activities are unknown, however, *kahu* Nettie Fernandez Tiffany has knowledge that all burials were reinterred in the same area, west of the Paradise Cove main *lūʻau* stage.

SIHP # 50-80-12-4968 Feature 5 was exposed on 12 January 1995 west of the Paradise Cove main *lūʻau* stage and contains no other documentation. Temporary curation measures and reinternment activities are unknown, however, *kahu* Nettie Fernandez Tiffany has knowledge that all burials were reinterred in the same area, west of the Paradise Cove main *lūʻau* stage.

SIHP # 50-80-12-4968 Feature 6 was observed from archaeological monitoring activities for the gas line near a "luau pit" west of the Paradise Cove main *lūʻau* stage on 13 January 1995. SIHP # -4968 is an extended burial with disturbance on its right side. No other provenience information was recorded. Temporary curation measures and reinternment activities are unknown, however, *kahu* Nettie Fernandez Tiffany has knowledged that all burials were reinterred in the same area, west of the Paradise Cove main *lūʻau* stage.

In summary, SIHP # 50-80-12-4968, human skeletal remains, is assessed as significant under Criterion d (have yielded or is likely to yield, information important for research on prehistory of history) for its archaeological information and Criterion e (have an important value to the Native Hawaiian people or to another ethnic group of the state due to its associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts these associations being important to the group's history and cultural identity) because of its cultural value as human skeletal remains, pursuant to HAR §13-284-6. The historic property retains integrity of location, design, and materials.

Section 7 Summary and Interpretation

At the request of the James Campbell Company, LLC, CSH has prepared this AISR for the Paradise Cove Redevelopment project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu, TMKs: [1] 9-1-057:027. Beginning in 2023 with targeted completion by 2025, the James Campbell Company plans to improve the 10.85-acre property known as Paradise Cove. This will be the first major improvement of amenities on the property in over 25 years.

The subsurface testing plan was based on the combination of three previous studies' test locations and documentation of known historic properties within the project area (Komori and Dye 1979, Davis and Haun 1987, and Glidden et al. 1993), and consultation with SHPD and cultural *kahu* Nettie Fernandez Tiffany. Current AIS test excavations were placed based on targeting the known historic properties within areas not previously investigated and placed for representative distribution. Some trenches were reoriented based on known subsurface utilities via the maintenance crew and concerns from Mrs. Tiffany.

The subsurface testing plan originally consisted of 19 subsurface test excavations (T-1 through T-19). The subsurface testing plan was modified per the request of SHPD, excluding three proposed test excavations (T-1 through T-16). Two test excavations, T-11 and T-14, were abandoned due to the presence of an active sewer drain line and a fire sprinkler line that both broke during excavation activities. All but two test excavations were excavated by a backhoe excavator to sterile material between 0.52 and 2.14 mbs, or the coral shelf observed between 0.75 and 1.75 mbs. Two test excavations (T-10 and T-12) were hand excavated to 3 ftbs or sterile material as requested by Mrs. Tiffany in avoidance of any possible voids in the coral shelf and proximity to known human burials.

The general observed stratigraphy from open trenching primarily consists of imported and locally procured fill deposits (Stratum I) overlying the coral shelf. The southern portion of the project area contained a wetland deposit (Stratum II/SIHP # 50-80-12-3362). These observations are consistent with the USDA soil data for the project area and its vicinity (Foote et al. 1972). All excavations were backfilled after completion of documentation.

A silty clay loam alluvial fill observed in a majority of test excavations likely represents the deliberate soil runoff from plantation drainage activities of the Ewa Plantation Company conducted from the early 1900s through the 1920s. These fill deposits typically overlay the undulating coral shelf. In coastal/western areas, locally procured sand fills were typically observed overlying the silty clay loam alluvial fills. Most of the test excavations containing sand fills were used during utility installation and landscaping activities. The *mauka*/eastern areas contained crushed coral fill. The imported crushed coral fill was likely utilized to raise the surface during the development of Paradise Cove in the late 1970s.

Two previously identified historic properties were identified consisting of coastal wetlands (SIHP #50-80-12 -3362) and human skeletal remains (SHIP # -4968). SIHP # -3362 was identified in the southern portion of the project area within three excavations (T-14 through T-16). SIHP # -4968 is a previously identified historic property consisting of approximately six sets of human skeletal remains located in the western portion of the project area *makai*/west of the main Paradise Cove *lūʻau* stage.

Historic artifacts consisting of glass bottle and bottle fragments were recovered from fill deposits including locally procured sand fill associated with the late twentieth century construction of Paradise Cove and an alluvial fill layer associated with plantation activities from the early 1900s into the 1920s. One artifact from a sand fill layer dates to 1939-ca. 1949, and one artifact from the alluvial plantation runoff fill dates to the 1950s to 1960s. These dates are inconsistent with the estimated deposition dates of the layers, indicating a high degree of disturbance.

Marine shell and basalt fragments possibly related to traditional food preparation were observed in a disturbed A horizon within T-10. Although utility remnants within the trench indicate this layer was likely disturbed during construction activities for Paradise Cove along with the other strata, no historic artifacts were found mixed into this layer. A small amount of faunal osseous remains was identified in the southwest and southern portions of the project area. The identified faunal remains include cow (*Bos Taurus*), fish (Osteichthyes), and one fragment belonging to a medium-sized mammal (inconsistent with human morphology; likely pig). All of these faunal materials appear consistent with food refuse.

Three pollen samples (Samples 1 through 3) extracted from three bulk sediment samples thought to be buried wetland soils (SIHP # -3362) were submitted for pollen analysis. Sample 1 was collected from T-14 located in the southern portion of the project area from Stratum IIb from the backdirt pile. Sample 2 was collected from T-15 in the southern portion of the project area from Stratum II from the backdirt pile at approximately 150 to 170 cmbs. Sample 3 was collected from the east sidewall in Stratum II between 125 to 140 cmbs.

Ten types of pollen and spores were identified with the dominant types including Cheno-Am and grass pollen. All three samples contained high proportions of degraded grains indicating poor preservation. Samples 1 and 2 were collected from the wetland deposits closer to the shoreline and had comparable concentrations suggesting a dry shrubland characterized by *aweoweo* and various grasses. Sample 3 was collected from inland wetland deposits and contained more pollen than degraded grains in comparison to Samples 1 and 2. Still lacking good preservation, the identified pollen reflected a marshland environment surrounded by dry landscape. Due to poor preservation, it is possible that the degraded pollens from Samples 1 and 2 once resembled the similar marshland environment as reflected in the Sample 3 results.

In summary, the Paradise Cove Redevelopment project AIS documented aspects of the former land surface throughout the excavated portions of the project area. Previous archaeological studies have also documented human interment in the area. Based on AIS testing, the majority of the project area appears to be moderately disturbed from multiple phases of land altering activities including the plantation, ranching, and the development of Paradise Cove. The northern portion of the project area is significantly shallower in comparison to the central and southern portions of the project area revealing the undulating coral shelf in these areas. Due to the undulating coral shelf and proximity to the ocean, it is possible that multiple underground caverns exist throughout the *makai*/western portion of the project area. The southeastern portion of the project area is evidenced by pre- to post-Contact activity associated with coastal wetlands (SIHP # -3362) utilized as a subsequent habitation, agriculture, and water control area. Based on locally procured sand fills near the western shoreline portion of the current project area and known human burials (SIHP # 50-80-12-4968) in these areas, it is likely these areas may contain cultural deposits including human skeletal remains.

Section 8 Significance Assessments

Historic property significance is evaluated and assessed based on the five State of Hawaiʻi historic property significance criteria. To be considered significant, a historic property must possess integrity of location, design, setting, materials, workmanship, feeling, and/or association and meet one or more of the following broad cultural/historic significance criteria (in accordance with HAR §13-284-6):

a. Be associated with events that have made an important contribution to the broad patterns of our history;

b. Be associated with the lives of persons important in our past;

c. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value;

d. Have yielded, or is likely to yield, information important for research on prehistory or history; or

e. Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

Two previously identified historic properties have been identified within the current project area. Table 25 lists the historic properties along with their significance/eligibility assessments and mitigation recommendations. These significance recommendations are included in this AISR for the review and concurrence of the SHPD.

SIHP # 50-80-12-3363, coastal wetlands, is assessed as significant per HAR §13-284-6 under Criteria d (have yielded, or is likely to yield information important for research on prehistory or history). This was based on the potential to further understand the types of agricultural and aquacultural practices utilized and determine the boundaries of the coastal wetlands. The historic property retains integrity of location and materials.

SIHP # 50-80-12-4968, human skeletal remains, is assessed as significant per HAR §13-284-6 under Criterion d (have yielded or is likely to yield, information important for research on prehistory of history) for its archaeological information and Criterion e (have an important value to the Native Hawaiian people or to another ethnic group of the state due to its associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts these associations being important to the group's history and cultural identity) because of its cultural value as human skeletal remains. The historic property retains integrity of location, design, and materials.

Table 27. Archaeological historic property integrity, significance, and mitigation recommendations

SIHP # 50-80-12	Test Excavation	Formal Type/ Description	Integrity							Significance	Mitigation Recommendation
			Location	Design	Setting	Materials	Workmanship	Feeling	Association		
-3362	T-14 through T-16	Coastal wetlands	Y	N	N	Y	N	N	N	d	Archaeological monitoring
-4968	N/A	Human skeletal remains	Y	Y	N	Y	N	N	N	d and e	Continued preservation

Section 9 Project Effect and Mitigation Commitments

9.1 Project Effect

The proposed project will potentially affect two significant historic properties (SIHP #s 50-80-12-3362 and -4968) identified within the project area. The project-specific effect is “effect, with agreed upon mitigation commitments” pursuant to HAR §13-284-7. The recommended mitigation measures will reduce the project’s potential effect on significant historic properties.

9.2 Mitigation Recommendations

The agreed upon mitigation commitments for the Paradise Cove Redevelopment project consists of archaeological monitoring (a form of data recovery).

Archaeological monitoring of all ground-disturbing activities is agreed upon for the entire project area. On-site archaeological monitoring will be conducted to identify and appropriately document any additional exposures of SIHP #s 50-80-12-3362 and -4968, and any newly identified historic properties that may be encountered during construction. An archaeological monitoring plan meeting the requirements of HAR §13-279-4 will be submitted for SHPD review and acceptance prior to the commencement of construction activity.

Section 10 References Cited

Abbott, R. Tucker and S. Peter Dance

1990 *Compendium of Seashells*. American Malacologists, Melbourne, Florida.

Adams, Bradley and Pamela Crabtree

2012 *Comparative Osteology*. Academic Press, Reed Elsevier, New York.

Age, The

1986 Kumagai in $6 bill Hawaii Venture. *The Age*, 3 December.

Alexander, A.C.

1873 Map of Honouliuli. Registered Map 405. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Barrera, William M., Jr.

1975 *A Report on the Archaeological Reconnaissance Survey of the Proposed Barber's Point Harbor Area*. Bernice Pauahi Bishop Museum, Department of Anthropology, Honolulu.

1979 *West Beach, Oahu: An Archaeological Survey*. Chiniago, Inc., Honolulu.

1984 *West Beach, Oahu: Archaeological Status Report. TMK: 9-1-14:2, 9-2-13:3,7,2 0-1-15:3,6,7,10,4.* Chiniago Inc., Honolulu.

1986 *West Beach, O‘ahu Archaeological Investigations.* Chiniago, Inc., Honolulu.

Bath, Joyce

1989 *Waimanalo Gulch Petroglyphs -80-12-4110 Waimanalo Gulch, Honouliuli, Ewa, Oahu.* State Historic Preservation Division, Kapolei, Hawai‘i.

BLM/SHA (Bureau of Land Management/Society for Historical Archaeology)

2019 Historic Glass Bottle Identification & Information Website. Electronic document, www.sha.org/bottle/index.htm.

Bordner, Richard M. and Carol Silva

1983 *Archaeological Reconnaissance and Historical Documentation: Waimanalo Gulch, Oahu, TMK:9-2-03:2, 40, 13 (por).* Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai‘i.

Briggs, L. Vernon

1926 *Experiences Of A Medical Student In Honolulu, and On The Island Of O‘ahu 1881*. David D. Nickerson Company, Boston.

Burke, Kelly L. and Hallett H. Hammatt,

2014 *Archaeological Monitoring Report for the Farrington Highway Part 1, Phases A and B, 12" and 24" Water Main Installation Project, Nānākuli and Honouliuli Ahupua‘a, Wai‘anae and ‘Ewa Districts, Island of O‘ahu, TMK: [1] 8-9-001, 002, 005 through 007 and [1] 9-2-003*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Byerly, David and Patrick M. O'Day

2017 *Archaeological Inventory Survey Report Hawaiki Submarine Cable Landing Project, 92-384 Farrington Highway, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu, Hawaiʻi TMK (1) 9-2-049:001, 002, and 005; (1) 9-2-051:001 por., 010, and 011; and Farrington Highway*. Garcia & Associates, Honolulu.

Charvet-Pond, Ann and Bertel D. Davis

1992 *West Beach Data Recovery Program Phase 4, Archaeology and Paleontological Excavations*. Paul H. Rosendahl, Ph.D., Inc., Hilo, Hawaiʻi.

Collector's Weekly

2018 *Bireley's Orange Drink Bottle Circa 1954 Non-Carbonated.* Electronic document, https://www.collectorsweekly.com/stories/239867-bireleys-orange-drink-bottle-circa-1954.

Condé, Jesse C. and Gerald M. Best

l973 *Sugar Trains.* Glenwood Publishers, Felton, California.

Covington

1881 Hawaiian Government Survey map of Oahu. Registered Map 1381. Hawaiʻi Land Survey Division, Department of Accounting and General Services, Honolulu.

Davis, Bertell D.

1990 Human Settlement in Pristine Insular Environments: A Hawaiian Case Study from Barbers Point, Southwestern Oʻahu. Ph.D. Dissertation, University of Hawaiʻi, Honolulu.

2000 *West Beach Data Recovery Phase IV Archaeological and Paleontological Excavations Ko Olina Resort Land of Honouliuli, ʻEwa District, Island of Oʻahu* (4 Volumes). Paul H. Rosendahl, Inc., Hilo, Hawaiʻi.

Davis, Bertell D. and Alan E. Haun

1986 *Preliminary Report upon Completion of Field Work: Phase 2 – Intensive Survey and Test Excavations West Beach Data Recovery Program*. Paul H. Rosendahl, Ph.D., Inc, Hilo, Hawaiʻi.

1987 *Phase 2 — Intensive Survey and Test Excavations, West Beach Data Recovery Program, West Beach Resort, Honouliuli, Ewa, Island of Oahu.* Paul H. Rosendahl, Ph.D., Inc, Hilo, Hawaiʻi.

Eisenberg, Jerome M.

1981 *A Collector's Guide to Seashells of the World.* Crescent Books, New York.

Elliott, Rex R.

1971 *Hawaiian Bottles of Long Ago. A Little of Hawaii's Past.* Hawaiian Service, Honolulu.

Elliott, Rex R. and Stephen C. Gould

1988 *Hawaiian Bottles of Long Ago: A Little of Hawaii's Past.* Hawaiian Service, Honolulu.

Ewa Plantation Company

1923 *Ewa Plantation Company Annual Report*. Microfilm at University of Hawaiʻi at Mānoa, Hamilton Library, Honolulu.

Farley, Gina M. and David W. Shideler

2018 *Archaeological Literature Review and Field Inspection Report in Support of Consultation with SHPD for Historic Preservation Determination for the Atlantis Resort & Residence, Ko Olina Development Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu, TMK: [1] 9-1-057:006, 007, and 047; 9-1-059:008 (por.).* Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Fike, R.E.

1987 *The Bottle Book: A Comprehensive Guide to Historic, Embossed Medicine Bottles.* Peregrine Smith Books, Salt Land City, Idaho.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens

1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawaiʻi Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

Fornander, Abraham

1919 *Fornander Collection of Hawaiian Antiquities and Folklore*. Vols. V and VI, Part 2. T.G. Thrum editor. Memoirs of the Bernice Pauahi Bishop Museum. Bishop Museum Press, Honolulu.

1916-1920 *Fornander Collection of Hawaiian Antiquities and Folklore*. T.G. Thrum editor. Memoirs of the Bernice Pauahi Bishop Museum. Bishop Museum Press, Honolulu.

Frierson, Barbara

1972 A Study of Land Use and Vegetation Change: Honouliuli, 1790-1925. Manuscript prepared for Graduate Seminar in Geography (750). University of Hawaiʻi, Honolulu.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte

2013 Online Rainfall Atlas of Hawaiʻi. *Bulletin of the American Meteorological Society volume 94, pp. 313-316, doi: 10.1175/BAMS-D-11-00228.1*. Electronic document, http://rainfall.geography.hawaii.edu.

Giambelluca, T.W., X. Shuai, M.L. Barnes, R.J. Alliss, R.J. Longman, T. Miura, Q. Chen, A.G. Frazier, R.G. Mudd, L. Cuo, and A.D. Businger

2014 Evapotranspiration of Hawaiʻi. Final report submitted to the U.S. Army Corps of Engineers—Honolulu District, and the Commission on Water Resource Management, State of Hawaiʻi. University of Hawaiʻi at Mānoa, Honolulu. Electronic resource, http://climate.geography.hawaii.edu/.

Glidden, Catherine, Maurice Major, and Boyd Dixon

1993 *Results of Subsurface Data Recovery in Selected Areas of Paradise Cove, Honouliuli, ʻEwa, Oʻahu.* Anthropology Department, Bernice Pauahi Bishop Museum, Honolulu.

Godden, Geoffrey A.

1964 *Encyclopaedia of British Pottery and Porcelain Marks.* Herbert Jenkins, London.

Google Earth

2013 Aerial photographs of Hawaiʻi. Google Inc., Mountain View, California. Available online at www.google.com/earth.html.

Hammatt, Hallett H.

1995 Response to Inadvertent Discovery of Human Remains at Paradise Cove. Unpublished field notes. 11 January 1995 through 18 January 1995. Available at Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Hammatt, Hallett H. and William H. Folk

1981 *Archaeological and Paleontological Investigation at Kalaeloa (Barber's Point), Honouliuli, ʻEwa, Oʻahu, Federal Study Areas 1a and 1b, and State of Hawaiʻi Optional Area 1.* Archaeological Research Center Hawaiʻi, Lāwaʻi, Kauaʻi, Hawaiʻi.

Hammatt, Hallett H., Jennifer Robins, Mark Stride, and Matthew McDermott

1991 *An Archaeological Inventory Survey for the Makaīwa Hills Project Site, Honouliuli, ʻEwa, Oʻahu.* Cultural Surveys Hawaiʻi, Kailua, Hawaiʻi.

Hammatt, Hallett H. and David W. Shideler

1989 *Archaeological Reconnaissance of the Six-Acre Proposed HECO Kahe Training Facility (T.M.K. 9-1-3:27), Honouliuli, ʻEwa, Oʻahu.* Cultural Surveys Hawaiʻi, Kailua, Hawaiʻi.

1999 *An Archaeological Inventory Survey for the Waimānalo Gulch Sanitary Landfill Project Site, Honouliuli, ʻEwa, Oʻahu*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

2001 *Archaeological Inventory Survey In Support of the Proposed 360 Fiber Optic Cable Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu, (TMK: 9-1-14 & 15).* Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

2007 *Archaeological Literature Review and Field Inspection For an Approximately 21.2-Acre Project Area at Koʻolina, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu TMK: [1] 9-1-057:002 & 004.* Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Hammatt, Hallett H., David W. Shideler, Constance R. O'Hare, and Jon Tulchin

2013 *Archaeological Inventory Survey Testing at Tracks Beach Park For the Proposed Leeward Bikeway Project, Phase II, Federal Aid Project # STP-BW-0300(8) Honouliuli Ahupuaʻa, ʻEwa District Island of Oʻahu TMK: (1) 9-2-003:011.* Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Handy, E.S. Craighill and Elizabeth G. Handy

1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment.* Bishop Museum Bulletin 233. Bernice Pauahi Bishop Museum, Honolulu.

Hawaiʻi Land Survey Division

1933 Land Court Application 1069 Map 1. Hawaiʻi Land Survey Division, Department of Accounting and General Services, Honolulu.

Hawaiʻi TMK Service

2016 Tax Map Key [1] 9-1-057. Hawaiʻi TMK Service, Honolulu.

Honolulu Advertiser

1991 Paradise Cove deal approved. *Honolulu Advertiser*, 16 November.

Honolulu Star-Advertiser

2010 Developer left his mark on Hawaii. *Honolulu Star-Advertiser*, 24 December.

Honolulu Star-Bulletin

1998 New owners to restart Ko Olina development. *Honolulu Star-Bulletin*, 20 August.

ʻĪʻī, John Papa

1959 *Fragments of Hawaiian History*. Mary Kawena Pukui, translator. Bishop Museum Press, Honolulu.

Immisch, George B.

1964 Land Reclamation and the Role of the Hydroseparator at Ewa Plantation: A Case Study of Some of the Effects of Mechanized Harvesting in the Hawaiian Sugar Industry. Master's thesis, University of Hawaiʻi at Mānoa, Honolulu.

Jourdane, Muffet (Elaine)

1995 *Inadvertent Discovery of Human Remains at Paradise Cove, Honouliuli, ʻEwa, Oahu, State Site No. 50-80-12-4968, SHPD #762.* Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawaiʻi.

Kahiolo, G.W.

1978 *He Moolelo No Kamapuaa, The Story of Kamapuaa*. Esther T. Mookini and Erin C. Neizmen, translators, with assistance of David Tom. Hawaiian Studies Program, University of Hawaiʻi at Mānoa, Honolulu.

Kamakau, Samuel M.

1976 *The Works of the People of Old, Na Hana a ka Poʻe Kahiko.* Bishop Museum Special Publication 61. Bishop Museum Press, Honolulu.

1991 *Tales and Traditions of the People of Old; Nā Moʻolelo a Ka Poʻe Kahiko*. Originally published 1865-1869. Bishop Museum Press, Honolulu.

Kay, E. Allison

1979 *Hawaiian Marine Shells.* Section 4. Bishop Museum Press, Honolulu.

Kelly, Marion

1983 *Na Mala o Kona: Gardens of Kona, A History of Land Use in Kona, Hawaii*, Bishop Museum Dept. Report Series 83-2, Anthropology Department, Bernice Pauahi Bishop Museum, Honolulu.

1991 Notes on the History of Honouliuli. In *Archaeological Survey of the Naval Air Station, Barber's Point Oʻahu, Hawaiʻi, Appendix A*, by A.E. Haun, Applied Research Group, Bernice Pauahi Bishop Museum, Honolulu.

Kikuchi, William K.

1959 *Standard Oil Refinery Site Letter Report* (plus maps and field notes on file). Bernice Pauahi Bishop Museum, Honolulu.

Komori, Eric K. and Thomas Dye

1979 *Archaeological Testing at Lanikuhonua, West Beach, Ewa, Oʻahu, Hawaiʻi, (TMK 9-1-13:por.10).* Bernice Pauahi Bishop Museum, Honolulu.

Ko Olina Development, LLC

n.d. Ko Olina Resort and Marina Construction photos. Ko Olina Development, LLC, Honolulu.

Kovel, Ralph and Terry Kovel

1986 *Kovels' New Dictionary of Marks: Pottery & Porcelain 1850 to the Present.* Crown Publishers, Inc., New York.

Lanikūhonua Cultural Institute

2019 *The History*. Electronic document, http://www.lanikuhonua.com/the-property.

Lehner, Lois

1988 *Lehner's Encyclopedia of U.S. Marks on Pottery, Porcelain & Clay*. Collector Books, Paducah, Kentucky.

Leidemann, Helen Higman

Lindsey, Bill

2014 Historic Glass Bottle Identification & Information Website. Accessed at http://www.sha.org/bottle.

Malden, Lieutenant Charles R.

1825 South Coast of Oahu. Registered Map 640. Hawai'i Land Survey Division, Department of Accounting and General Services, Honolulu.

Maly, Kepā

1992 Historical Documentary Research. Appendix E in *Archaeological Inventory Survey, Contaminated Soil Stockpile/Remediation Facility,* by Berdena Burgett and Paul H. Rosendahl. Paul H. Rosendahl, Ph. D., Inc., Hilo, Hawai'i.

Mason, Glenn E.

1984 Lime Kiln Site No. 1436. Manuscript. Spencer Mason Partnership, Honolulu.

McAllister, J.G.

1933 *Archaeology of O'ahu*. Bishop Museum Bulletin 104. Bernice Pauahi Bishop Museum, Honolulu.

Medina, Leandra and Hallett H. Hammatt

2013 *Archaeological Monitoring Report for the Aulani Disney Resort and Spa Development Project an Approximately 21.2-Acre Project Area at Ko'olina Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-1-057:002 & 004.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Millar, Jim

1988 *The Handbook of Hawaiian Machine Made Soda Bottles.* Soda Mart, Goodletsville, Tennessee.

Monsarrat, M.D.

1909 Map of Oahu fisheries, Waianae section. Registered Map 2848. Hawai'i Land Survey Division, Department of Accounting and General Services, Honolulu.

Munsey, Cecil

1970 *Illustrated Guide to Collecting Bottles.* Hawthorn Books, Inc., New York.

Nakuina, Emma M.

1904 *Hawaii—Its People and Their Legends*. Hawaiʻi Promotion Committee, Honolulu.

Nakuina, Moses K.

1992 *The Wind Gourd of Laʻamaomao, The Hawaiian Story of Pākaʻa and Kūapākaʻa, Personal Attendants of Keawenuiaʻumi, Ruling Chief of Hawaii and Descendants of Laʻamaomao*. Esther T. Mookini and Sarah Nākoa, translators. Kalamakū Press, Honolulu.

Native Register

1848 Native Register of Kuleana Claims to Quiet Land Titles in the Hawaiʻi Lands (1847-53). Hawaiʻi State Archives, Honolulu.

Neller, Earl

1985 *A Preliminary Review and Evaluation of Archaeological Studies and Recommendations for the Proposed West Beach Estates at ʻEwa, Oʻahu.* Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawaiʻi.

Nojima, Yoko

2008 Cooking with Stones: An Ethnoarchaeological Study of Stone Oven Cooking Strategies in Island Melanesia. Unpublished Ph.D. dissertation, Department of Anthropology, University of Hawaiʻi, Honolulu

O'Leary, Owen L., David W. Shideler, and Hallett H. Hammatt

2007 *Archaeological Inventory Survey Addendum for the Makaīwa Hills Project Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMK: [1] 9-1-015:005 por. And 017; 9-2-003:002 por., 005 por., and 084 por*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Olsen, Stanley J.

1964 *Mammal Remains from Archaeological Sites: Part 1 - Southeastern and Southwestern United States.* Peabody Museum Press, Cambridge, Massachusetts.

Pagliaro, Penny

1987 Ewa Plantation: An Historical Survey 1890 to 1940. Manuscript. Historic Preservation Program, University of Hawaiʻi at Mānoa, Honolulu.

Paradise of the Pacific

1902 The Most Productive Sugar Plantation in the World. *Paradise of the Pacific*, December 1902:19–22. Honolulu.

Park, Valerie and Sara Collins

2010 *Archaeological Monitoring Report in Support of the Kahe Reverse Osmosis (RO) Water Pipeline Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu, State of Hawaii TMKs: (1) 9-1-015:002 & 9-2-003:011*. Pacific Consulting Services, Inc. Honolulu.

Payette, Pete

2003 *American Forts: Hawaiʻi*. Electronic document, http://www.geocities.com/naforts/hi.html (accessed 29 April 2004)

Pukui, Mary K., Samuel H. Elbert, and Esther Mookini

1974 *Place Names of Hawaii*. University of Hawaii Press, Honolulu.

Schmid, Elisabeth

1972 *Atlas of Animal Bones for Prehistorians, Archaeologists and Quaternary Geologists.* Elsevier Publishing Company, Amsterdam-London-New York.

Schmitt, Robert C.

1968 *Demographic Statistics of Hawaii: 1778-1965.* University of Hawaii Press, Honolulu.

1973 *The Missionary Censuses of Hawaii.* Bernice Pauahi Bishop Museum, Honolulu.

Schulz, Peter, Bill Lockhart, Carol Serr, Bill Lindsey, and Beau Schriever

2019 *A History of Non-Returnable Beer Bottles.* Electronic document, https://sha.org/bottle/pdffiles/NRBeers.pdf.

Shideler, David W. and Hallett H. Hammatt

2008 *Letter Report Addressing Architectural Concerns Board of Water Supply Farrington Highway Part 1 (Phase A & B) Haleakalā Road to Ali‘i Nui Drive Project Job No 03-104 TMK: [1] 8-7-008; 8-9-001, 002, 005, 006, 007; 9-1-056 & 9-2-003*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Sinoto, Akihiko

1976 *A Report on Cultural Resources Survey at Barbers Point, Island of O‘ahu.* Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Sisson, Septimus

1953 *The Anatomy of the Domestic Animals*. W.B. Saunders Company, Philadelphia.

Soehren, Lloyd

1964 *Waimanalo Gulch House Site. TMK: 9-2-03:72*. Bernice Pauahi Bishop Museum, Honolulu.

Stark, Richard, Megan Hawkins, and Hallett H. Hammatt

2015 *Archaeological Assessment Report for the Four Seasons Resort O‘ahu at Ko Olina, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, TMK: [1] 9-1-057:001 por.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Sterling, Elspeth P. and Catherine C. Summers (compilers)

1978 *Sites of O‘ahu.* Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Thrum, Thomas G.

1886 Great Land Colonization Scheme. *Hawaiian Almanac and Annual* for 1887. Thos. G. Thrum, Honolulu.

1906 Heiaus and Heiau Sites Throughout the Hawaiian Islands. Omiting Koas, or Place of Offering to Kuula, the Deity of Fisher Folk. *Thrum’s Hawaiian Annual for 1907*. Thos. G. Thrum, Honolulu.

Titcomb, Margaret

1979 *Native Use of Marine Invertebrates in Old Hawaii.* University of Hawaii Press, Honolulu.

Toulouse, Julian Harrison

1971 *Bottle Makers and their Marks*. Thomas Nelson, Inc., Nashville and New York.

Tuggle, H. David and M.J. Tomonari-Tuggle

1997 *A Cultural Resource Inventory of Naval Air Station Barbers Point, Oʻahu, Hawaiʻi, Part I: Phase I Survey and Inventory Summary*. International Archaeological Research Institute, Inc., Honolulu.

UH SOEST

1949 UH SOEST Ko Olina to Nanakuli Coast aerial photograph. University of Hawaiʻi at Mānoa School of Ocean and Earth Science and Technology–Coastal Geology Group.

U.S. Army War Department

1919 U.S. Army War Department fire control map, Nankuli and Barbers Point quadrangles. USGS Information Services, Denver, Colorado.

1936 U.S. Army War Department terrain map, Waianae and Barbers Point quadrangles. USGS Information Services, Denver, Colorado.

1943 U.S. Army War Department terrain map, Nanakuli and Barbers Point quadrangles. USGS Information Services, Denver, Colorado.

USDA (U.S. Department of Agriculture)

2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/ (accessed March 2005).

USGS (U.S. Geological Survey)

1951 USGS aerial photograph. USGS Information Services, Denver, Colorado.

1953 Ewa USGS Survey 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

1968 Ewa USGS Survey 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

1977 USGS Orthophotoquad, Ewa Quadrangle. (Aerial photograph). USGS Information Services, Denver, Colorado.

1998 Ewa USGS Survey 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

2005 USGS Orthoimagery (aerial photograph). USGS Information Services, Denver, Colorado.

2011 USGS Orthoimagery (aerial photograph). USGS Information Services, Denver, Colorado.

Waihona ʻAina

2000 *The Māhele Database.* Electronic document, http://waihona.com

Whitten, David

2009 *Glass Factory Marks on Bottles.* Electronic document, http://www.myinsulators.om/glass-factories/bottlemarks.html

Yoklavich, Anne K., Robert Drolet, and Patricia Drolet

1995 *Preliminary Report Cultural Resources Management Overview Survey Naval Air Station, Barbers Point, O‘ahu Hawai‘i.* Ogden Environmental and Energy Services Company, Inc., Honolulu.

Zumwalt, Betty

1980 Ketchup, Pickles, Sauces: 19th Century Food in Glass. M. West Publishers, Fulton, California.

Appendix A Pollen Analysis

Pollen Analysis

By Bruce G. Phillips, MS
BGP Consulting LLC

In advance of development at Paradise Cove, Honouliuli Ahupuaʻa, Island of Oʻahu, Cultural Surveys Hawaiʻi (CSH) investigated a portion of SIHP # -3362, a former coastal marshland. Subsequent to these efforts, three soil samples from three separate trenches (T-14 through 16) were selected for pollen analysis; all samples were from Stratum II, the suspected wetland deposit. The goal was to characterize vegetation communities at the time of deposition.

Methods

Sediment samples were sent to the Paleoecology, Palynology, and Climate Change Laboratory, University of Colorado-Denver for pollen extractions. Sample bag contents were mixed thoroughly, and 10-gram subsamples were taken. Approximately 19,332 grains of *Lycopodium* tracers were added to estimate pollen concentration. Hydrochloric acid was added to each sample to dissolve *Lycopodium* tablets and carbonates. After rinsing with deionized water, potassium hydroxide was added and samples were heated in a hot water bath for 10 minutes to deflocculate consolidated clay and organics and to remove humic acids. To reduce the heavier matrix fraction, the material was then sieved through a 180 µm-mesh screen. Smaller sands and large silts were removed using a suspension and decant method. Samples were then treated with hydrofluoric acid to remove remaining silicates. An acetolysis mixture of acetic anhydride and sulfuric acid was added to each sample and placed in a hot water bath for eight minutes. The samples were then washed with glacial acetic acid. The remaining residues were washed with water and alcohol, stained with safranine, and suspended in glycerol.

At BGP Consulting facilities, extracts were mounted and examined at a viewing power of 400X on an Olympus BHTU compound microscope. Typically, standard counts of 100 to 200 pollen grains and spores are conducted. In the current analysis, however, pollen deterioration allowed only 100-grain counts for all samples, as described below. Identifications were aided by BGP Consulting reference material and by keys (Selling 1946, 1947; Moore, et al. 1991). Each fossil pollen grain was identified to the generic level when possible. If a grain could not be differentiated from similar genera, it was identified to the family level. Pollen grains that were broken, corroded, or degraded beyond recognition were assigned to the "degraded" category. As all counts are 100 grains, the numbers of grains counted and percentages are the same (i.e., count=%). Pollen concentrations were calculated with the following formula:

$$\text{Concentration (grains/gram)} = \frac{\text{pollen grains counted}}{\text{tracers counted}} \times \frac{\text{tracer concentration}}{\text{sample weight}}$$

Results

Ten types of pollen and spores were identified (Table 1). High proportions of degraded grains (25 to 34%) indicated poor preservation in all samples and that the data likely were not an accurate reflection of the original assemblage (Table 2). Cheno-Am and grass pollen dominated all the samples. The assemblage was nearly homogenous, consisting almost entirely of the two dominant types and degraded grains. The exception was Sample 3 (T-16), in which 16 possible sedge grains were identified. No Polynesian or historic introductions were found. Nor was there any evidence of farming.

Samples 1 (T-14) and Sample 2 (T-15) had comparable concentrations (7,435 and 7,160 grains per gram, respectively); Sample 2 had slightly more identifiable types. Both samples had the highest proportions of degraded grains. If taken at face value, the data suggested a dry shrub and grassland, characterized by *aweoweo* and various grasses.

In contrast, Sample 3 (T-16) contained more pollen (12,888 grains per gram) and the lowest proportion of degraded grains (25%), suggesting better (albeit not good) preservation. The few clearly identifiable sedge grains had a ghost-like appearance, lacking any surface texture but with the apparent equatorial pores and size characteristics of Cyperaceae pollen (Selling 1947:350). Though a tentative identification (hence the cf. or "resembles" designation), other potential sedge grains were counted which would otherwise have been classified as "degraded". If the data for Sample 3 were accurate, then Stratum II reflects a marshland surrounded by a dry landscape. Further, if the identification was correct, sedge grains in Samples 1 and 2 might have been relegated to the "degraded" category, masking any indication of marsh deposits.

Degraded pollen assemblages are not uncommon (Moore, et al. 1991). Many factors cause pollen deterioration, and the process is not well understood (Holloway 1981, 1989). Mechanical factors can cause grains to be crushed or torn apart, whereas chemical agents can affect their structural integrity. Chief among chemical agents is the cycle of wetting and drying. It is possible that pollen in sediments at or near the water table have suffered deterioration due to fluctuations in groundwater level, caused by climatic (e.g., rainfall) and/or oceanic (e.g., sea levels) factors, or possibly even tides. Also affecting the number and distribution of pollen types is the amount of sporopollenin in grains of different plants. Sporopollenin is a highly resistant organic compound that allows pollen to be preserved in sediments and other settings. Because Cheno-Ams, Poaceae, and Asteraceae have large amounts of the compound and hence preserve well, they are often over-represented in the pollen record. Unfortunately, the sporopollenin content of Cyperaceae has not been well studied (Moore et al. 1991). Soil chemistry can also cause pollen to degrade. For example, ancient soils in the American Southwest are highly basic, causing deterioration. It is possible that the calcareous limestone parent material of Stratum II contributed to pollen deterioration.

In summary, all three samples had poorly preserved pollen assemblages, sufficient only for 100-grain counts. If the data are considered even somewhat accurate, then high Cheno-Am and grass proportions in Samples 1 and 2 suggested the area was shrub and grassland. If Sample 3 is more accurate, then Stratum II represents a marsh surround by dryland flora, again reflected by high Cheno-Am and grass proportions.

References

Holloway, R.G.
1981 Preservation and Experimental Diagenesis of the Pollen Exine. Ph.D. dissertation, Texas A&M University, College Station, Texas.
1989 Experimental Mechanical Pollen Degradation and Its Application to Quaternary Age Deposits. *Texas Journal of Science* 41:131-145.

Moore, P.D., J.A. Webb and M.E. Collinson
1991 *Pollen Analysis*. Blackwell Scientific Publications, London.

Selling, O. H.
1946 *Studies in Hawaiian Pollen Statistics, Part I. The Spores of the Pteridophytes.* Bernice P. Bishop Museum Special Publications 37.
1947 *Studies in Hawaiian Pollen Statistics, Part II. The Pollens of the Hawaiian Phanerograms*. Bernice P. Bishop Museum Special Publications 37.

Table 2. Pollen data.

Sample	1	2	3
Trench	T-14	T-15	T-16
Stratum	IIb	II	II
Depth (cm)	130-135	~150-170	125-140
Concentration (grains per gram	7,435	7,160	12,888
Types per sample	6	7	6
Sum	100	100	100
Count/%			
Degraded	34	31	25
Unknown		1	
Herbs and Shrubs			
Asteraceae, high-spine		1	
Asteraceae, low-spine	3	2	1
Cheno-Am	36	24	20
cf. Cyperaceae	1		16
Euphorbiaceae	1		
Fabaceae	2		
Poaceae	23	39	36
Ferns and Fern Allies			
Monolete spore, rough		1	1
Trilete spore, rough			1
Trilete spore, smooth		1	

Table 1. Pollen and spore types

Type	Common Name	Plant Community
Herbs and Shrubs		
Asteraceae, high spine	Sunflower family, *Dubautia* -type	Disturbed habitats
Asteraceae, low spine	Sunflower family, *Ambrosia* -type	Disturbed habitats
Cheno-Am	*Aweoweo*	Coastal Dry Shrublands
cf. Cyperaceae	Sedge family	Coastal Dry Sedgelands
Euphorbiaceae	Spurge family	Lowland Dry Shrublands
Fabaceae	Pea family	Coastal Dry Grasslands and Shrublands
Poaceae	*Aki aki* ; Grass family	Coastal Dry Grasslands, Sedgelands, and Mixed Communities
Ferns and Fern Allies		
Monolete spore, rough	Ferns	Coastal to Lowland Mesic Forests
Trilete spore, rough	Ferns and fern allies	Coastal to Lowland Mesic Forests
Trilete spore, smooth	Ferns and fern allies	Coastal to Lowland Mesic Forests

Appendix C

Cultural Impact Assessment

Draft
Cultural Impact Assessment for the The Cove at Ko Olina Redevelopment Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu
TMK: [1] 9-1-057:027

Prepared for
James Campbell Company, LLC

Prepared by
Kamuela Kaapana, M.Ed.,
Kellen Tanaka, B.S.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: HONOULIULI 182)

November 2022

O‘ahu Office
P.O. Box 1114
Kailua, Hawai‘i 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
1860 Main St.
Wailuku, Hawai‘i 96793
Ph.: (808) 242-9882
Fax: (808) 244-1994

Management Summary

Reference	Cultural Impact Assessment for The Cove at Ko Olina Redevelopment Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu, TMK: [1] 9-1-057:027 (Kaapana et al. 2022)
Date	November 2022
Project Number(s)	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: HONOULIULI 182
Agencies	State of Hawaiʻi, Department of Health, Office of Environmental Quality Control (DOH/OEQC)
Land Jurisdiction	James Campbell Company, LLC
Project Proponent	James Campbell Company, LLC
Project Location	The project area is currently occupied primarily by Paradise Cove Luau located between Aliʻinui Drive and the shoreline *makai* (seaward)/west of the entrance to the Ko Olina Resort. The project area is depicted on the 1998 Ewa U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	Beginning in 2023, the James Campbell Company plans to improve the 10.85-acre (4.39-hectare) property known as Paradise Cove. This will be the first major improvement of amenities on the property in over 25 years. Use of the property has been primarily for commercial *lūʻau* (modern term for Hawaiian feast) and entertainment operations since the late 1970s. The on-property facilities that house the current entertainment business date from the property's last major redevelopment in the early 1990s when the property was zoned and subdivided in recognition of its long-time commercial use. Prior to its commercial use, the property was part of the neighboring Lanikūhonua property which was the residence of Alice Kamokilaikawai Campbell (1884–1971) for over 30 years. Kamokila Campbell was the daughter of James Campbell (1826–1900). The Paradise Cove property was acquired by James Campbell in 1877 as a part of his purchase of the *ahupuaʻa* (traditional land division usually extending from the mountains to the sea) of Honouliuli. The intent of the upcoming property improvement is to create an authentic Hawaiian gathering place with an inclusive, spiritual, genuine, surprising, and welcoming character for *kamaʻāina* (native born) and visitors. When completed, new amenities will celebrate the traditions, beauty, and spirit of ancient Hawaiʻi in an immersive coastal setting unlike any place on Oʻahu. The revitalized property will be comprised of a unique mix of Hawaiian music and entertainment, dining, shopping, and other activities that will stand out to the community for its unique

	setting and memorable experiences. The history of the place will be recognized. Planned improvements include a new performing arts venue capable of housing a daily entertainment experience focused on Hawaiian culture. To activate the property as a gathering place throughout the day, other planned improvements may include small-scale retail shops, an open-air marketplace showcasing made in Hawai‘i and West O‘ahu goods and services, restaurants showcasing local cuisine and agricultural products, daytime activities appropriate for the coastal setting, and welcoming and engaging common areas. Potential programming may include commercial activities highlighting the sense of the place, educational and cultural workshops, and coordinated cultural events and programs with the neighboring Lanikūhonua Cultural Institute. The property's improvement will abide by its zoning limit that no more than 30% of the property will be occupied by structures thereby keeping intact a natural sense of open space and *makai* view planes. Structures will be set well back from the shoreline considering resiliency needs for rising seas and storm events, the natural and cultural sensitivity of the near shore areas and to ensure open access shoreline paths. Other considerations include sustaining an appropriate level of beach access so as not to overwhelm the natural cove and lagoon that is a truly special resource. The improvements are planned for completion around 2025 when the property will be opened to the public with a new and authentic sense of place recognizing its special setting and history.
Project Acreage	The project area is 10.85 acres (4.39 hectares).
Document Purpose	This cultural impact assessment (CIA) was prepared to comply with the State of Hawai‘i's environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the proposed project's potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project's potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control's *Guidelines for Assessing Cultural Impacts*) which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawai‘i significance Criterion e, pursuant to Hawai‘i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or

	oral accounts—these associations being important to the group's history and cultural identity" (HAR §13-275-6 and §13-284-6). The document is intended to support the project's environmental review and may also serve to support the project's historic preservation review under HRS §6E-8 and HAR §13-284.
Results of Background Research	Background research for this study yielded the following results, presented in approximate chronological order: 1. Honouliuli is the largest *ahupuaʻa* in the *moku* (district) of ʻEwa. The literal translation of Honouliuli is "dark water," "dark bay," or "blue harbor," and thus is named for the waters of Pearl Harbor which marks the eastern boundary of the *ahupuaʻa* (Jarrett 1930:22). Another source translates Honouliuli as "The blue bays or inlets" (*Saturday Press*, 11 August 1883). Honouliuli appears in the "Moʻolelo of Lepeamoa," the chicken-girl of Pālama, where Honouliuli is the name of the husband of the chiefess Kapālama, and grandfather of Lepeamoa (Westervelt 1923:164–184). 2. Honouliuli is generally described as very hot and dry. Evidence for drought-like conditions is further supported by the relative lack of traditional rain names associated with the Honouliuli Ahupuaʻa. The Nāulu rain is the only known rain associated with Honouliuli. Due to the lack of rainwater, freshwater resources were accessed via a karstic system. 3. In traditional Hawaiian times, the areas of exposed coral (Pleistocene limestone) outcrop were undoubtedly more extensive. According to McAllister (1933), holes and pits in the coral were generally accessed for water, while larger pits, often containing soil, were used for cultivation. McAllister additionally remarked that at the time of his 1930s survey, *maiʻa* (banana; *Musaceae*) and *kō* (sugarcane; *Saccharum officinarum*) were being cultivated within the pit caves (sinkholes) (McAllister 1933:109). 4. The traditional *kaʻao* (legends) associated with the area speak of the *akua* (godly) brothers, Kāne and Kanaloa. It was their supernatural feat of hurling *pōhaku* (stone) across the island that determined the boundaries of land divisions (Sterling and Summers 1978:1). Additional *moʻolelo* (stories) speak of Hiʻiaka and her travels across the plains of ʻEwa. In particular, the *wahi pana* (storied place) of Kaupeʻa is described. Kamakau describes Kaupeʻa as a wide plain where a grove of *wiliwili* (*Erythrina sandwicensis*) stands (Kamakau 1991a:47). This plain is an *ao kuewa*, a realm belonging to homeless souls. In general, the *kamaʻāina* of both Honouliuli Ahupuaʻa and ʻEwa District made a point to avoid this place.

5. Puʻuokapolei, a prominent hill located on the ʻEwa coastal plain, was the primary landmark for travelers on the trail running from Pearl Harbor to Waiʻanae. A *heiau* (pre-Christian place of worship) was once on the summit of the hill, however, by the time of McAllister's survey of Oʻahu it had been destroyed (McAllister 1933:108). The hill was also used as a point of solar reference or as a place for celestial observations of the winter solstice and summer solstice. A ceremony at a *heiau* on Puʻuokapolei provides a vantage point to capture the sun setting directly behind Puʻu Pālailai, a peak farther west in the Waiʻanae range. A coinciding ceremony at Kūpalaha Heiau in Waikīkī captures the same essence as the sun sets behind Puʻuokapolei.
6. John Papa ʻĪʻī, a historian and attendant to Kamehameha I, describes a network of leeward Oʻahu trails that in later historic times encircled and crossed the Waiʻanae Range, allowing passage from West Loch to the Honouliuli lowlands, past Puʻuokapolei and Waimānalo Gulch to the Waiʻanae coast and onward, along the shoreline of Oʻahu (ʻĪʻī 1959:96–98). Following ʻĪʻī's description, a portion of this trail network would have passed close to the present Farrington Highway alignment, north of the project area.
7. In early historic times, the population of Honouliuli was concentrated at the western edge of West Loch in the vicinity of Kapapapuhi Point. This area was clearly a major focus of population due to the abundance of marine resources in close proximity to a wide expanse of well-irrigated bottomland suitable for wetland taro cultivation.
8. Following the Māhele of 1848, 96 individual land claims were made in the *ahupuaʻa* of Honouliuli, with 72 claims being registered and awarded by King Kamehameha III to *makaʻāinana* (commoners). The 72 *kuleana* (individual parcels) awards were almost all made adjacent to Honouliuli Gulch, which contained fishponds, *loʻi* (irrigated taro field), *kula* (pasture/field), and house lots.
9. Beginning with the time of Western Contact, Hawaiian populations were introduced to many virulent western diseases which began to decimate the native populations. In 1832, a missionary census of Honouliuli recorded the population as 1,026. Within four years the population was down to 870 (Schmitt 1973:19, 22). Between 1848 and 1853, a series of epidemics of measles, influenza, and whooping cough often wiped out whole villages.
10. With the increasing foreign interests on Oʻahu Island during the last half of the nineteenth century, an array of agricultural

	enterprises was attempted. In 1871, John Coney rented the lands of Honouliuli to James Dowsett and John Meek, who used the land for cattle grazing. In 1877, James Campbell purchased most of Honouliuli Ahupuaʻa for a total of $95,000. 11. Major land use changes came to western Honouliuli when the U.S. military began development in the area. Military installations were constructed both near the coast and in the foothills and upland areas. Barbers Point Military Reservation (formerly Battery Barbers Point from 1937–1944) at Kalaeloa (Barbers Point Beach) was used, beginning in 1921, as a training area for firing 155 millimeter (mm) caliber guns (Payette 2003). Also in the vicinity were Camp Malakole Military Reservation (formerly Honouliuli Military Reservation), used from 1939, and Gilbert Military Reservation, used from 1922–1944. Fort Barrette (a.k.a. Kapolei Military Reservation and Battery Hatch) atop Puʻuokapolei was in use from 1931–1948 for housing four 3-inch anti-aircraft batteries (Payette 2003). In the 1950s, the site was used as a Nike missile base. Palailai Military Reservation was built in 1921 atop Puʻu Pālailai in Makakilo and housed Battery Palailai and Fire Control Station B (Payette 2003). 12. Beginning in 1939, Alice Kamokilaikawai Campbell, daughter of James and Abigail Kuaihelani Maipinepine Campbell, resided in Lanikūhonua, adjacent to the project area for nearly 30 years. Mrs. Campbell named the area Lanikūhonua which means “where the heavens meet the earth” (Lanikūhonua Cultural Institute 2019). Cultural descendant Nettie Fernandez Tiffany, current caretaker of the Lanikūhonua Institute, stated that her mother, Leilani Fernandez, was a close friend of Alice Campbell (personal communication October 2019). Mrs. Fernandez owned a beach home within the current project area and was the previous caretaker of the Campbell Estate property. 13. The 1980s saw a joint venture between Japanese construction giant, Kumagai Gumi, and Hawaiʻi developers, Horita Corporation and TSA International, for the development of a $6 billion resort originally called “West Beach” (*The Age*, 3 December 1986:34). Four man-made lagoons were constructed, as well as an 18-hole golf course, luxury condominiums, and a hotel (*Honolulu Star-Bulletin*, 20 August 1998). In 1991, the developers of West Beach, West Beach Estates, purchased Paradise Cove Luau (*Honolulu Advertiser*, 16 November 1991). The project stalled as a result of the Japanese investment bubble bursting in the early 1990s (*Honolulu Star-Advertiser*, 24 December 2010). The area is now known officially as Ko Olina.

Results of Community Consultation	CSH attempted to contact 80 Hawaiian organizations, agencies, and community members. Of the 11 people that responded, one of these *kamaʻāina* (native born) and/or *kūpuna* (elder) provided written testimony and one met with CSH for more in-depth interview. Consultation was received from the following community members: 1. Nettie Tiffany, *kahu* (caretaker) of Lanikūhonua Cultural Institute 2. William Aila Jr., Interim Chair of Hawaiian Homes Commission, Director of Department of Hawaiian Homelands 3. Kūhiō Lewis, Chief Executive Officer (CEO) for the Council for Native Hawaiian Advancement (CNHA) 4. Tracie Kaʻōnohilani Farias Lopes, *Kumu Hula* (*hula* teacher) for Ka Lā ʻŌnohi Mai O Haʻehaʻe and Instructor at Hawaiʻi Pacific University and R. Keawe Lopes, *Kumu Hula* of Ka Lā ʻŌnohi Mai O Haʻehaʻe and Director of the Kawaihuelani Center for Hawaiian Language at the University of Hawaiʻi at Mānoa
Impacts and Recommendations	Based on information gathered from the community consultation, participants voiced their concerns in the following cultural context: 1. Nettie Tiffany, *kahu* of the Lanikūhonua Cultural Institute, pointed out various native vegetation present at Lanikūhonua. She also pointed out Anianikū and Kōʻula fishponds located west of the proposed project area. 2. Although not specifically identified, Ms. Tiffany shared that religious practices did occur on the project area and within the surrounding vicinity. 3. William Aila Jr. mentioned there is a "Kuahu [altar] located to the west of Lanikuhonua just beyond the housing but within the County Park that is unimproved." He believes "that it is a fishing shrine." He recalled, "When I was younger 40 years ago, fishermen left hoʻokupu [offerings] on it." Mr. Aila also shared his belief that "Uau Kani (Wedge tail shearwater) continue nest in the area surrounding it." 4. CSH recommends that the proposed project should allow access to the shoreline in the vicinity of the proposed project area for ongoing traditional cultural practices including the gathering of aquatic resources such as fish, *limu* (seaweed) and salt and *hula*. 5. Ms. Tiffany shared that burial remains have been previously identified within the project area. Therefore, there is a probability of disturbing other burials not previously identified if construction and development of this proposed project should continue. 6. Ms. Tiffany emphasized the importance of the protection of one's self as well as others while on the Paradise Cove property and when conducting work. She shared that all work conducted for the project should be done with *pono* (proper) and workers

	need to be *makaʻala* (aware). It is the intentions and actions of people that guide a reaction from the spirits. If any disturbance of *iwi kūpuna* (ancestral remains) or any other culturally significant materials such as *pōhaku* (stone) should occur, both Native Hawaiian and legal protocols need to be followed. 7. CSH recommends the project proponents consult with the Lanikūhonua Cultural Institute during the design process to avoid potential impacts to undisclosed cultural sites and ongoing cultural practices occurring within The Cove at Ko Olina Redevelopment project area. 8. Kūhiō Lewis suggested that project proponents could curate a type of continuation of the Makahiki sense of place and celebration by incorporating traditional Hawaiian games such as spear throwing and *ʻulu maika* (ancient Hawaiian game suggesting bowling) into the storytelling of the area. 9. Mr. Lewis stated there are "amazing opportunities" for economic development in the area. He noted "our people need jobs, they need opportunities that don't exist on the west side." He emphasized that "Hawaiians need to be involved in the economy of this development." He stated that project proponents should not bring in mainland developers. 10. Mr. Lewis suggested the marketplace "should be run by a Hawaiian entity that can work to build up the capacity of the businesses from this area to sell their products." He noted, "it's not just the vendors, it's the people running the marketplace so that the values are inclusive throughout the whole thing." He stated that the marketplace should not have mainland franchises. It should have Hawaiʻi-based products from Hawaiian-based businesses grounded in Hawaiian values. 11. Mr. Lewis would like Hawaiian businesses involved in the "facilitation of the operations or curating the stories that are being told at those areas." He pointed out there are "amazing businesses that practice traditional type of things that could have a place in that Ko Olina space." He clarified that he is "not talking about people to demonstrate how to pound *poi* [the Hawaiian staff of life, made from cooked taro corms] or *kalo* [Taro; *Colocasia esculenta*], or show them how to make *kapa* [tapa; bark cloth]." 12. Mr. Lewis stated the project proponents need to focus on incorporating Hawaiian values. He emphasized that the Hawaiian community should be given opportunities to curate stories that are "real and authentic to Hawaiʻi." He suggested shows performed at the proposed amphitheater should be developed and curated by Hawaiians from the area telling their stories. He also suggested the amphitheater should allow charitable uses so the

	local community could use it for events such as an annual *hoʻolauleʻa* (celebration), block party, or other gatherings celebrating the area's history and traditions without paying exorbitant fees. 13. Mr. Lewis emphasized that "there needs to be a sense of place for the west side community." It should not only cater to tourists but should also be a destination for locals. He would like it to be a place where "locals and visitors can live together, be alongside each other." 14. Mr. Lewis stated that "the best way to contribute to the perpetuation of this place" is to find meaningful opportunities for Native Hawaiians to be involved in the economy. He noted, "it's not even just Hawaiians anymore, […] all the ethnic groups are struggling to make ends meet" and "have no meaningful involvement in the economy." He pointed out that every day, droves from the local community are packing up their stuff, moving to the mainland and taking with them "the fabric of *aloha* (love), the connection to Hawaiʻi, the stories of Hawaiʻi." He emphasized, "That's how you perpetuate Hawaiʻi, you allow the people from this place to stay here." 15. Tracie Kaʻōnohilani Farias Lopes stated that their *ʻohana* family has "frequented the beautiful beaches from Ko ʻOlina to Neneʻu [Pōkaʻī Bay] for family gatherings." They have also "actively fished the reefs along the coast and enjoyed manini [very common reef surgeonfish; *Acanthurus triostegus*], weke [Certain species of the *Mullidae*, surmullets or goatfish], kala [Surgeonfish, unicorn fish, *Teuthidae*; *Naso hexacanthus*, *N. unicornis*, *N. brevirostris*], maiko [surgeonfish; *Acanthurus nigroris*], heʻe [Octopus; *Polypus* sp.] and ʻōʻio [Ladyfish, bonefish; *Albula vulpes*] from Keaulana, Kalanianaʻole Beach Park, Ulehawa, Puʻuohulu-Kai, and Māʻili." 16. Mrs. Lopes emphasized that "As kumu hula, educators and creative show directors, the vision for this development is exciting because Hawaiʻi, the people of Hawaiʻi and the visitors who visit our home deserve to see authentic Hawaiian entertainment in Hawaiʻi." She stated that Ko ʻOlina will be a "beautiful setting" for *kamaʻāina* and visitors to see "authentic Hawaiian entertainment." 17. Mrs. Lopes emphasized that "Hawaiʻi needs a show that will only focus on the traditions, beauty and excitement of **Hawaiian** culture and dance and not have to journey through Polynesia for a great experience." She added, "The Hawaiian experience is great on its own and we know this because we live this. It's time to put Hawaiʻi first in the entertainment industry here."

	18. Mrs. Lopes was asked to create a new show at the Paradise Cove Lūʻau in 2016. She recalled that “With the helpful insight and research of Keawe [Lopes], the memories of many past shows, the collaboration of cultural resource people, a template for kumu to work from and kumu/director guided practices with all cast members,” they were able to “open three new shows in only 5 months.” To ensure the show was unique, Mr. and Mrs. Lopes “composed and selected songs celebrating Oʻahu and Hawaiʻi while incorporating traditional and contemporary elements. Choreography was then created and taught to the dancers to perform by the kumu hula.” One of the songs created during this process was “Nani Koʻolina.” 19. Mrs. Lopes expressed her hope that more *mele* (songs) like “Nani Koʻolina” can be “composed to share as hula presentations at the proposed entertainment venue that features what is truly Hawaiian thought in poetic expression.” She emphasized that the “key is to bring creative and culturally grounded kumu who are connected to the area and culture to build a solid Hawaiian show.” 20. Mrs. Lopes stated that including “mele like ‘Nani Koʻolina’ in the show, repopulating the seashore with kaunaʻoa [*Cuscuta sandwichiana*], sharing stories of Kākuhihewa and sharing mele that tell of the delicacies of the ocean, food preparation and fishing practices perhaps can all support the vision of the entertainment aspect of the project.” She emphasized that the “most important is to have a kumu hula who is trained and culturally grounded lead the entertainment.” 21. Mrs. Lopes thanked James Campbell Company for “the initiative to use this land to promote, celebrate and perpetuate our Hawaiian cultural art forms, language and moʻolelo for all ages to experience.” She emphasized that “This will be a significant step forward and the James Campbell Company will be at the forefront of this significant movement with mele like “ ‘Nani Koʻolina’ and ‘He Mele Inoa No Kuhihewa’ and the collective creativity of our kanaka [Hawaiian people] today.” She also noted that “the show and other cultural elements can provide magical and meaningful experiences for both kamaʻāina and malihini [tourist].” 22. Mrs. Lopes stated, “For us, itʻs important to entertain but to also educate.” She noted, “One of the most popular daily activities at any hotel or show for our malihini is the hula [dance] lesson,” however, she feels that “sometimes these activities can be too commercial and sometimes inappropriate when taught for the mass because how we run our hālau is very, very different.” She suggests the song, “Hula In Paradise,” which she composed

	specifically for this area would be a "perfect hula to teach because it is in English and it acknowledges nature that surrounds you while on the property and also shares some cultural practices as well in a fun way." The chorus of the song is an example of "how culture and entertainment can be incorporated and still be tasteful to all." 23. The Lopes ‘Ohana has a "special spiritual connection to Ko ‘Olina and Lanikūhonua." Mrs. Lopes recalled taking her daughters to Anianikū to experience the ocean for the first time and to dedicate them to Ke Akua. She noted that visting Ko ‘Olina is "not just relaxation time but a re-connect to our past experiences and inspires future experiences as well." 24. Mrs. Lopes also noted the "ocean and shoreline of Nānākuli and the proposed area of revitalization in Ko‘olina" is where she was "water baptized as an adult" and where she "spent the most time with my kumu [teacher] O‘Brian, kumu Thaddius and Charles Ka‘upu while learning hula and oli [chant]." Her *kumu* O'Brian set aside "special times of the year on property to re-unite with hālau [house for *hula* instruction] members," as well as "time for Kapu kai or ceremonial preparations in the ocean for his dancers to meditate, spiritually cleanse and pray before important hula and life events." She emphasized that "these experiences are so important to us as practitioners." 25. Mr. and Mrs. Lopes stressed the importance of maintaining access to the ocean so her *‘ohana*, her *hālau*, and other cultural practitioners may continue their practices. She suggested "creating a formal agreement between practitioners, the estate and the proposed kahu mālama [caretaker] of the area to allow our people to conduct our training and formal ceremonies there as our way of reconnecting to our sources of strength and healing taught to us by our kumu and kūpuna." 26. Mrs. Lopes noted there are burials within the property and "we should always be respectful when entering the property or near sites." She thanked Aunty Nettie Tiffany for "holding the ‘ike [knowledge] of the locations of these resting places of our kūpuna," as well as the project proponents for "taking care of these areas when the project begins." 27. Mrs. Lopes mentioned there are "two hula mounds" at the Ocean Garden. "The larger mound faces the ocean and the other faces the entrance." She expressed her "support to keep these mounds in its current location and condition." She stated that the mounds "provide natural staging for entertainment, a space for the daily educational activities and possibly hula ceremonial gatherings and presentations." She emphasized that "They will continue to be special and very useful areas if preserved."

	28. Mr. and Mrs. Lopes strongly support featuring Hawaiian artisans in the proposed marketplace. She stated, "If it is made by the artists of that area themselves, these items are not just souvenirs but can become family heirlooms in the future." She noted, "We have so many artists in Hawaiʻi and being able to feature authentic Hawaiian work in galleries or in shops to purchase in this area is exciting and offers our malihini and kamaʻāina a unique shopping experience while supporting our community." 29. Mr. and Mrs. Lopes also expressed gratitude that this "project has the potential of creating numerous jobs for residents in the area." She emphasized that "This is so important! By offering Hawaiian marketplace and authentic Hawaiian entertainment like this, we believe that many hula practitioners will want to be a part of it and will travel from all moku of Oʻahu to do so." 30. Mr. and Mrs. Lopes are willing to "participate and creatively collaborate" with Aunty Nettie, Uncle Kimo Alama Keaulana, and Twyla Mendez, all of whom have connections with Campbell Estate and are respected in the *hula* community. Mrs. Lopes noted, "We all uphold legacy and create beautiful experiences in all educational and entertainment settings so this would be exciting." 31. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended. 32. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Table of Contents

List of Figures

List of Tables

Section 1 Introduction

1.1 Project Background

At the request of James Campbell Company, LLC, Cultural Surveys Hawaiʻi, Inc. (CSH) has prepared this cultural impact assessment (CIA) for the The Cove at Ko Olina Redevelopment project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu, TMK: [1] 9-1-057:027. The project area is currently leased by Paradise Cove, located between Aliʻi Nui Drive and the shoreline, *makai* (seaward)/west of the entrance to the Ko Olina Resort. The project area is depicted on a portion of the 1998 Ewa U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2), and a 2013 aerial photograph (Figure 3).

Beginning in 2023, the James Campbell Company plans to improve the 10.85-acre (4.39-hectare) property known as Paradise Cove. This will be the first major improvement of amenities on the property in over 25 years.

Use of the property has been primarily for commercial *lūʻau* (modern term for Hawaiian feast) and entertainment operations since the late 1970s. The on-property facilities that house the current entertainment business date from the property's last major redevelopment in the early 1990s when the property was zoned and subdivided in recognition of its long-time commercial use. Prior to its commercial use, the property was part of the neighboring Lanikūhonua property which was the residence of Alice Kamokilaikawai Campbell (1884–1971) for over 30 years. Kamokila Campbell was the daughter of James Campbell (1826–1900). The Paradise Cove property was acquired by James Campbell in 1877 as a part of his purchase of the *ahupuaʻa* (traditional land division) of Honouliuli.

The intent of the upcoming property improvement is to create an authentic Hawaiian gathering place with an inclusive, spiritual, genuine, surprising, and welcoming character for *kamaʻāina* (native born) and visitors. When completed, new amenities will celebrate the traditions, beauty, and spirit of ancient Hawaiʻi in an immersive coastal setting unlike any place on Oʻahu. The revitalized property will be comprised of a unique mix of Hawaiian music and entertainment, dining, shopping, and other activities that will stand out to the community for its unique setting and memorable experiences. The history of the place will be recognized.

Planned improvements include a new performing arts venue capable of housing a daily entertainment experience focused on Hawaiian culture. To activate the property as a gathering place throughout the day, other planned improvements may include small-scale retail shops, an open-air marketplace showcasing made in Hawaiʻi and West Oʻahu goods and services, restaurants showcasing local cuisine and agricultural products, daytime activities appropriate for the coastal setting, and welcoming and engaging common areas. Potential programming may include commercial activities highlighting the sense of the place, educational and cultural workshops, and coordinated cultural events and programs with the neighboring Lanikūhonua Cultural Institute.

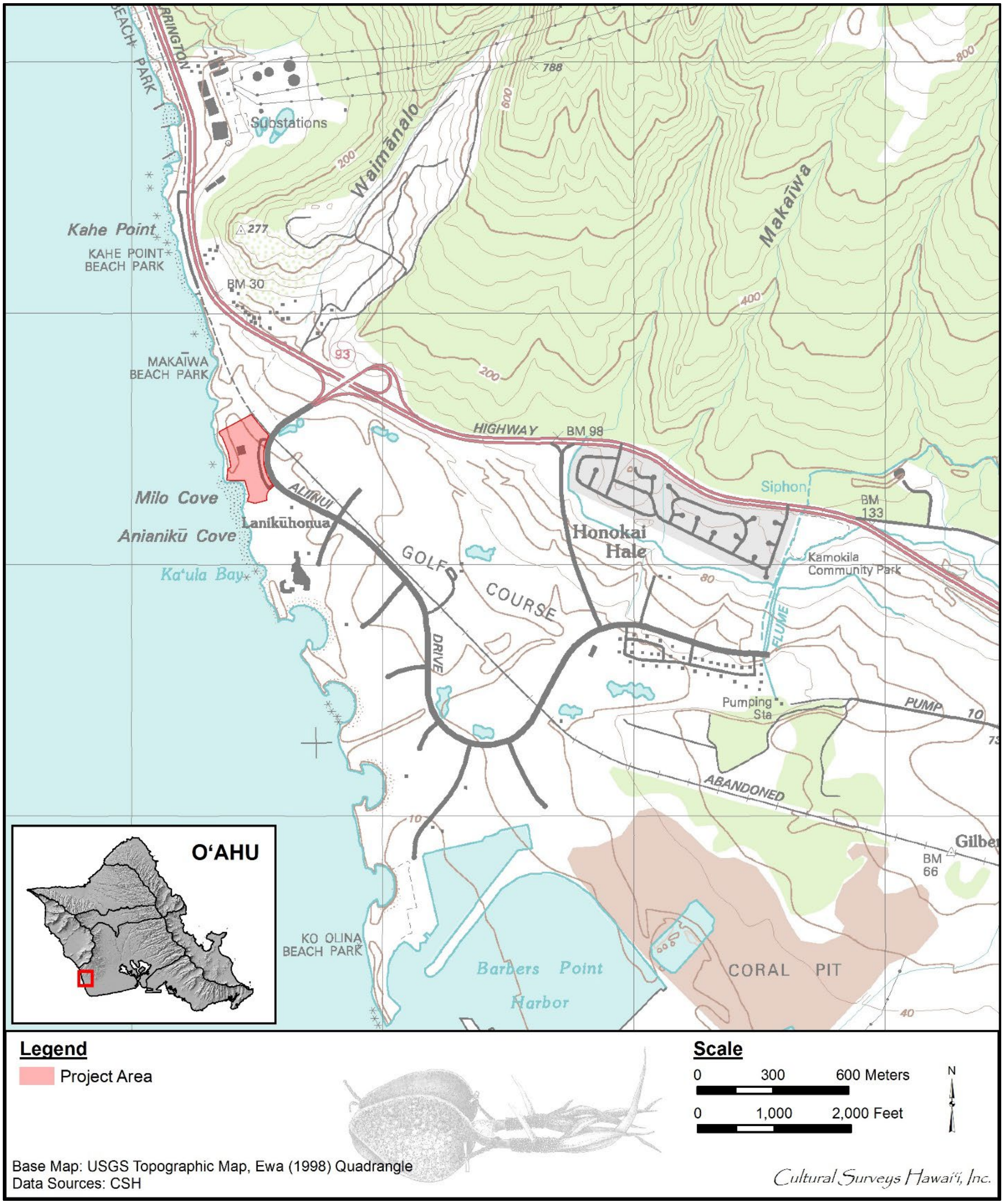


Figure 1. Portion of the 1998 Ewa USGS 7.5-minute topographic quadrangle showing the location of the project area

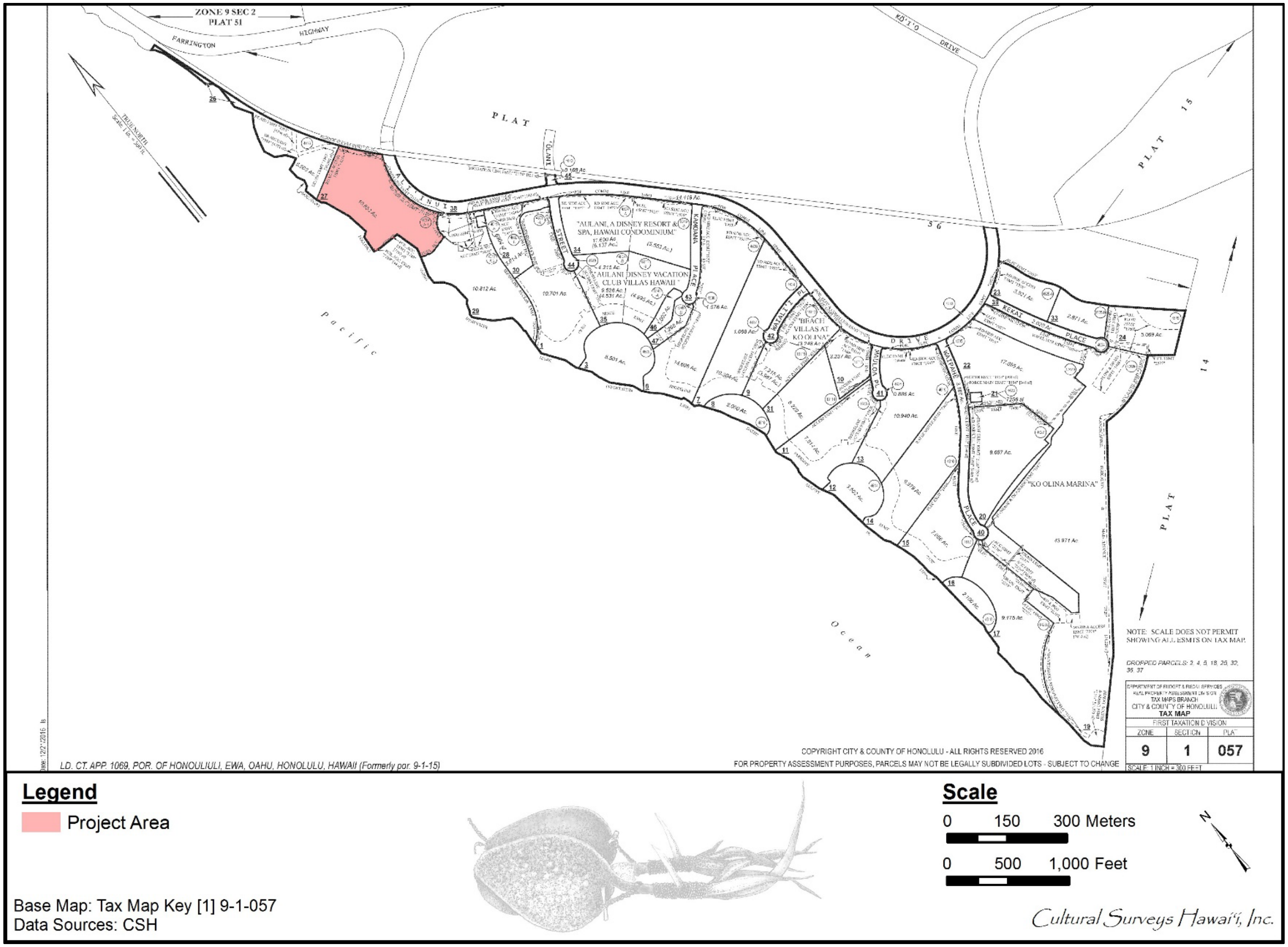


Figure 2. TMK: [1] 9-1-057 showing the location of the project area (Hawai‘i TMK Service 2016)

Figure 3. 2013 Google Earth aerial image showing the project area

The property's improvement will abide by its zoning limit that dictates no more than 30% of the property will be occupied by structures thereby keeping intact a natural sense of open space and *makai* view planes. Structures will be set well back from the shoreline considering resiliency needs for rising seas and storm events, the natural and cultural sensitivity of the near shore areas, and to ensure open access shoreline paths. Other considerations include sustaining an appropriate level of beach access so as not to overwhelm the natural cove and lagoon that is a truly special resource.

The improvements are planned for completion around 2025 when the property will be opened to the public with a new and authentic sense of place recognizing its special setting and history.

1.2 Document Purpose

This CIA was prepared to comply with the State of Hawaiʻi's environmental review process under Hawaiʻi Revised Statutes (HRS) §343, which requires consideration of the proposed project's potential effect on cultural beliefs, practices, and resources. Through document research, this report provides information compiled to date pertinent to the assessment of the proposed project's potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control's *Guidelines for Assessing Cultural Impacts*) which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawaiʻi significance Criterion e, pursuant to Hawaiʻi Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance Criterion e refers to historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity" (HAR §13-275-6 and §13-284-6). The document will likely also support the project's historic preservation review under HRS §6E.

1.3 Scope of Work

The scope of work for this CIA includes the following:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Natural Environment

The project area is on the southwest coast of O‘ahu at Ko Olina, with elevations typically below 5 m above mean sea level. Annual temperature in the project area averages 23.8˚ C (74.7˚ F) (Giambelluca et al. 2014). The mean annual rainfall is between 567 mm (22.19 inches) and 569 mm (22.43 inches) (Giambelluca et al. 2013). Surface water in the vicinity is quite limited. Makaīwa Gulch and Waimānalo Gulch to the northeast host intermittent streams, but these rarely flow except during major storms.

1.4.1 *Ka Lepo* (Soils)

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), the project area’s soils are diverse (Figure 4). The northern portion of the project area extending to a small portion of the shoreline is within Keaau clay, 0 to 2% slopes (KmA). The remainder of the shoreline is within coral outcrop (CR). The southeastern portion of the project area is within Keaau clay, saline, 0 to 2% slopes (KmbA). The southern portion of the project area is adjacent to Jaucas sand, 0 to 15% slopes (JaC).

Keaau series are described as follows:

> This series consists of poorly drained soils on the coastal plains on the island of Oahu. These soils are developed in alluvium deposited over reef limestone or consolidated coral sand. They are nearly level and gently sloping. Elevations range from 5 to 40 feet. The annual rainfall amounts to 20 to 35 inches. Most of the rainfall occurs between November and April. The mean annual soil temperature is 73˚ F. Keaau soils are geographically associated with Kaloko, Mokuleia, and Pearl Harbor soils.
>
> These soils are used for sugarcane and pasture. The natural vegetation consists of kiawe, bemudagrass, bristly foxtail, and fingergrass [Foote et al. 1972:64–65]

Coral outcrop soils are described as follows:

> Coral outcrop (CR) consists of coral or cemented calcareous sand on the island of Oahu. The coral reefs formed in shallow ocean water during the time the ocean stand was at a higher level. Small areas of coral outcrop are exposed on the ocean shore, on the coastal plains, and at the foot of the uplands. Elevations range from sea level to approximately 100 feet. The annual rainfall amounts to 18 to 40 inches. Coral outcrop is geographically associated with Jaucas, Keaau, and Mokuleia soils.
>
> Coral outcrop makes up about 80 to 90 percent of the acreage. The remaining 10 to 20 percent consists of a thin layer of friable, red soil material in cracks, crevices, and depressions within the coral outcrop. This soil material is similar to that of the Malama series.
>
> This land type is used for military installations quarries, and urban development. Vegetation is sparse. It consists of kiawe, koa haole, and fingergrass. [Foote et al. 1972:29]

The Jaucas soil series is described as follows:

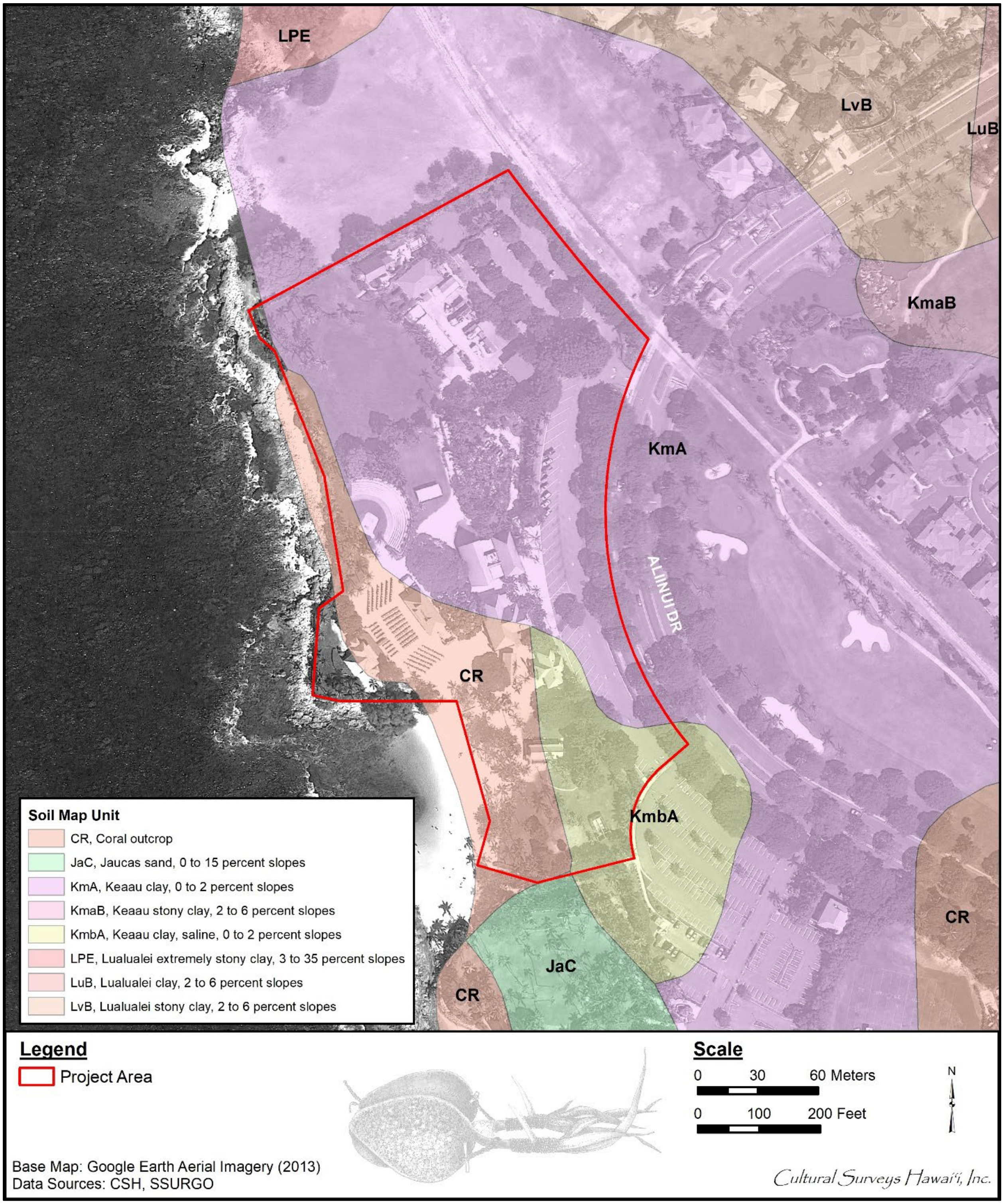


Figure 4. Portion of a 2013 Google Earth aerial imagery with overlay of *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii* (Foote et al. 1972; USDA SSURGO 2001), indicating soil types within and surrounding the project area

excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean. These soils occur on all islands of this survey area. They developed in wind- and water-deposited sand from coral and seashells. They are nearly level to strongly sloping. Elevations range from sea level to 100 feet […] [Foote et al. 1972:48]

1.4.2 *Ka Makani* (Winds)

For Native Hawaiians, *makani* (wind) were named for various reasons. Names of winds were assigned based on but not limited to their direction, strength, and geographic location. David Malo, a Native Hawaiian historian, explains some general terms related to wind:

> […] There was the *kona*, a wind from the south, of great violence and of wide extent. It affected all sides of an island, east, west, north, and south, and continued for many days […] The *kona* wind often brings rain, though sometimes it is rainless. […] The *hoolua*, a wind that blows from the north, sometimes brings rain and sometimes is rainless. […] The *hau* is a wind from the mountains, and they are thought to be the cause of it, because this wind invariably blows from the mountains outwards towards the circumference of the island. [Malo 1951:14]

Malo has supplied a foundation of names for winds, however, there is an abundance of names in various stories and chants.

A‘e loa is a term given to the prevailing northeasterly trade winds (Nakuina 1992:138) along with *A‘e* (Pukui and Elbert 1986:3), *Moa‘e*, and *Moa‘e Lehua* (Pukui and Elbert 1986:249). In the traditional story *The Wind Gourd of La‘amaomao*, Pāka‘a and his son Kūapāka‘a are descendants of the wind goddess La‘amaomao whose traditional home was in a gourd that also contained all of the winds of Hawai‘i. La‘amaomao controlled and called forth the winds by chanting their names. Moa‘ekū is a specific wind of ‘Ewaloa.

He Moaeku ko Ewaloa	Moa‘e-ku is of ‘Ewaloa
He Kehau ko Wai‘ōpua	Kēhau is of Wai‘ōpua
He Waikoloa ko Lihue	Waikōloa is of Līhu‘e
He Kona ko Puuokapolei	Kona is of Pu‘uokapolei
He Maunuunu ko Pu‘uloa	Māunuunu is of Pu‘uloa
[*Ke Aloha Aina* 1904:3]	[Nakuina 1992:51]

In the Legend of Halemano, the romantic O‘ahu anti-hero chanted a love song with a reference to the winds of Līhu‘e:

Huli ae la Kaala kau i luna,	Search is made to the top of Kaala,
Waiho wale kai o Pokai,	The lower end of Pokai is plainly seen.
Nānā wale ke aloha i Honouliuli,	Love looks in from Honouliuli,
Kokolo kēhau he makani no Lihue.	The dew comes creeping, it is like the wind of Lihue.

[Fornander 1919:5(2):252–253]

In *The Epic Tale of Hi‘iakaikapoliopele*, the goddess Hi‘iaka, the young sister of the fire goddess Pele, born as an egg and carefully warmed and nourished by Pele herself (Westervelt

1916:69), embarks on a quest to retrieve her older sister's lover, Lohiʻau. While traversing the island chain, Hiʻiaka encounters various gods and demi-gods, spirits and shapeshifters, as well as chiefs and commoners. According to the *moʻolelo*, Hiʻiaka watches as her beloved friend Hōpoe is killed by the embers of her sister Pele. She chants atop of Pōhākea and tells of the winds of Waikōloa and Waiʻōpua.

KAU HOʻOKAHI HANERI A ME KANALIMAKUMAMĀKOLU	CHANT ONE HUNDRED AND FIFTY-THREE
Aloha kuʻu hoa i ka pūʻali lā	Alas my friend of the rugged mountain pass
A luna i Pōhākea, he luna o Kamaoha	On high at Pohakea, above Kamaoha
He lae ʻino ʻo Maunauna	Maunauna is a dangerous escarpment
ʻO Līhuʻe ke hele ʻia	Lihuʻe's high plain yet to be traversed
Honi i ke ʻala mauʻu	Inhaling the scent of the grasses
I ke ʻala o ke kupukupu	The fragrance of kupukupu fern
E linoa ala e ka Waikōloa	Entwined by the Waikoloa breeze
E ka makani he Waiʻōpua	By the wind called Waiʻōpua
Kuʻu pua, me he pua lā i kuʻu maka	My blossom, like a flower in my sight
Ka ʻoni i ka haku ʻōnohi, kā ka wai lā i liʻu	Moving before my eyes, washed salty by tears
I kuʻu maka lā, e uē au lā.	There in my sight, I weep.

[Hoʻoulumāhiehie 2008a:280; Hoʻoulumāhiehie 2008b:262]

1.4.3 *Ka Ua* (Rain)

Precipitation is a major component of the water cycle and is responsible for depositing *wai* (fresh water) on local flora. *Kānaka* (Native Hawaiians) recognized two distinct annual seasons. The first, known as *kau* (period of time, especially summer) lasts typically from May to October and is a season marked by a high-sun period corresponding to warmer temperatures and steady trade winds. The second season, *hoʻoilo* (winter, rainy season) continues through the end of the year from November to April and is a much cooler period when trade winds are less frequent, and widespread storms and rainfall become more common (Giambelluca et al. 1986:17). Each small geographic area on Oʻahu had a Hawaiian name for its own rains. According to Akana and Gonzalez (2015):

> Our kupuna had an intimate relationship with the elements. They were keen observers of their environment, with all of its life-giving and life-taking forces. They had a nuanced understanding of the rains of their home. They knew that one place could have several different rains, and that each rain was distinguishingable from another. They knew when a particular rain would fall, its color, duration, intensity, the path it would take, the sound it made on the trees, the scent it carried, and the effect it had on people. [Akana and Gonzalez 2015:XV]

Honouliuli was no exception to this naming practice. Despite the relative lack of rainfall in this area, the Nāulu rain is known to be associated with the *ahupuaʻa* of Honouliuli. This rain is generally understood as a sudden shower, and more commonly associated with Kawaihae, Hawaiʻi and Niʻihau (notoriously dry locations as well) (Akana and Gonzalez 2015:187).

The Nāulu rain is mentioned in a chant offered by Hiʻiakaikapoliopele, the younger sister of the volcanic goddess Pele. In *Ka Moʻolelo o Hiʻiakaikapoliopele*, the goddess Hiʻiaka, embarks on a quest to retrieve her older sister's lover, Lohiʻauipo. During Hiʻiaka's travel through ʻEwa, she recites an affectionate *oli* (chant) as she recalls the Kaiʻokia edict placed on her and Lohiʻauipo by Pele. One of the main focal points in this chant is the line, *"Ke koi lā i ke ao o ka Nāulu e hanini i ka wai ola ihola nā kupa kamaʻāina i ka wai a ka ʻōpua*." This line introduces the Nāulu rain as the rain of Honouliuli. The line continues to say the water from the clouds is what the natives survive on.

Ola i ke ahe a ka makani Māunuunu	I am spared by the Māunuunu wind
I ka hapahapai mai aka makani ʻAoʻaoa	By the uplifting ʻAoʻaoa breeze
Ke koi lā i ke ao o ka Nāulu e hanini i ka wai	Urging the Nāulu storm clouds to pour down their waters
Ola ihola nā kupa kamaʻāina i ka wai a ka ʻōpua	The natives here survive on water from the clouds
Ke halihali aʻela nā ʻōpua i ke awa lau	Which billowing clouds carry along to the branching lochs
E koi mai ana iā Hiʻiaka e kūoʻe helei ke kula	Compelling Hiʻiaka to trudge that open stretch
[Hoʻoulumāhiehie 2008a:294–295]	[Hoʻoulumāhiehie 2008b:275–276]

The general lack of rain names is indicative of historic environmental conditions within the *ahupuaʻa*; these conditions, in turn, shaped agricultural practices in the area. Environmental limitations forced ingenuity and innovation. McAllister provides written evidence of the innovative ways in which Honouliuli's *kamaʻāina* approached agricultural activities:

> […] It is probable that the holes and pits in the coral were formerly used by Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here. [McAllister 1933:109]

1.4.4 *Nā Kahawai* (Streams)

Honouliuli Ahupuaʻa and the encompassing ʻEwa District are notoriously dry. Agricultural sinkholes were especially important on the ʻEwa plain. In traditional Hawaiian times, the areas of exposed coral (*Pleistocene* limestone) outcrop were undoubtedly more extensive. Limestone outcrop, composed of detritus, calcareous sand, reef dwelling organisms, and coralline algae, is subject to dissolution from water. This dissolution has formed a series of connected and isolated caves under the ʻEwa Plains. Although invisible to human eyes, streams flow under the surface of Honouliuli via the karsic system. "Sink holes" would accumulate water within them via a subterranean water or karst system; this water also contained nutrient-rich sediment that allowed plants such as *kalo* (taro; *Calocasia esculenta*), *kī* (ti; *Cordyline fruticosa*), and *noni* (Indian mulberry; *Morinda citrifolia*) to survive.

To the west are fairly steep gradient gulches forming a more linear than dendritic drainage pattern. The major gulches from east to west are Kaloʻi, Hunehune, Makalapa, Makakilo, Awanui, Pālailai, Makaīwa, Waimānalo, and Limaloa. These gulches are steep-sided in the uplands and generally of a high gradient until they emerge onto the flat ʻEwa plain. The alluvium they have carried has spread out in delta fashion over the *mauka* (toward the mountains) portions of the plain, which comprises a dramatic depositional environment at the stream gradient change. These gulches are generally dry, but during seasonal Kona storms, they carry immense quantities of runoff onto the plane and into the ocean. As typical drainages in arid slopes, they are either raging uncontrollably or are dry, and do not form stable water sources for traditional agriculture in their upper reaches. The western Honouliuli gulches, in contrast to those draining into Pearl Harbor to the east, do not have valleys suitable for extensive irrigated agriculture. However, this lack is more than compensated by the rich watered lowlands at the base of Honouliuli Gulch.

Topography of the area is moderately sloping. In terms of hydrology, the area is drained by two deeply dissected gulches, Kaloʻi Gulch 300 m to the southwest and Honouliuli Gulch 700 m to the northeast. These gulches at a comparable elevation are believed to rarely run with water. Historic maps indicate a spring located approximately 2.2 km to the north. Such infrequent springs may have been key to the early human activity on the southeast Waiʻanae slope.

1.4.5 *Ka Lihikai a me Ka Moana* (Seashore and Ocean)

Both seashore and ocean provided physical and spiritual sustenance for the people of Honouliuli. According to Malo, the ocean was divided into smaller divisions, stretching from *ʻae kai* (water's edge) to *moana* (pelagic zone). Outside the coastal areas was the belt known as *kua au*, where the shoal water ended. Further out was the *kai au*, deeper waters designated for surfing, swimming, or spearing squid (Malo 1951:26). For Honouliuli Ahupuaʻa, specifically between Kalaeloa and Kūalakaʻi, the sea of this region was identified as Hilo one. It appears that the name is drawn from an on-shore locality known as Hilo one. According to Maly and Maly (2012),

> Hilo one and the spring of Hoakalei—Near the shore of Honouliuli were once found places of fame in the traditions of Hiiaka-i-ka-poli-o-Pele, youngest sister of the Pele clan, who traveled across Honouliuli while on her return trip to Hawaii Island, from Kauai. While traveling along the shore between Kalaeloa and Kualakai, Hiiaka was adorned with blossoms of the lehua trees which grew in the vicinity. At the place called Hilo one, she found the spring Hoakalei, where she stopped and looked at the water. Upon looking in the water, she saw her own reflection, adorned with the lei of *lehua* blossoms, thus the name Hoakalei (reflections of the garland). [Maly and Maly 2012:125]

While walking the coastline between Kalaeloa and Kūalakaʻi, the goddess sang out the following:

O Hiiaka ka wahine,	Hiiaka is the woman
Ke ako la i ka pua o Hoakalei,	Who picked the flowers of Hoakalei,
Ke kui la, ke uo la i ka manai	And with a needle strung and made them into
Eha ka lei, ka apana lei lehua a ka wahine	four garlands, the sectioned lei of the woman,
Kuu pokii.	O my younger sibling.
Kuu pokii mai ke ehu makani o lalo.	My younger sibling who came from the place

Lulumi aku la i ke kai o Hilo-one.	where the dusty wind rises from below. Overturned in the sea of Hilo-one.
No Hilo ke aloha, Aloha wale ka lei—e. [*Ka Naʻi Aupuni* 1906]	The aloha is for Hilo, Love for the lei. [Maly and Maly 2012:125]

1.5 Built Environment

Paradise Cove is located adjacent to Lanikūhonua Cultural Institute to the south, Makaiwa Beach Park to the north, Kai Lani at Ko Olina Aoao and a portion of Ko Olina Golf Course to the east, and the Pacific Ocean to the west (see Figure 3). Aliʻinui Drive is the major vehicular artery servicing the resorts of Ko Olina and connecting them to the H-1 freeway system. The project area has been extensively modified from sugarcane development and previous construction activities related to Paradise Cove. The eastern portion of the project area consists of a large, paved parking lot area. The remainder of the Paradise Cove area consists of large flat grassy areas, portable and intact buildings, and modern *lūʻau* huts. The landscaping includes coconut trees (*Cocos nucifera)*, *kiawe* (*Prosopis pallid)*, *naupaka* (*Scaevola sericea)*, mimosa trees (*Albizia julibrissin*), and various exotic shrubs.

Section 2 Methods

2.1 Archival Research

Research centers on Hawaiian activities including *kaʻao* (legends), *wahi pana* (storied places), *ʻōlelo noʻeau* (proverbs), *oli*, *mele* (songs), traditional *moʻolelo*, traditional subsistence and gathering methods, ritual and ceremonial practices, and more. Background research focuses on land transformation, development, and population changes beginning with the early post-Contact era to the present day.

Cultural documents, primary and secondary cultural and historical sources, historic maps, and photographs were reviewed for information pertaining to the study area. Research was primarily conducted at the CSH library. Other archives and libraries including the Hawaiʻi State Archives, the Bishop Museum Archives, the University of Hawaiʻi at Mānoa's Hamilton Library, Ulukau, The Hawaiian Electronic Library (Ulukau 2014), the State Historic Preservation Division (SHPD) Library, the State of Hawaiʻi Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via Waihona ʻAina Corporation's Māhele database (Waihona ʻAina 2022), the Office of Hawaiian Affairs (OHA) Papakilo Database (Office of Hawaiian Affairs 2015), and the Ava Konohiki Ancestral Visions of ʻĀina website (Ava Konohiki 2015).

2.2 Community Consultation

2.2.1 Scoping for Participants

We begin our consultation efforts with utilizing our previous contact list to facilitate the interview process. We then review an in-house database of *kūpuna* (elders), *kamaʻāina*, cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHOs; includes Hawaiian Civic Clubs and those listed on the Department of Interior's NHO list), and community groups. We also contact agencies such as SHPD, OHA, and the appropriate Island Burial Council where the proposed project is located for their response on the project and to identify lineal and cultural descendants, individuals and/or NHO with cultural expertise and/or knowledge of the study area. CSH is also open to referrals and new contacts.

2.2.2 "Talk Story" Sessions

Prior to the interview, CSH cultural researchers explain the role of a CIA, how the consent process works, the project purpose, the intent of the study, and how their *ʻike* (knowledge) and *manaʻo* (thought, opinion) will be used in the report. The interviewee is given an Authorization and Release Form to read and sign.

"Talk Story" sessions range from the formal (e.g., sit down and *kūkākūkā* [consultation, discussion] in participant's choice of place over set interview questions) to the informal (e.g., hiking to cultural sites near the study area and asking questions based on findings during the field outing). In some cases, interviews are recorded and transcribed later.

CSH also conducts group interviews, which range in size. Group interviews usually begin with set, formal questions. As the group interview progresses, questions are based on interviewees' answers. Group interviews are always transcribed and notes are taken. Recorded interviews assist the cultural researcher in 1) conveying accurate information for interview summaries, 2) reducing misinterpretation, and 3) missing details to *moʻolelo*.

CSH seeks *kōkua* (assistance) and guidance on identifying past and current traditional cultural practices of the study area. Those aspects include general history of the *ahupuaʻa*; past and present land use of the study area; knowledge of cultural sites (for example, *wahi pana*, archaeological sites, and burials); knowledge of traditional gathering practices (past and present) within the study area; cultural associations (*kaʻao* and *moʻolelo*); referrals; and any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the study area.

2.2.3 Completion of Interview

After an interview, CSH cultural researchers transcribe and create an interview summary based on information provided by the interviewee. Cultural researchers give a copy of the transcription and interview summary to the interviewee for review and ask them to make any necessary edits. Once the interviewee has made those edits, we incorporate their *ʻike* and *manaʻo* into the report. When the draft report is submitted to the client, cultural researchers then prepare a finalized packet of the participant's transcription, interview summary, and any photos taken during the interview. We also include a thank you card and honoraria. This is for the interviewee's records.

It is important to CSH cultural researchers to cultivate and maintain community relationships. The CIA report may be completed, but CSH researchers continuously keep in touch with the community and interviewees throughout the year—such as checking in to say hello via email or by phone, volunteering with past interviewees on community service projects, and sending holiday cards to them and their *ʻohana* (family). CSH researchers feel this is an important component to building relationships and being part of an *ʻohana* and community.

"*I ulu no ka lālā i ke kumu*—the branches grow because of the trunk," an *ʻōlelo noʻeau* (#1261) shared by Mary Kawena Pukui with the simple explanation: "Without our ancestors we would not be here" (Pukui 1983:137). As cultural researchers, we often lose our *kūpuna* but we do not lose their wisdom and words. We routinely check obituaries and gather information from other informants if we have lost our *kūpuna*. CSH makes it a point to reach out to the *ʻohana* of our fallen *kūpuna* and pay our respects including sending all past transcriptions, interview summaries, and photos for families to have on file for genealogical and historical reference.

Section 3 Traditional Accounts

3.1 *Nā Ka‘ao a me nā Mo‘olelo* (Legends and Stories)

Hawaiian storytellers of old were greatly honored; they were a major source of entertainment and their stories contained lessons while interweaving elements of Hawaiian lifestyles, genealogy, history, relationships, arts, and the natural environment (Pukui and Green 1995:IX). According to Pukui and Green (1995), storytelling is better heard than read for much becomes lost in the transfer from the spoken to the written word and *ka‘ao* are often full of *kaona* or double meanings.

Ka‘ao are defined by Pukui and Elbert (1986:108) as a “legend, tale [...], romance, [and/or], fiction.” *Ka‘ao* may be thought of as oral literature or legends, often fictional or mythic in origin, and have been “consciously composed to tickle the fancy rather than to inform the mind as to supposed events” (Beckwith 1970:1). Conversely, Pukui and Elbert (1986:254) define *mo‘olelo* as a “story, tale, myth, history, [and/or] tradition.” The *mo‘olelo* are generally traditional stories about the gods, historic figures or stories which cover historic events and locate the events with known places. *Mo‘olelo* are often intimately connected to a tangible place or space (*wahi pana)*.

In differentiating *ka‘ao* and *mo‘olelo* it may be useful to think of *ka‘ao* as expressly delving into the *wao akua* (realm of the gods), discussing the exploits of *akua* (gods) in a primordial time. *Mo‘olelo* on the other hand, reference a host of characters from *ali‘i* (royalty) to *akua; kupua* (supernatural beings) to *maka‘āinana* (commoners); and discuss their varied and complex interactions within the *wao kānaka* (realm of man). Beckwith elaborates, “In reality, the distinction between *ka‘ao* as fiction and *mo‘olelo* as fact cannot be pressed too closely. It is rather in the intention than in the fact” (Beckwith 1970:1). Thus a so-called *mo‘olelo*, which may be enlivened by fantastic adventures of *kupua*, “nevertheless corresponds with the Hawaiian view of the relation between nature and man” (Beckwith 1970:1).

Both *ka‘ao* and *mo‘olelo* provide important insight into a specific geographical area, adding to a rich fabric of traditional knowledge. The preservation and passing on of these stories through oration remain a highly valued tradition. Additionally, oral traditions associated with the study area communicate the intrinsic value and meaning of a place, specifically its meaning to both *kama‘āina* as well as others who also value that place.

The following section presents traditional accounts of ancient Hawaiians living in the vicinity of the project area. Many relate an age of mythical characters whose epic adventures inadvertently lead to the Hawaiian race of *ali‘i* and *maka‘āinana*. The *ka‘ao* in and around the project area shared below are some of the oldest Hawaiian stories that have survived; they still speak to the characteristics and environment of the area and its people.

3.1.1 The Naming of Honouliuli

Honouliuli is the largest *ahupua‘a* in the *moku* (district) of ‘Ewa. One translation of the name for this district is given as “unequal” (*Saturday Press*, 11 August 1883). Others translate the word as “strayed” and associate it with the legends of the gods Kāne and Kanaloa:

> When Kane and Kanaloa were surveying the islands they came to Oahu and when they reached Red Hill saw below them the broad plains of what is now ‘Ewa. To mark boundaries of the land they would throw a stone and where the stone fell

> would be the boundary line. When they saw the beautiful land lying below them, it was their thought to include as much of the flat level land as possible. They hurled the stone as far as the Waiʻanae range and it landed somewhere, in the Waimanalo section. When they went to find it, they could not locate the spot where it fell. So ʻEwa (strayed) became known by the name. The stone that strayed. [Told to E.S. by Simeon Nawaa, 22 March 1954 in Sterling and Summers 1978:1]

Another explanation for the name comes from the "Legend of Lepeamoa," the chicken-girl of Pālama. In this legend, Honouliuli is the name of the husband of the chiefess Kapālama and grandfather of Lepeamoa. The land of Honouliuli was named for him (Westervelt 1923:164–184).

It is likely that the boundaries of the westernmost *ahupuaʻa* of ʻEwa were often contested with people of the neighboring Waiʻanae District. The ʻEwa people could cite divine sanction that the dividing point was between two hills at Pili o Kahe:

> This is a spot where two small hills of the Waiʻanae range come down parallel on the boundary between Honouliuli and Nānākuli (ʻEwa and Waiʻanae). The ancient Hawaiians said the hill on the ʻEwa side was the male and the hill on the Waiʻanae side was female. The stone was found on the Waiʻanae side hill and the place is known as Pili o Kahe (*Pili* = to cling to, *Kahe* = to flow). The name refers, therefore, to the female or Waiʻanae side hill. And that is where the boundary between the two districts runs. [Told to E.S. by Simeon Nawaa, 22 March 1954 in Sterling and Summers 1978:1]

3.1.2 Puʻokapolei, Astronomical Marker and *Heiau*

Puʻuokapolei was the primary landmark for travelers on the cross-*ahupuaʻa* trail that ran from Pearl Harbor in the east to Waiʻanae in the West (ʻĪʻī 1959:27, 29; Nakuina 1992:54; E.M. Nakuina 1904 in Sterling and Summers 1978:34). *Puʻu* means hill and Kapolei means "beloved Kapo," a reference to Kapōʻulakinaʻu, the sister of the Hawaiian volcano goddess, Pele (Pukui et al. 1974:89). Kamakau says ancient Hawaiians used Puʻuokapolei as an astronomical marker to designate the seasons:

> […] the Oʻahu people who reckoned the time (Oahu poʻe helu) called the season Kau for the setting of the sun from Puʻuokapolei, a hill in Honouliuli, ʻEwa, to the opening of Mahinaona (i ke kawaha o Mahinaona). When the sun moved south from Puʻuokapolei—and during the season of the sun in the south—for the coming of coolness and for the sprouting of new buds on growing things—the season was called Hoʻoilo [winter, rainy season]. [Kamakau 1976:14]

A ceremony commemorating the changing of the seasons is still observed each year in the beginning of May at Waikīkī and Honouliuli. This ceremony was documented in a previous cultural impact assessment conducted by CSH (Genz et al. 2012). Sam ʻOhukaniʻōhiʻa Gon III, Na Waʻa Lalani Kahuna O Puʻu Koholā, and the late Kumu Hula John Keola Lake's *hula hālau* (hula instruction) perform *oli* and *hula* (dance), explaining that the *kilo hōkū* (observers of stars) of Oʻahu observed how, from the perspective of Waikīkī, the sun sets in a southerly direction over the ocean during the winter solstice and in a northerly direction behind the ʻEwa ridgeline during the summer solstice. During the springtime, the position of the setting sun marches steadily northward each day, and at the beginning of May, the sun sets behind Puʻuokapolei, perfectly centered within its depression from the vantage point of Kūpalaha Heiau just west of the Waikīkī Aquarium. A coinciding ceremony at a *heiau* on Puʻuokapolei similarly views the setting of the sun behind Puʻu Pālailai farther west, and a line of sight extending eastward from Puʻu Pālailai, Puʻuokapolei, and the former site of Kūpalaha Heiau ends at the closely associated Papaʻenaʻena Heiau. Mr. Gon suggests Papaʻenaʻena Heiau may have been part of the ceremonies of this astronomical event.

3.1.3 Kamapuaʻa and Kamaunuaniho at Puʻuokapolei

Puʻuokapolei was also known to be the home of Kamapuaʻa's grandmother, Kamaunuaniho, one of the three migrants from Kahiki that were ancestors to the people of Oʻahu (Legend of Kamapuaa, Fornander 1919:5(2):318; Kahiolo 1978:81, 107). Kamapuaʻa, the Hawaiian pig god, once lived in Kaluanui on the windward side of Oʻahu, but he escaped to ʻEwa when he was pursued by the chief Olopana.

> Kamapuaʻa subsequently conquered most of the island of Oʻahu, and, installing his grandmother [Kamaunuaniho] as queen, took her to Puʻuokapolei, the lesser of the the two hillocks forming the southeastern spur of the Waiʻanae Mountain Range, and made her establish her 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. [Nakuina 1904:50]

Emma Nakuina goes on to note, "A very short time ago [prior to 1904] the foundations of Kamaunuaniho's house could still be seen at Puuokapolei" (Nakuina 1904:50). Another account (*Ka Loea Kālaiʻāina*, 13 January 1900 in Sterling and Summers 1978:34) speaks of Kekeleʻaikū, the older brother of Kamapuaʻa, who also lived on Puʻuokapolei.

In Lilikalā Kameʻeleihiwa's version of the *moʻolelo* of Kamapuaʻa, Pele and Kamapuaʻa meet and a battle ensues on Hawaiʻi Island between the two. Kamapuaʻa tells Kekeleʻaikū,

> ʻListen to me, elder brother. You wait here. When you smell the stench of burning bristles, then you must assume I am dead. However, if indeed you do not smell the stench of the bristles, you will know that your younger brother has not been harmed and that he has ʻeaten of the cooked taro.ʼ [Kameʻeleihiwa 1996:62]

3.2 *Nā Wahi Pana* (Legendary or Storied Place)

Wahi pana are legendary or storied places of an area. These legendary or storied places may include a variety of natural or human-made structures. Oftentimes dating to the pre-Contact period, most *wahi pana* are in some way connected to a particular *moʻolelo*, however, a *wahi pana* may exist without a connection to any particular story. Davianna McGregor outlines the types of natural and human-made structures that may constitute *wahi pana*:

> Natural places have mana [spiritual power], and are sacred because of the presence of the gods, the akua, and the ancestral guardian spirits, the ʻaumakua. Human-made structures for the Hawaiian religion and family religious practices are also sacred. These structures and places include temples, and shrines, or heiau, for war, peace, agriculture, fishing, healing, and the like; puʻuhonua, places of refuge and sanctuaries for healing and rebirth; agricultural sites and sites of food production such as the loʻi pond fields and terraces slopes, ʻauwai irrigation ditches, and the

fishponds; and special function sites such as trails, salt pans, holua slides, quarries, petroglyphs, gaming sites, and canoe landings. [McGregor 1996:22]

As McGregor makes clear, *wahi pana* can refer to natural geographic locations such as streams, peaks, rock formations, ridges, offshore islands and reefs, or they can refer to Hawaiian land divisions such as *ahupua‘a* or *‘ili* (land division smaller than an *ahupua‘a*), and man-made structures such as fishponds. In this way, the *wahi pana* of Honouliuli tangibly link the *kama‘āina* of Honouliuli to their past. It is common for places and landscape features to have multiple names, some of which may only be known to certain *‘ohana* or even certain individuals within an *‘ohana*, and many have been lost, forgotten, or kept secret through time. Place names also convey *kaona* (hidden meanings) and *huna* (secret) information that may even have political or subversive undertones. Before the introduction of writing to the Hawaiian Islands, cultural information was exclusively preserved and perpetuated orally. Hawaiians gave names to literally everything in their environment, including individual garden plots and *‘auwai* (water courses), house sites, intangible phenomena such as meteorological and atmospheric effects, *pōhaku* (stone), *pūnāwai* (freshwater springs), and many others. According to Landgraf (1994), Hawaiian *wahi pana* “physically and poetically describes an area while revealing its historical or legendary significance” (Landgraf 1994:v).

3.2.1 Nā Inoa ‘Āina a me Nā Wahi Pana o Honouliuli

Place names and *wahi pana* of Honouliuli are depicted on Figure 5 and listed in Table 1. Unless otherwise noted, the definitions of place names are taken from Lloyd Soehren’s *Hawaiian Place Names* database (Soehren 2019), where no translation is given, it did not appear in Soehren’s database.

Table 1. Place names and *wahi pana* of Honouliuli Ahupua‘a

Place	Type	Meaning	Source
Awanui	Gulch	Big harbor, or big *kawa* plant	Pukui and Elbert 1986
‘Ēkahanui	Gulch	Large bird’s nest fern	Pukui et al. 1974
Hāpapa, Pu‘u	Peak	Rock stratum hill; a shallow	Thrum 1922
Hoakalei	Spring	*Lei* reflection	Pukui et al. 1974
Honouliuli	Stream, gulch	Dark bay; blue harbor	Thrum 1922
Huliwai	Gulch	Water search	Pukui et al. 1974
Hunehune	Gulch	Tiny	Pukui et al. 1974
Kahe	Point	Flow	Pukui et al. 1974
Kahe, Pu‘u	Hill	Flow	Pukui et al. 1974
Kalaeloa	*‘Ili ‘āina*	The long point	Pukui et al. 1974
Kalaeloa	Point	The long point	Pukui et al. 1974
Kalanamaikahiki			
Kalo‘i	Gulch	The taro patch	Pukui et al. 1974
Kānehili	Plain		
Kānehoa, Pu‘u	Peak	A native shrub; Kāne’s friend	Thrum 1922

Place	Type	Meaning	Source
Kapapapuhi	Point, *ʻili ʻāina*	The numerous eels	Thrum 1922
Kapolei	Gulch	Beloved Kapo, a sister of Pele	Pukui et al. 1974
Kapolei, Puʻu o	Hill	Beloved Kapo, a sister of Pele	Pukui et al. 1974
Kapuai, Puʻu	*Puʻu*	Footstep	Thrum 1922
Kaua, Puʻu	*Puʻu*	War hill or fort hill	Pukui et al. 1974
Kaupeʻa	Plain	Crisscross, interwoven	Pukui and Elbert 1986
Keoneʻōʻio	Gulch	The sandy place with bonefish (*ʻōʻio*)	Pukui et al. 1974
Koʻolina	Village	Delightful, lovely	Pukui et al. 1974
Kuʻina, Puʻu	*Puʻu*, *heiau*		
Kuʻua, Puʻu	*Puʻu*, *heiau*	Relinquished hill	Pukui et al. 1974
Līhuʻe	*ʻIli ʻāina*	Cold chill	Pukui et al. 1974
Limaloa	Gulch	Long arm	Pukui et al. 1974
Makaīwa	Gulch	Mother of pearl eyes	Pukui et al. 1974
Makakilo, Puʻu	*Puʻu*	Observing eyes	Pukui et al. 1974
Makalapa	Gulch	Ridge features	Pukui et al. 1974
Manawahua, Puʻu	*Puʻu*	Great grief hill, or nausea hill	Pukui et al. 1974
Manawaiahu	Gulch	Bird water pool	Pukui et al. 1974
Manawaiʻelelū	Gulch	Cockroach water branch	Pukui and Elbert 1986
Maunakapu	Peak	Sacred mountain	Pukui et al. 1974
Maunauna	*Puʻu*, gulch	Mountain sent on errands	Pukui et al. 1974
Nāmoʻopuna	Gulch	The grandchildren	Pukui and Elbert 1986
Oneʻula	Village, beach	Red sand	Pukui et al. 1974
Pālailai	Gulch	Young *lai* fish	Pukui et al. 1974
Pālailai, Puʻu	*Puʻu*	Young *lai* fish hill	Pukui et al. 1974
Pālāwai	Gulch	Kind of sea moss	Thrum 1922
Pālehua	*Puʻu*	*Lehua* flower enclosure	Pukui et al. 1974
Palikea	*Puʻu*, ridge	White cliff:	Pukui et al. 1974
Paupauwela (Poupouwela)	*ʻIli ʻāina*	An angry person	Thrum 1922
Pili o Kahe	Point	Clinging to Kahe	Pukui et al. 1974
Pōhākea	Pass	White stone	Pukui et al. 1974
Pōhaku Palaha	*Pōhaku*	Broad rock	Thrum 1922
Poulihale	Gulch	Dark house	Pukui et al. 1974
Pouilihale, Puʻu	*Puʻu*	Dark house hill	Pukui et al. 1974
Puʻuloa	*ʻIli ʻāina*, beach	Long hill	Pukui et al. 1974

Place	Type	Meaning	Source
Wai‘eli	Gulch	Dug water	Pukui et al. 1974
Waimānalo	Gulch	Potable water	Pukui et al. 1974

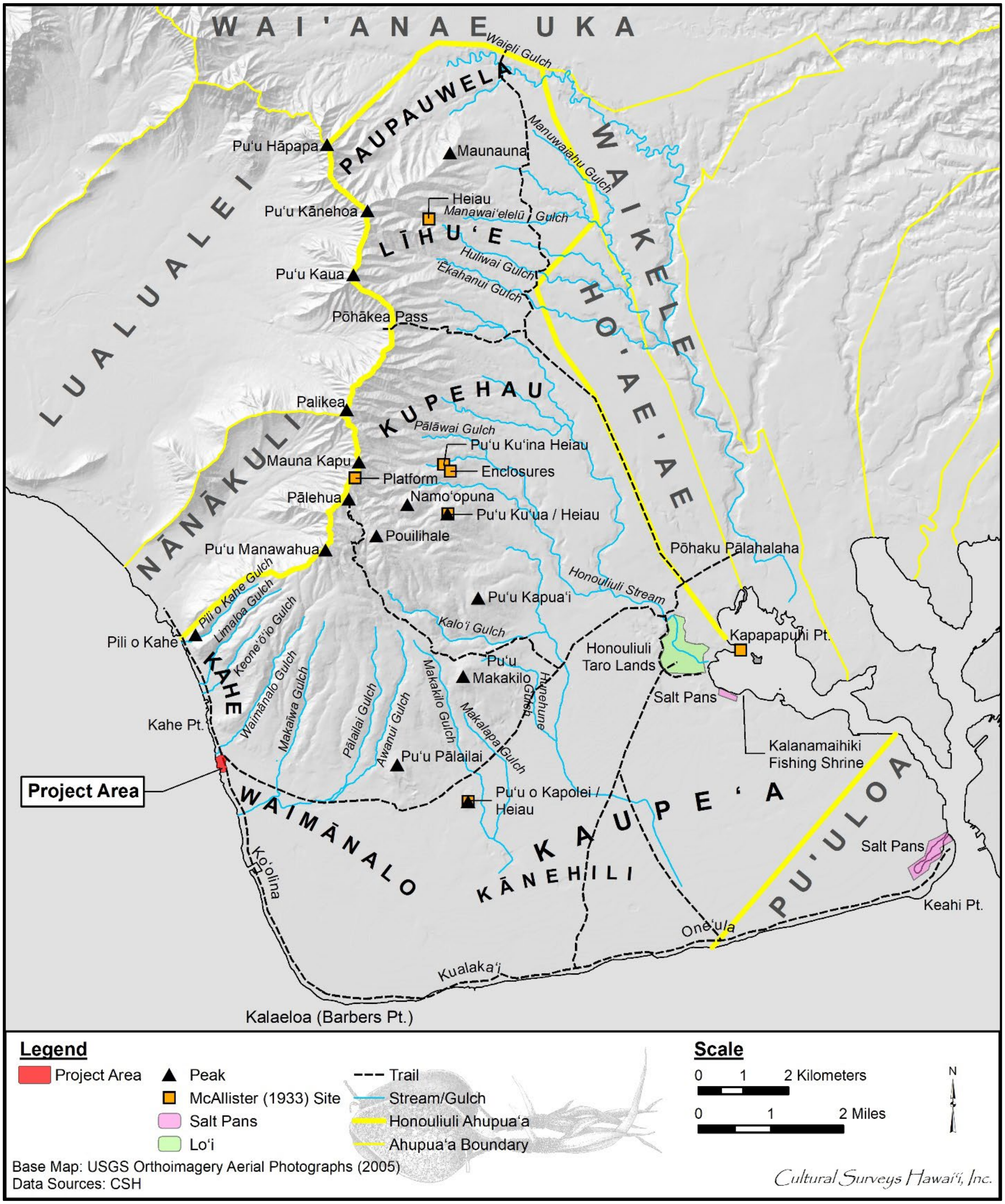


Figure 5. 2005 USGS Orthoimagery aerial photograph with overlay of the location of The Cove at Ko Olina Redevelopment project area, and the cultural landscape of Honouliuli Ahupuaʻa in southwest Oʻahu

3.2.2 *Nā Heiau*

Heiau were pre-Christian places of worship. Construction of some *heiau* were elaborate, consisting of large communal structures, while others were simple earth terraces or shrines (McAllister 1933:8).

Heiau are most commonly associated with important religious ceremony; large structures with platforms or altars of one or more terraces were indicative of such function (McAllister 1933:8). Archaeologist Gilbert McAllister reports on two known *heiau* in the *ahupuaʻa* of Honouliuli, as well as two other sites that could have possibly been *heiau*. These *heiau* were located on Puʻuokapolei, on Puʻu Kuʻua, at the foot of Puʻu Kanehoa, and at the foot of Mauna Kapu (McAllister 1933).

3.2.2.1 Puʻuokapolei

A *heiau* was once located on Puʻuokapolei, but it had been destroyed by the time of McAllister's (1933:108) survey of the island in the early 1930s. The hill was used as a point of solar reference or as a place for such observations (Fornander 1919:6[2]:297). Puʻuokapolei may have been regarded as the gate of the setting sun, just as the eastern gate of Kumukahi in Puna is regarded as the gate of the rising sun; both places are associated with the Hawaiian goddess Kapō (Emerson 1915:41). This somewhat contradicts some Hawaiian cosmologies, in which Kū was the god of the rising sun, and Hina, the mother of Kamapuaʻa, was associated with the setting of the sun. Fornander (1919:6[2]:292) states that Puʻuokapolei may have been a *leina,* jumping off point associated with the wandering souls who roamed the plains of Kaupeʻa and Kānehili, *makai* of the hill.

McAllister writes that the stones from the *heiau* supplied the rock crusher located on the side of this elevation, about 100 feet (ft) away on the seaside. There was once a large rock shelter on the *makai* side where it is said to have been the residence of Kamapuaʻa and his grandmother (McAllister 1933:108). After conquering the majority of Oʻahu, he established his grandmother as queen of this *wahi* (place) (Pukui et al. 1974:203).

3.2.2.2 Puʻu Kuʻua

Puʻu Kuʻua Heiau located in Palikea, Honouliuli, overlooks both Honouliuli and Nānākuli, and is at the height of approximately 1,800 ft. McAllister (1933:108) noted that, "Most of the stones of the heiau were used for a cattle pen located on the sea side of the site. That portion of the heiau which has not been cleared for pineapples has been planted in ironwoods."

3.2.2.3 Unidentified *heiau* at the foot of Puʻu Kanehoa

Located at the foot of Puʻu Kanehoa is a small enclosure thought to have possibly been a *heiau*. McAllister writes,

> My informant, Reiney, recalls the respect the old Hawaiians had for the place when he was punching cattle with them in his youth. It is a walled inclosure 2 by 3 feet. On the inside the walls are between 2 and 3 feet high, and on the outside they range from 2 to 5 feet, depending upon the slope of the land. On three sides the walls are 2 feet wide, but the fourth is 3 feet wide. The walls are evenly faced with a fill of smaller stones. At present the site is surrounded with a heavy growth of Lantana; but only a thick growth of grass and two small guava bushes are in the interior,

which is most unusual unless human hands keep the interior clear. Possibly this is not a *heiau* but a small inclosure considered sacred for some reason. [McAllister 1933:107]

3.2.2.4 Unidentified *heiau* at the foot of Puʻu Kuina

Located in Aikukai, Honouliuli, at the foot of Puʻu Kuina what looked to be a terrace is all that remained when McAllister cataloged Site 134. He notes the inability to determine the size of the *heiau* or the number of terraces that once stood (McAllister 1933:107).

3.2.3 Plains of ʻEwa

3.2.3.1 The Plains of Kaupeʻa

Several places on the ʻEwa coastal plain are associated with *ao kuewa*, the realm of the homeless souls. Samuel Kamakau explains Hawaiian beliefs of the afterlife:

> There were three realms (*ao*) for the spirits of the dead […] There were, first, the realm of the homeless souls, the *ao kuewa*; second, the realm of the ancestral spirits, the *ao ʻaumakua*; and third, the realm of Milu, *ke ao o Milu.*
>
> The *ao kuewa*, the realm of homeless souls, was also called the *ao ʻauwana*, the realm of wandering souls. When a man who had no rightful place in the *ʻaumakua* [family or personal gods] realm (*kanaka kuleana ʻole*) died, his soul would wander about and stray amongst the underbrush on the plain of Kamaʻomaʻo on Maui, or in the *wiliwili* grove of Kaupeʻa on Oahu. If his soul came to Leilono [in Hālawa, ʻEwa near Red Hill], there he would find the breadfruit tree of Leiwalo, *kaʻulu o Leiwalo*. If it was not found by an *ʻaumakua* soul who knew it (*i maʻa mau iaia*), or one who would help it, the soul would leap upon the decayed branch of the breadfruit tree and fall down into endless night, the *pō pau ʻolo o Milu*. Or, a soul that had no rightful place in the *ʻaumakua* realm, or who had no relative or friend (*makamaka*) there who would watch out for it and welcome it, would slip over the flat lands like a wind, until it came to a leaping place of souls, *a leina a ka ʻuhane*.
>
> On the plain of Kaupeʻa beside Puʻuloa [Pearl Harbor], wandering souls could go to catch moths (*pulelehua*) and spiders (*nanana*). However, wandering souls could not go far in the places mentioned earlier before they would be found catching spiders by *ʻaumakua* souls, and be helped to escape. […] [Kamakau 1991a:47–49]

This association of Puʻuokapolei and Kānehili with wandering souls is also illustrated in a lament on the death of Kahahana, the paramount chief of Oʻahu, who was killed by his father, Kahekili, after Kahahana became treacherous and killed the high priest Kaʻopulupulu.

E newa ai o hea make i ka lā,	Go carefully lest you fall dead in the sun,
Akua noho la i Puʻuokapolei.	The god that dwells on Kapolei hill.
E hanehane mai ana ka lā i nā	The sun is wailing on account of the
wahine o Kamao,	women of Kamao,
Akua peʻe, pua ʻohai o ke kaha,	A hiding god, blossoming ohai of the banks
I walea wale i ke a-	Contented among the stones

I ka ulu kanu a Kahai.	Among the breadfruit planted by Kahai.
Haina ‘oe e ka oo-	Thou hast spoken of by the oo-
E ka manu o Kānehili.	By the bird of Kānehili.

[Fornander 1919:6(2):297]

Fornander provides some notes on this lament. The god dwelling at Kapolei is the god Kahahana, stating that this is where his soul has gone. Kamao is one of the names to the door of the underworld. This lament draws an association with wandering souls and the place where the first breadfruit tree was planted by Kaha‘i at Pu‘uloa (Fornander 1919:6[2]:304).

Pukui (1983) offers this Hawaiian saying, which places the wandering souls in a *wiliwili* (*Erythrina sandwicensis*) grove at Kaupe‘a:

> *Ka wiliwili o Kaupe‘a.*
>
> The *wiliwili* grove of Kaupe‘a
>
> In ‘Ewa, O‘ahu. Said to be where homeless ghosts wander among the trees.
>
> [Pukui 1983:180]

Beckwith (1970:154) has stressed that “the worst fate that could befall a soul was to be abandoned by its *‘aumakua* (ancestral spirit) and left to stray, a wandering spirit (*kuewa*) in some barren and desolate place.” These wandering spirits were often malicious, so the places where they wandered were avoided.

3.2.3.2 The Plains of Pukaua

The Hawaiian language newspaper *Ka Loea Kālai‘āina* (13 January 1900) relates that near Pu‘uokapolei, on the plain of Pukaua, on the *mauka* side of the road, there was a large rock. This *mo‘olelo* suggests the plain around Pu‘uokapolei was called Pukaua. The *mo‘olelo* is as follows:

> If a traveler should go by the government road to Waianae, after leaving the village of gold, Honouliuli, he will first come to the plain of Puu-ainako and when that is passed, Ke-one-ae. Then there is a straight climb up to Puu-o-Kapolei and there look seaward from the government road to a small hill. That is Puu-Kapolei […] You go down some small inclines, then to a plain. This plain is Pukaua and on the *mauka* side of the road, you will see a large rock standing on the plain […] There were two supernatural old women or rather peculiar women with strange powers and Puukaua belonged to them. While they were down fishing at Kualaka‘i [near Barbers Point] in the evening, they caught these things, *‘a‘ama* crabs (Grapsus tenuicrustatus), *pipipi* shellfish (Nerita picea), and whatever they could get with their hands. As they were returning to the plain from the shore and thinking of getting home while it was yet dark, they failed for they met a one-eyed person [bad omen]. It became light as they came near to the plain, so that passing people were distinguishable. They were still below the road and became frightened lest they be seen by men. They began to run—running, leaping, falling, sprawling, rising up and running on, without a thought of the *‘a‘ama* crabs and seaweeds that dropped on the way, so long as they would reach the upper side of the road. They did not go far for by then it was broad daylight. One woman said to the other, ‘Let us hide lest

> people see us,' and so they hid. Their bodies turned into stone and that is one of the famous things on this plain to this day, the stone body.
>
> This is the end of these strange women. When one visits the plain, it will do no harm to glance on the upper side of the road and see them standing on the plain. [*Ka Loea Kālai‘āina*, 13 January 1900, translation in Sterling and Summers 1978:39]

In another version of this story, the two women met Hi‘iaka as she journeyed toward the ‘Ewa coast. The women were *mo‘o* (lizards) and were afraid that Hi‘iaka would kill them, so they changed into their lizard form. One of the lizards hid in a little space on a stone beside the coastal trail, and the other hid nearby (*Ka Hōkū o Hawai‘i*, 15 February 1927, translated in Maly 1997:19). From that time on the stone was known as "Pe‘e-kāua," meaning "we two hidden." Hi‘iaka greeted the two women but did not harm them and continued on.

When she reached Pu‘uokapolei, she also greeted two old women who lived at an *‘ohai* (*Sesbania tomentosa*) grove on the hill. These women were named Pu‘uokapolei and Nāwahineokama‘oma‘o (*Ka Hōkū o Hawai‘i*, 22 February 1927, translated in Maly 1997:19). As she continued her travels, she looked to the ocean and saw the canoe carrying Lohi‘au:

Ku‘u kāne i ke awa lau o Pu‘uloa	My man on the many harbored sea of Pu‘uloa
Mai ke kula o Pe‘ekāua ke noho	As seen from the plain of Pe‘ekāua
E noho kāua i ke kaha o ka ‘ōhai	Let us dwell upon the *‘ōhai* covered shore
I ka wiliwili i ka pua o ka lau noni	Where the *noni* blossoms are twisted together
O ka ihona i Kānehili la	Descending along Kānehili
Ua hili ho‘i au-e	I am winding along.

[*Ka Hōkū o Hawai‘i,* 22 February 1927, translated in Maly 1997:20]

3.2.4 Kūalaka‘i

Kūalaka‘i is the name of an area near Barbers Point, located on the southwestern side of Honouliuli Ahupua‘a. Clark (1977:74) says it is named for a type of sea cucumber that squirts a purple fluid when squeezed. Pukui identifies the sea creature as *Tethys* a member of the invertebrate family *Aplysiidae* commonly called sea hares (Pukui et al. 1974:119). Pukui adds this area was once the site of a spring called Hoaka-lei ("lei reflection") "because Hi‘iaka picked *lehua* (*Metrosideros. polymorpha*) flowers here to make a *lei* (garland) and saw her reflection in the water" (Pukui et al. 1974:119).

Kūalaka‘i is mentioned in the "Legend of the Children," a tale that foretold the breaking of the eating *kapu* (taboo) by the *ali‘i*. A young brother and sister always fished at Kūalaka‘i, a beach area on the southern coast of Honouliuli. On this day, they laid out their nets, but all they caught was a single *palani* (surgeonfish; *Acanthurus dussumieri*), a fish that was *kapu* for men; only women could eat it.

> […] They fished again and again until the afternoon and nothing was caught. The children were weary and went home without fish. When they came as far as Pu‘u-o-Kapolei where the blossoms of the ma‘o [the native cotton, *Gossypium sandvicense]* looked golden in the sunlight, the sister sat down to make ma‘o leis for themselves. When the leis were made they went across the breadth of Kaupe‘a to Waipio. [*Ka Loea Kālai‘āina*, 22 July 1899:15; translation in Sterling and Summers 1978:7]

They stopped at the stream of Ka‘aimalu on the way to their home and the sister convinced her brother to share the fish between the two, thus breaking the *kapu*. "Because these children ate fish secretly, the spot is called Ka‘ai-malu (Secret eating) to this day" (Sterling and Summers 1978:7).

3.2.5 Kalaeloa

Kalaeloa literally means "the long point" (Pukui et al. 1974:72). Kalaeloa was the home of Uhumāka‘ika‘i, a *kupua* who could take the form of a man or a giant parrotfish (*uhu).* He is mentioned in several legends concerning the hero Kawelo and with Kawelo's struggles with the ruling chief of Kaua‘i, ‘Aikanaka.

> This friend was Kauahoa also an alii of Wailua (Kauai). Their king, Aikanaka, in the time of Kākuhihewa of Oahu and Lonoikamakahiki of Hawaii. Aikanaka got offended with Kawelo and sent him to live at Waikiki. Cause. The king at a surf bathing told Kawelo to get a calabash of water for him to wash off with, but on Kawelo's failing to do it, he took a calabash of soft poi and threw it over Kawelo and sent him off as already stated. At Waikiki, Kawelo studied the art of fighting to be revenged on Aikanaka. A *kupua*, Uhu makaikai, a fish was his teacher. Makuakeke was his helper in the canoe. The fish lived at Pōhaku o Kawai near Kalailoa (Kalaeloa), Oahu (Barbers Point) […] [Hawaiian Ethnological Notes, Bishop Museum Vol. II:114, translation in Sterling and Summers 1978:41]

Kalaeloa is also associated with the introduction of *ulu* (breadfruit) to Hawai‘i. According to the *mo‘olelo*, the chief Kaha‘i left from Kalaeloa for a trip to Kahiki. On his return to the Hawaiian Islands, he brought back the first breadfruit (Kamakau 1991b:110) and planted it near the waters of Pu‘uloa or "long hill," now known as Pearl Harbor (Beckwith 1940:97).

3.3 *Nā ‘Ōlelo No‘eau* (Proverbs)

Hawaiian knowledge was shared by way of oral histories. Indeed, one's *leo* (voice) is oftentimes presented as *ho‘okupu* ("a tribute or gift" given to convey appreciation, to strengthen bonds, and to show honor and respect); the high valuation of the spoken word underscores the importance of the oral tradition (in this case, Hawaiian sayings or expressions), and its ability to impart traditional Hawaiian "aesthetic, historic, and educational values" (Pukui 1983:vii). Thus, in many ways these expressions may be understood as inspiring growth within reader or between speaker and listener:

> They reveal with each new reading ever deeper layers of meaning, giving understanding not only of Hawai‘i and its people but of all humanity. Since the sayings carry the immediacy of the spoken word, considered to be the highest form of cultural expression in old Hawai‘i, they bring us closer to the everyday thoughts and lives of the Hawaiians who created them. Taken together, the sayings offer a

> basis for an understanding of the essence and origins of traditional Hawaiian values. The sayings may be categorized, in Western terms, as proverbs, aphorisms, didactic adages, jokes, riddles, epithets, lines from chants, etc., and they present a variety of literary techniques such as metaphor, analogy, allegory, personification, irony, pun, and repetition. It is worth noting, however, that the sayings were spoken, and that their meanings and purposes should not be assessed by the Western concepts of literary types and techniques. [Pukui 1983:vii]

Simply, *ʻōlelo noʻeau* may be understood as proverbs. The Webster dictionary notes it as "a phrase which is often repeated; especially, a sentence which briefly and forcibly expresses some practical truth, or the result of experience and observation." It is a pithy or short form of folk wisdom. Pukui equates proverbs as a treasury of Hawaiian expressions (Pukui 1995:xii). Oftentimes within these Hawaiian expressions or proverbs are references to places. This section draws from the collection of author and historian Mary Kawena Pukui and her knowledge of Hawaiian proverbs describing *ʻāina* (land), chiefs, plants, and places.

3.3.1 *ʻŌlelo Noʻeau* #493

This *ʻōlelo noʻeau* is in reference to a wind of ʻEwa, named Moaʻe. ʻEwa Moku was known for its oysters and when fishermen went to gather the oysters, they did so in silence as to not scare off the oysters. However, when the Moaʻe wind blew, it would ripple the water, scaring the oysters away.

> 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 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. [Pukui 1983:59]

3.3.2 *ʻŌlelo Noʻeau* #661

This *ʻōlelo noʻeau* refers to the *nehu* (anchovy, *Stolephorus purpureus*) fish that were to be in abundance in ʻEwa.

> *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. [Pukui 1983:74]

3.3.3 *ʻŌlelo Noʻeau* #1330

This *ʻōlelo noʻeau* is referring to the *ʻanae* (full-sized *ʻamaʻama* [mullet, *Mugil cephalus*]) fish that would travel from ʻEwa to Koʻolau, hence the name *ʻanaeholo* or travelling mullet fish.

> Ka iʻa hali a ka makani.
>
> *The fish fetched by the wind.*
>
> The ʻanaeholo, a fish that travels from Honouliuli, where it breeds, to Kaipāpaʻu 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. [Pukui 1983:145]

3.3.4 *‘Ōlelo No‘eau* #1331

This *‘ōlelo no‘eau* is in reference to the oysters of ‘Ewa as well as a reminder to “*hāmau leo*,” (be silent) when gathering this type of fish.

> Ka i‘a hāmau leo o ‘Ewa.
>
> *The fish of ‘Ewa that silences the voice*.
>
> The pearl oyster, which has to be gathered in silence. [Pukui 1983:145]

3.3.5 *‘Ōlelo No‘eau* #1666

Pukui (1983:180) offers this Hawaiian saying, which places the wandering souls in a “*wiliwili*” grove at Kaupe‘a, a place in Honouliuli where homeless ghosts wandered among the trees.

> *Ka wiliwili o Kaupe‘a*
>
> The wiliwili grove of Kaupe‘a
>
> In ‘Ewa, O‘ahu. Said to be where homeless ghosts wander among the trees. [Pukui 1983:180]

3.3.6 *‘Ōlelo No‘eau* #2542

The expression below describes the residents of the Kaupe‘a ‘Ili.

> *‘Ō‘ū ō loa na manu o Kaupe‘a.*
>
> The birds of Kaupe‘a trill and warble.
>
> Said of the chatter of happy people. [Pukui 1983:278]

3.3.7 *‘Ōlelo No‘eau* #2357

Unlike the other *‘ōlelo no‘eau* of ‘Ewa Moku, this *‘ōlelo no‘eau* describes the lands of ‘Ewa as consisting of red dirt. During heavy rains, this red dirt flows down into the ocean, turning the sea of ‘Ewa red.

> *O ‘Ewa, ‘āina kai ‘ula i ka lepo.*
>
> *‘Ewa, land of the sea reddened by earth*.
>
> ‘Ewa was once noted for being dusty, and its sea was reddened by mud in time of rain. [Pukui 1983:257]

3.3.8 *‘Ōlelo No‘eau* #2770

This *‘ōlelo no‘eau* compares the *kāī* variety of *kalo* (taro) to the beauty of a woman of ‘Ewa. *Kāī* was a variety of *kalo* that would yield excellent *poi* (pounded taro).

> *Ua ‘ai i ke kāī-koi o ‘Ewa*.
>
> *He has eaten the kāī-koi taro of ‘Ewa*.
>
> Kāī is O‘ahu’s best eating taro; one who has eaten it will always like it. Said of a youth or a maiden of ‘Ewa, who, like the kāī taro, is not easily forgotten. [Pukui 1983:305]

3.4 *Nā Oli* (Chants)

Oli, according to Mary Kawena Pukui (Pukui 1995:xvi–xvii) are often grouped according to content. Chants often were imbued with *mana* (divine power); such *mana* was made manifest through the use of themes and *kaona*. According to Pukui, chants for the gods (*pule*; prayers) came first, and chants for the *ali‘i*, “the descendants of the gods,” came second in significance. Chants “concerning the activities of the earth peopled by common humans” were last in this hierarchy (Pukui 1995:xvi–xvii). Emerson conversely states,

> In its most familiar form the Hawaiians–many of whom [were lyrical masters]–used the oli not only for the songful expression of joy and affection, but as the vehicle of humorous or sarcastic narrative in the entertainment of their comrades. The dividing line, then, between the oli and those other weightier forms of the mele, the inoa, the kanikau (threnody), the pule, and that unnamed variety of mele in which the poet dealt with historic or mythologic subjects, is to be found almost wholly in the mood of the singer. [Emerson 1965:254]

While *oli* may vary thematically, subject to the perspective of the *ho‘opa‘a* (chanter), it was undoubtedly a valued art form used to preserve oral histories, genealogies, and traditions, to recall special places and events, and to offer prayers to *akua* and *‘aumākua* alike. Perhaps most importantly, as Alameida (1993:26) writes, “chants […] created a mystic beauty […] confirming the special feeling for the environment among Hawaiians: their *one hānau* (birthplace), their *kula iwi* (land of their ancestors).”

3.4.1 *Oli* for Kūali‘i

A chant for the chief Kūali‘i, an ancient chief of O‘ahu, mentions the *ahupua‘a* of the ‘Ewa District including Honouliuli. Each phrase usually contains a play on words, as the place name and one meaning of the word, or portion of the word, appears on each line, for example, *kele* in Waikele means “slippery.” However, these word plays are not necessarily related to the actual place name meanings of the *ahupua‘a*.

Uliuli ka poi e piha nei—o Honouliuli;	Blue is the *poi* [pounded taro] which appeases [the hunger] of Honouliuli;
Aeae ka paakai o Kahuaiki—Hoaeae;	Fine the salt of Kahuaike—Hoaeae;
Pikele ka ia e Waikele—o Waikele;	Slippery the fish of Waikele— of Waikele;
Ka hale pio i Kauamoa—o Waipio;	The arched house at Kauamoa— of Waipio;
E kuu kaua i ka loko awa—o Waiawa;	Let us cast the net in the *awa*-pond— of Waiawa;
Mai hoomanana ia oe—o Manana.	Do not stretch yourself at—Manana.
He kini kahawai,	Many are the ravines,
He lau kamano—o Waimano;	Numerous the sharks, at Waimano;

Ko ia kaua e ke au—o Waiau;	We are drawn by the current—of Waiau;
Kukui malumalu kaua—Waimalu;	In the *kukui* grove we are sheltered—in Waimalu;
E ala kaua ua ao-e—o Kalauao;	Let us arise, it is daylight—at Kalauao;
E kipi kaua e ai—o Aiea;	Let us enter and dine—at Aiea;
Mai hoohalawa ia oe—O Halawa.	Do not pass by—Halawa.

[*Ka Nupepa Kuokoa,* Book 7, Number 21, 23 May 1868, He mele no Kualii, Kulanipipili, Kulanioka, Kunuiakea; Fornander 1917:4(2):400–401]

A chant for the Kauaʻi chief, Kaumualiʻi, a rival of Kamehameha I, also mentions place names of the ʻEwa District (Fornander 1919:6[3]:474-480). In a portion of this chant, the wind that blows from one end of ʻEwa to the other is compared to love.

Filled was the air of Ewa with the report,	Kupuni ula ka ea o Ewa i ke ala.
20. Like the sea-spray on the forest trees,	20. Me he puakai la i ka lau laau.
The forest of the ilima plain at Ulihale.	Ka laau i ka ilima o Ulihale,
Even reddening the outside of the house:	Ula no mawaho o ka hale.
The redness extends and covers the leaves of the field.	Ka ea ula. ke pili ka lau o ka weuweu,
The ridge covering of the house is broken by the whirlwind,	Haki ke kaupaku o ka hale i ka ea,
25. Which blows from Halawa to Honouliuli.	25. Ka ea no mai Halawa a Honouliuli,
Unfit is the man who forsakes love,	He uli ke kanaka haalele i ke 'loha.
How can he propagate love!	Me he mea la hala ke ʻloha iaia

[Fornander 1919:6(3):475]

3.5 *Nā Mele* (Songs)

The following section draws from the Hawaiian art of *mele*, poetic song intended to create two styles of meaning.

> Words and word combinations were studied to see whether they were auspicious or not. There were always two things to consider the literal meaning and the *kaona*, or ʻinner meaning.ʼ The inner meaning was sometimes so veiled that only the people to whom the chant belonged understood it, and sometimes so obvious that anyone who knew the figurative speech of old Hawaiʻi could see it very plainly. There are

> but two meanings: the literal and the *kaona*, or inner meaning. The literal is like the body and the inner meaning is like the spirit of the poem. [Pukui 1949:247]
>
> The Hawaiians were lovers of poetry and keen observers of nature. Every phase of nature was noted and expressions of this love and observation woven into poems of praise, of satire, of resentment, of love and of celebration for any occasion that might arise. The ancient poets carefully selected men worthy of carrying on their art. These young men were taught the old *meles* and the technique of fashioning new ones. [Pukui 1949:247]

3.5.1 Makakilo

This *mele* talks about the love of Makakilo, an area within the ʻEwa District that lies *mauka* of the proposed project area. In this *mele*, a line "*Kaulana kou inoa aʻo Barbers Point*" refererences the area of Kalaeloa and it being a welcoming home for sailors.

Aloha kuʻu home aʻo Makakilo	Loved is my home at Makakilo
Aia i ka nani aʻo Makakilo	There, in the beauty of Makakilo
Kaulana kou inoa aʻo Barbers Point	Your name is famous, Barbers Point
Home hoʻokipa mau ia no ka sela moku	Always a welcoming home for the sailor
Hoʻihoʻi ke aloha aʻo Makakilo	Let love return to Makakilo
Home hoʻokipa mau ia no ka malihini	Always a hospitable home for the visitor
Huli aku mākou iā kou nani	We turn towards your lovliness
A ʻike i ka nani o ke kuahiwi	And see the beauty of the mountains
Haʻina ʻia mai ana ka puana	The story is now told
Hoʻihoʻi ke aloha aʻo Makakilo	Let love return to Makakilo

[Mike Bonnice, n.d]

3.5.2 Mele no Kūaliʻi

The celebrated chief, Kūaliʻi, is said to have led an army of twelve thousand against the chiefs of Koʻolauloa with an army of twelve hundred upon the plains of Keahumoa (Fornander 1917:6[2]:364–401). According to McAllister (1933:107), the plains of Keahumoa are located west of Kīpapa Gulch in Waikele. Perhaps because the odds were so skewed the battle was called off and the *aliʻi* of Koʻolau ceded the districts of Koʻolauloa, Koʻolaupoko, Waialua, and Waiʻanae to Kūaliʻi. When the *aliʻi* of Kauaʻi heard of this victory at Honouliuli they gave Kauaʻi to Kūaliʻi as well and thus he became in possession of all the islands. The strife at Honouliuli was the occasion of the recitation of a song for Kūaliʻi by a certain Kapaʻahulani. This *mele* compares the king to certain places and objects in the islands, in this instance to the first breadfruit planted by

Kaha‘i at Pu‘uloa, and a pig and a woman on Pu‘uokapolei, possibly a reference to Kamapua‘a and his grandmother.

In this *mele*, the cold winds of Kumomoku and Leleiwe, near Pu‘uloa in Honouliuli are compared unfavorably to the god Kū:

Aole i like Ku.	Not like these are thou, Ku
Ia ua hoohali kehau,	[Nor] the rain that brings the land breeze,
Mehe ipu wai ninia la,	Like a vessel of water poured out.
Na hau o Kumomoku;	Nor to the mountain breeze of Kumomoku,
Kekee na hau o Leleiwi,	[The] land breeze coming round to Leleiwi.
Oi ole ka oe i ike	Truly, have you not known?
I ka hau kuapuu	The mountain breezes, that double up your back,
Kekee noho kee, o Kaimohala,	[That make you] sit crooked and cramped at Kaimohala,
O Kahili i Kaupea-la	The Kahili at Kaupea?
Aole i like Ku	Not like these are thou, Ku

[Fornander 1917:6(2):390–391]

A later section of this *mele* also refers to Pu‘uokapolei and makes mention of the famous blue *poi* of Honouliuli.

O Kawelo-e, e Kawelo-e,	O Kawelo! Say, Kawelo!
O Kaweloiki puu oioi,	Kawelokiki, the sharp-ponted hill,
Puu o Kapolei-e-	Hill of Kapolei.
Uliuli ka poi e piha nei-o Honouliuli.	Blue is the poi which appeases [the hunger] of Honouliuli.

[Fornander 1917:6(2):400–401]

3.5.3 Eia Mai Au ‘o Makalapua

This *mele* pays homage to the royal train called *Lanakila*. In honoring this train, the *mele* also pays homage to its most honored and well-known passenger, Queen Lili‘uokalani. This *mele* may also be understood as a protest song.

In analyzing this *mele*, cultural historian Kīhei de Silva notes that “Eia mai Au ‘o Makalapua” is the second of three chants that make up *hō‘alo i ka ihu o ka Lanakila* (Three Train Chants for Lili‘uokalani). He adds that these songs, “when considered in chronological succession […] add a Hawaiian dimension to the story of Benjamin Franklin (B.F.) Dillingham’s Oahu Railway and

Land Company (OR&L), a story that otherwise reads far too much like an early script of *How the West was Won*" (de Silva 2003). De Silva provides a chronology of B.F. Dillingham's rise to influence within Hawaiian political spheres, and his eventual founding and construction of the OR&L line. Dillingham also figures prominently within Honouliuli Ahupua'a (see Section 4.2). Dillingham's personal history is described by de Silva as follows:

- Arrived in Honolulu in 1865 as first mate of the *Whistler*.
- He promptly fell off a horse and broke his leg. When his ship left without him, he took a job as a clerk in a hardware store.
- 20 years later, in 1885, he had become Hawai'i's first big-time land speculator, buying and leasing vast tracts of property in West O'ahu in hopes of reselling it to housing and ag. interests.
- When no one, in fact, took interest in his largely inaccessible property, he decided to build a railroad through it.
- In 1888, Dillingham convinced Kalākaua to sign a franchise giving him three years to build a line running from Honolulu to the far end of Pearl River Lagoon. His critics called it 'Dillingham's Folly,' but Dillingham boasted that he would put his railroad into operation by Sept. 4, 1889, his 45th birthday.
- Things did not go well in the early months of construction, and in order to fulfill this boast, Dillingham had to fire up a miniscule saddle-tank engine named *Kauila*, hitch it to a flatcar that carried his passengers on jury-rigged seats, and send it bucking, wheezing, and spewing greasy foam down a mile-and-a-half of track that ended in the rice paddies of Pālama.
- Despite this farcical beginning, the construction of Dillingham's railroad then proceeded in rather impressive fashion: the line was opened to 'Aiea in November 1889, to Mānana in January 1890, to Honouliuli and 'Ewa Mill in June and July 1890, to Wai'anae in July 1895, to Waialua in June, 1898, and to Kahuku in January 1899. [de Silva 2003]

In 1890, as construction of the railway moved forward, B.F. Dillingham bought and shipped to Hawai'i a passenger coach named *The Pearl* and a locomotive named *General Valleho.* According to de Silva (2003), the *Pearl* was built in San Francisco and was "paneled in rich woods and outfitted with plush chairs, velvet drapes, electric lights, a kitchen, a *lānai* (porch) with a striped canvas awning, and a new-fangled contraption called a flush toilet." The *General Valleho* was renamed the *Lanakila* by Dillingham:

> […] [He] gave it the number 45, a tribute to his 45th birthday boast and erstwhile victory in the rice paddies of Pālama. The Lanakila became Dillingham's 4th locomotive—after the Kauila, Leahi, and Ka'ala—and for many years it was regarded as the most attractive engine in the OR&L stable. Dillingham apparently wasted no time in hitching the Pearl to the Lanakila and using the pair as his wine-'em and dine-'em celebrity train, the vehicle in which he wooed financial and political support for his business ventures. [de Silva 2003]

As part of Dillingham's plans to woo the influential, he invited King Kalākaua on the inaugural ride on the *Lanakila*. Dillingham also insisted the luxury coach *Pearl* serve as the king's own royal car. De Silva (2003) notes it is "safe for us to assume that Queen Lili‘u[okalani] rode in the Pearl when the *Lanakila* took her on the train rides." With the opening of the ‘Ewa Mill station, Queen Lili‘uokalani once again embarked on a journey on the *Lanakila*; this particular journey took her through "the lowlands of Honouliuli, and finally to the exposed coral plain of Pōlea on which the ‘Ewa Mill Station was located" (de Silva 2003).

Eia mai au ‘o Makalapua	Here I am, Makalapua
Hō‘alo i ka ihu o ka Lanakila.	Traveling where the *Lanakila* goes.
‘O ke ku‘e a ka hao a i Kūwili	The piston works at Kūwili
Ka hiona ‘olu a‘o Hālawa.	And down the pleasant descent of Hālawa.
Ua lawa ka ‘ikena i ke awalau	Satisfying is the view of the lochs
Iā ‘Ewa ka i‘a hāmau leo.	Of ‘Ewa, "land of the silent fish."
Ua piha ka uahi a i Mānana	The smoke rises at Mānana
Aweawe i ke kula o Waipi‘o.	And streams along at Waipi‘o.
I kai ho‘i au a Honouliuli	Then I reached the lowlands of Honouliuli
Ahuwale ke ko‘a o Pōlea.	Where the corals of Pōlea lie exposed.
Ha‘ina ‘ia mai ana ka puana	This is the conclusion of the song
Hō‘alo i ka ihu a ka Lanakila.	Of traveling where the *Lanakila* goes.

[de Silva 2003]

De Silva (2003) provides a remarkable breakdown of this *mele*, delving into the subtext to reveal another layer of understanding, of *kaona*:

> ‘Makalapua’ shares […] the sense of awesome efficiency and harmony […] These are apparent in ‘Makalapua's’ description of the working of the train's piston at Kūwili, in the rising and billowing of steam at Mānana and Waipi‘o, and especially in the sense of speed with which the mele whisks us from Honolulu to Pōlea in the space of its six, two-line verses. Efficiency and harmony, however, are not at the heart of ‘Makalapua;’ it is inspired and driven, instead, by *aloha ‘āina*—love for the land—and by *kū‘ē ho‘ohui ‘āina*—resistance to annexation. In my reading of the mele, the dominant imagery is that of flower-stringing. The train and track serve as the contemporary equivalent of lei needle and thread; with them, Lili‘u sews a series of beloved place-names and place-associations into a lei of adornment and protection for Ke-awalau-o-Pu‘uloa. Keawalauopu‘uloa, the many-harbored sea of Pu‘uloa, is the old name for Pearl Harbor. The cession of Pearl Harbor to America in return for sugar reciprocity was one of the hottest political issues of ‘Makalapua's’ day. Lili‘u was absolutely opposed to any Keawalau deals; her brother, on the other hand, had regularly waved this bait at the American nose; he was even rumored, on his Nov. 1890 departure to San Francisco, to have harbored a hidden Pearl Harbor agenda. The key lines of ‘Makalapua’ are ‘Ua lawa ka ‘ikena

i ke awalau / Iā ‘Ewa ka i‘ā hāmau leo […] I kai ho‘i au a Honouliuli / Ahuwale ke ko‘a o Pōlea.’ In my reading, these lines say: ‘We hold to our knowledge of Keawalau, we are like its closed-mouthed pipi, its oysters; we will never give up the pearl that we contain; here at the shoreline of Honouliuli we normally silent fish reveal this deeply held conviction.’ [de Silva 2003]

Section 4 Historical Accounts

4.1 Pre- and Early Post-Contact

Various Hawaiian legends and early historical accounts indicate the *ahupuaʻa* of Honouliuli was once widely inhabited by pre-Contact Hawaiian populations, including the Hawaiian *aliʻi*. In early historic times, the population of Honouliuli was concentrated at the western edge of West Loch in the vicinity of Kapapapuhi Point in the "Honouliuli Taro Lands" (see Figure 5). This substantial settlement is attributable for the most part to the plentiful marine and estuarine resources available at the coast, as well as lowlands fronting the West Loch of Pearl Harbor (Kaihuopalaʻai) suitable for wetland taro cultivation. Handy and Handy report,

> The lowlands, bisected by ample streams, were ideal terrain for the cultivation of irrigated taro. The hinterland consisted of deep valleys running far back into the Koʻolau range. Between the valleys were ridges, with steep sides, but a very gradual increase of altitude. The lower parts of the valley sides were excellent for the culture of yams and bananas. Farther inland grew the *ʻawa* for which the area was famous. [Handy and Handy 1972:469]

Dicks et al. (1987:78–79) conclude, on the basis of 19 radiocarbon dates and three volcanic glass dates, that "Agricultural use of the area spans over 1,000 years."

Also, breadfruit, coconuts, *wauke* (paper mulberry; *Broussonetia papyrifera*), bananas, *olonā* (*Touchardia latifolia*), and other plants were grown in the interior. ʻEwa was known as one of the best areas to grow gourds and was famous for its *māmaki* (*Pipturus*). It was also famous for a rare taro called the *kāī o ʻEwa*, which was grown in mounds in marshy locations (Handy and Handy 1972:471).

In addition, forest resources along the slopes of the Waiʻanae Range, as suggested by E.S. and E.G. Handy, probably acted as a viable subsistence alternative during times of famine and/or low rainfall:

> The length or depth of the valleys and the gradual slope of the ridges made the inhabited lowlands much more distant from the *ʻwao*, or upland jungle, than was the case on the windward coast. Yet the *ʻwao* here was more extensive, giving greater opportunity to forage for wild foods during famine time. [Handy and Handy 1972:469–470]

John Papa ʻĪʻī describes a network of leeward Oʻahu trails that in later historic times encircled and crossed the Waiʻanae Range, allowing passage from West Loch to the Honouliuli lowlands, past Puʻuokapolei and Waimānalo Gulch to the Waiʻanae coast and onward, along the shoreline of Oʻahu (Figure 6; ʻĪʻī 1959:96–98). Following ʻĪʻī's description, a portion of this trail network would have passed close to the present Farrington Highway alignment, north of the project area. The Malden map of 1825 (Figure 7) indicates the nearest community just northeast of the project area along the coast.

Aliʻi were also attracted to this region. One historical account of particular interest refers to an *aliʻi* residing in Ko Olina—the name associated with the immediate vicinity of the project area:

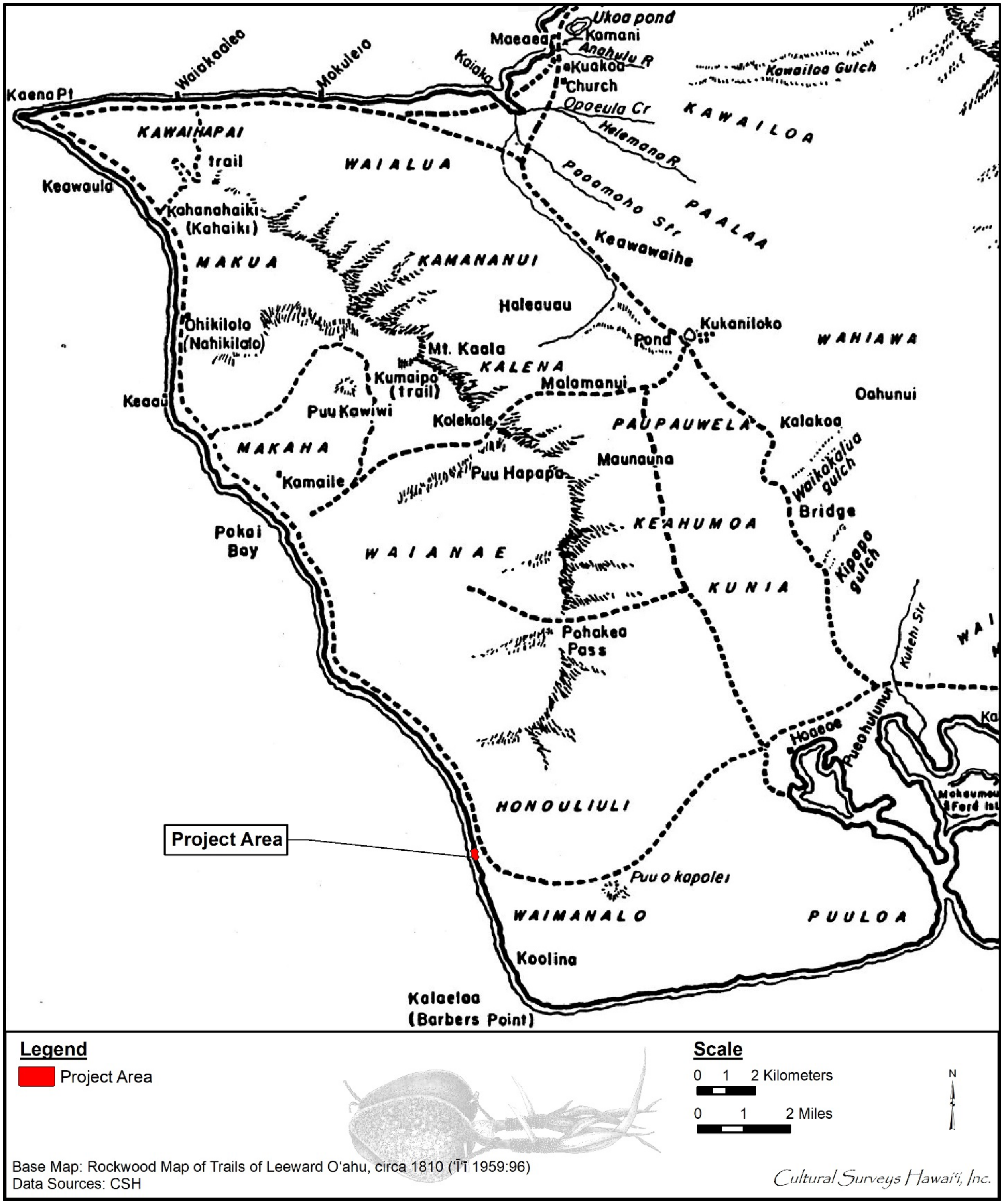


Figure 6. Portion of Rockwood map of trails of Leeward O‘ahu ca. 1810 (from ‘Ī‘ī 1959:96) showing the location of The Cove at Ko Olina Redevelopment project area

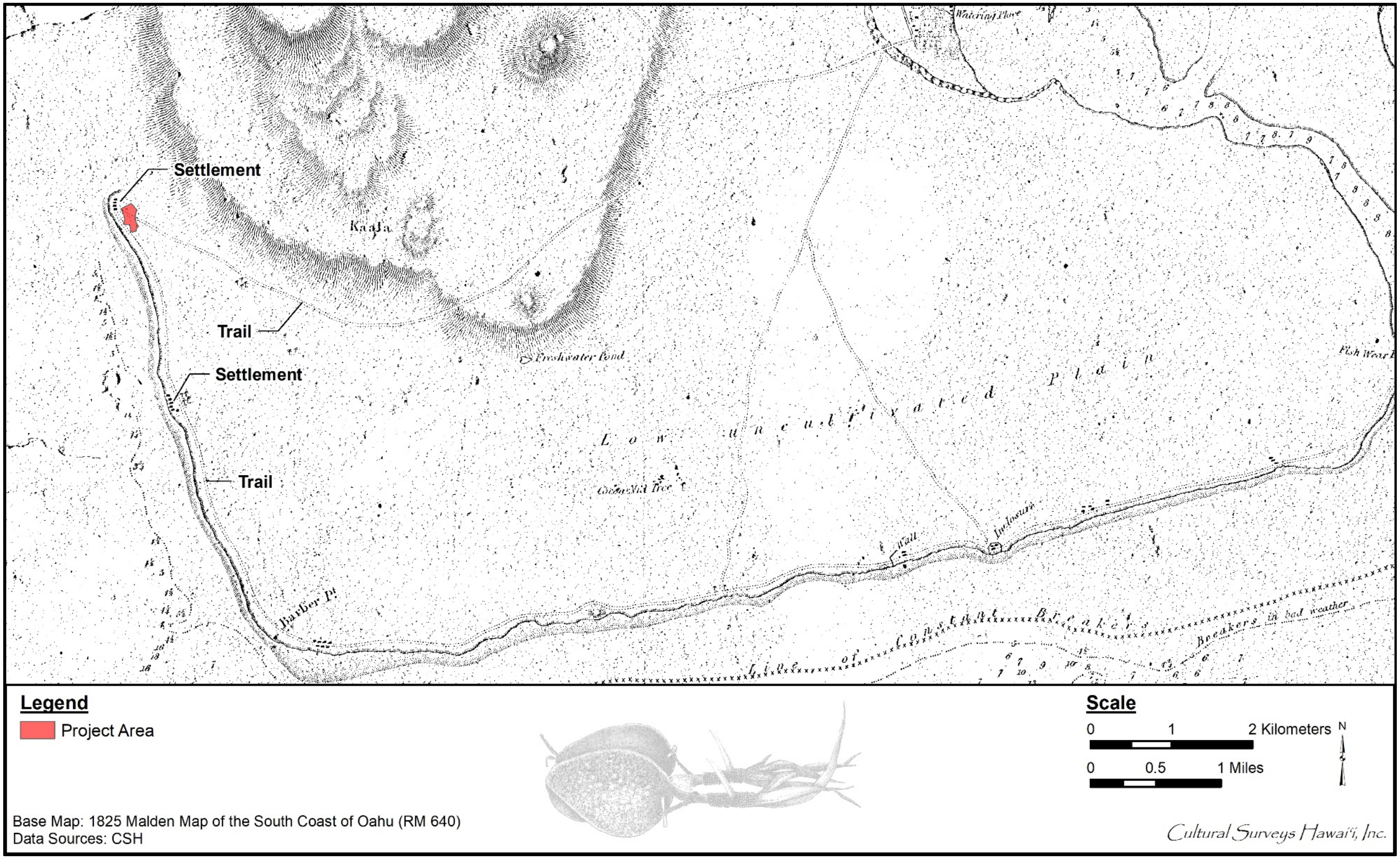


Figure 7. Portion of 1825 Malden map of the South Coast of Oahu (RM 640) showing the location of The Cove at Ko Olina Redevelopment project area in relation to former trails and settlements

> Koolina is in Waimanalo near the boundary of Ewa and Waianae. This was a vacationing place for chief Kakuhihewa and the priest Napuaikamao was the caretaker of the place. Remember Reader, this Koolina is not situated in the Waimanalo on the Koolau side of the island but the Waimanalo in Ewa. It is a lovely and delightful place and the chief, Kakuhihewa loved this home of his. [*Ke Au Hou* 13 July 1910 in Sterling and Summers 1978:41]

Other early historical accounts of the general region typically refer to the more populated eastern portion of ‘Ewa District, where missions and schools were established, and subsistence resources were perceived to be greater. However, the presence of historic properties along the barren coral plains and coast of southwest Honouliuli Ahupua‘a indicate pre-Contact and early post-Contact populations also adapted to less inviting areas, despite the environmental hardships.

Subsequent to Western Contact in the area, the landscape of the ‘Ewa plains and Wai‘anae slopes was adversely affected by the over-harvesting of the sandalwood forest, and particularly by the introduction of domesticated animals and exotic plant species. Domesticated animals including goats, sheep, and cattle were brought to the Hawaiian Islands by Captain George Vancouver in the early 1790s and were allowed to graze freely about the land for some time after. It is unclear when the domesticated animals were brought to O‘ahu; however, L.A. Henke reports the existence of a longhorn cattle ranch in Wai‘anae by at least 1840 (Frierson 1972:10). At the same time, perhaps as early as 1790, exotic vegetation species were introduced to the area. These typically included vegetation best suited to a terrain disturbed by the logging of sandalwood forest and eroded by animal grazing. Within the project area, the majority of the vegetation is composed of introduced species, mainly grasses.

At Contact, the most populous *ahupua‘a* on the island was Honouliuli, with the majority of the population centered around Pearl Harbor. In 1832, a missionary census of Honouliuli recorded the population as 1,026. Within four years the population was down to 870 (Schmitt 1973:19, 22). In 1835, there were eight to ten deaths for every birth (Kelly 1991:157–158). Between 1848 and 1853, there was a series of epidemics of measles, influenza, and whooping cough that often dismantled whole villages. In 1853, the population of ‘Ewa and Wai‘anae combined was 2,451 people. In 1872, it was 1,671 (Schmitt 1968:71). The inland area of ‘Ewa was probably abandoned by the mid-nineteenth century due to population decline and consolidation of the remaining people in the town of Honouliuli.

4.2 Mid- to Late 1800s

The Organic Acts of 1845 and 1846 initiated the process of the Māhele—the division of Hawaiian lands—which introduced private property into Hawaiian society. In 1848, the crown and the *ali‘i* received their land titles. The common people received their *kuleana* (individual parcels) in 1850. During the Māhele of 1848, 72 individual land claims in the *ahupua‘a* of Honouliuli were registered and awarded by King Kamehameha III to commoners (Tuggle and Tomonari-Tuggle 1997:34). The 72 *kuleana* awards were almost all made adjacent to Honouliuli Gulch, which contained fishponds and irrigated taro fields. No commoner awards were within or in the immediate vicinity of the project area, which appears to have been included in the largest *ali‘i* award (Royal Patent 6071, LCA 11216, *‘Āpana* [lot] 8) granted in Honouliuli Ahupua‘a to Miriam Ke‘ahi-Kuni Kekau‘ōnohi on January 1848 (Native Register). Kekau‘ōnohi acquired a deed to all unclaimed land within the *ahupua‘a*, totaling 43,250 acres.

Kekauʻōnohi was one of Liholiho's (Kamehameha II's) wives, and after his death she lived with her half-brother, Luanuʻu Kahalaiʻa, who was governor of Kauaʻi (Kelly 1983:21). Subsequently, Kekauʻōnohi ran away with Queen Kaʻahumanu's stepson, Keliʻiahonui and became the wife of Chief Levi Haʻalelea. Upon her death on 2 June 1851, her property passed to her husband and his heirs. In 1863, the owners of the *kuleana* lands deeded their lands back to Haʻalelea to pay off debts owed to him (Frierson 1972:12). In 1864, Haʻalelea died, and his second wife, Anadelia Amoe, transferred ownership of the land to her sister's husband, John Coney (Yoklavich et al. 1995:16).

In 1871, John Coney rented the land to James Dowsett and John Meek, who used the land for cattle grazing. In 1877, James Campbell purchased most of Honouliuli Ahupuaʻa—including the project area—for a total of $95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek, and James Robinson and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). He let the land rest for one year and then began to restock the ranch, so that he had 5,500 head after a few years (Dillingham 1885 in Frierson 1972:14).

An 1873 map depicts sparse housing in the vicinity of the project area with surroundings undeveloped and likely utilized for cattle grazing (Figure 8). An oblong-shaped area in the southern portion of the project area extends south into the Lanikūhonua area and northwest into the Pacific Ocean. The area appears to be an area containing a water feature that drains out into the sea.

In 1881, a medical student touring the island to provide smallpox vaccinations to the population viewed Campbell's property, recalled the Honouliuli Ranch:

> 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 manieizie 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 because they kill the growth of mimosa bushes, which would otherwise overrun the country and destroy the pasturage for cattle. [Briggs 1926:62–63]

Most of Campbell's lands in Honouliuli were used exclusively for cattle ranching. At that time, one planter remarked that "the country was so dry and full of bottomless cracks and fissures that water would all be lost and irrigation impracticable" (Ewa Plantation Company 1923:6–7). In 1879, Campbell brought in a well-driller from California to search the ʻEwa plains for water. The exploratory well, drilled to a depth of 240 ft near Campbell's home in ʻEwa, resulted in "a sheet of pure water flowing like a dome of glass from all sides of the well casing" ("The Legacy of James Campbell" n.d. in Pagliaro 1987:3). Following this discovery, plantation developers and ranchers drilled numerous wells in search of the valuable resource. A Hawaii Government map from 1881 shows a stone quarry to the southeast of the project area (Figure 9).

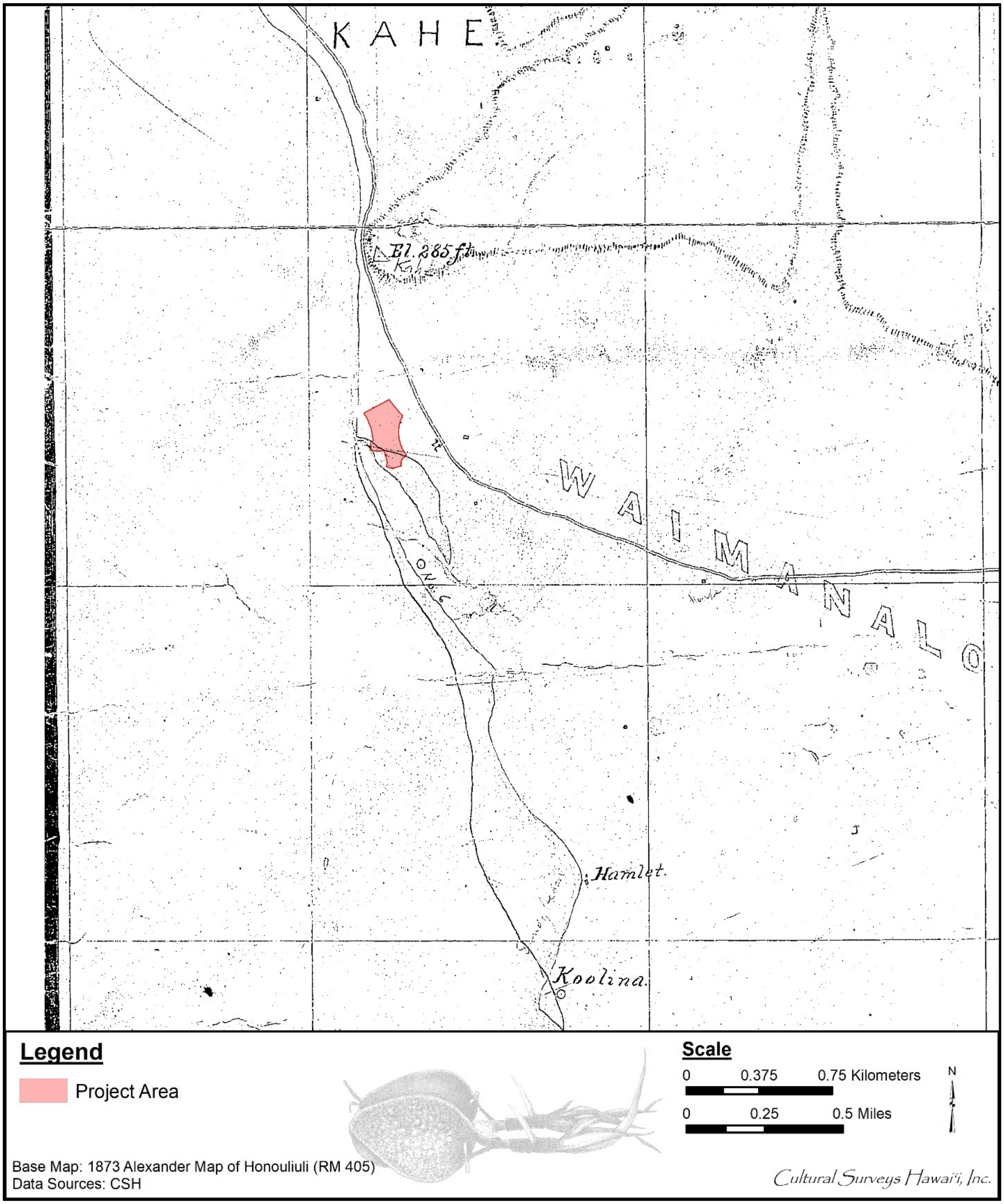


Figure 8. Portion of 1873 Alexander map of Honouliuli (RM 405) showing the southern portion of the project area within a former water feature surrounded by undeveloped lands

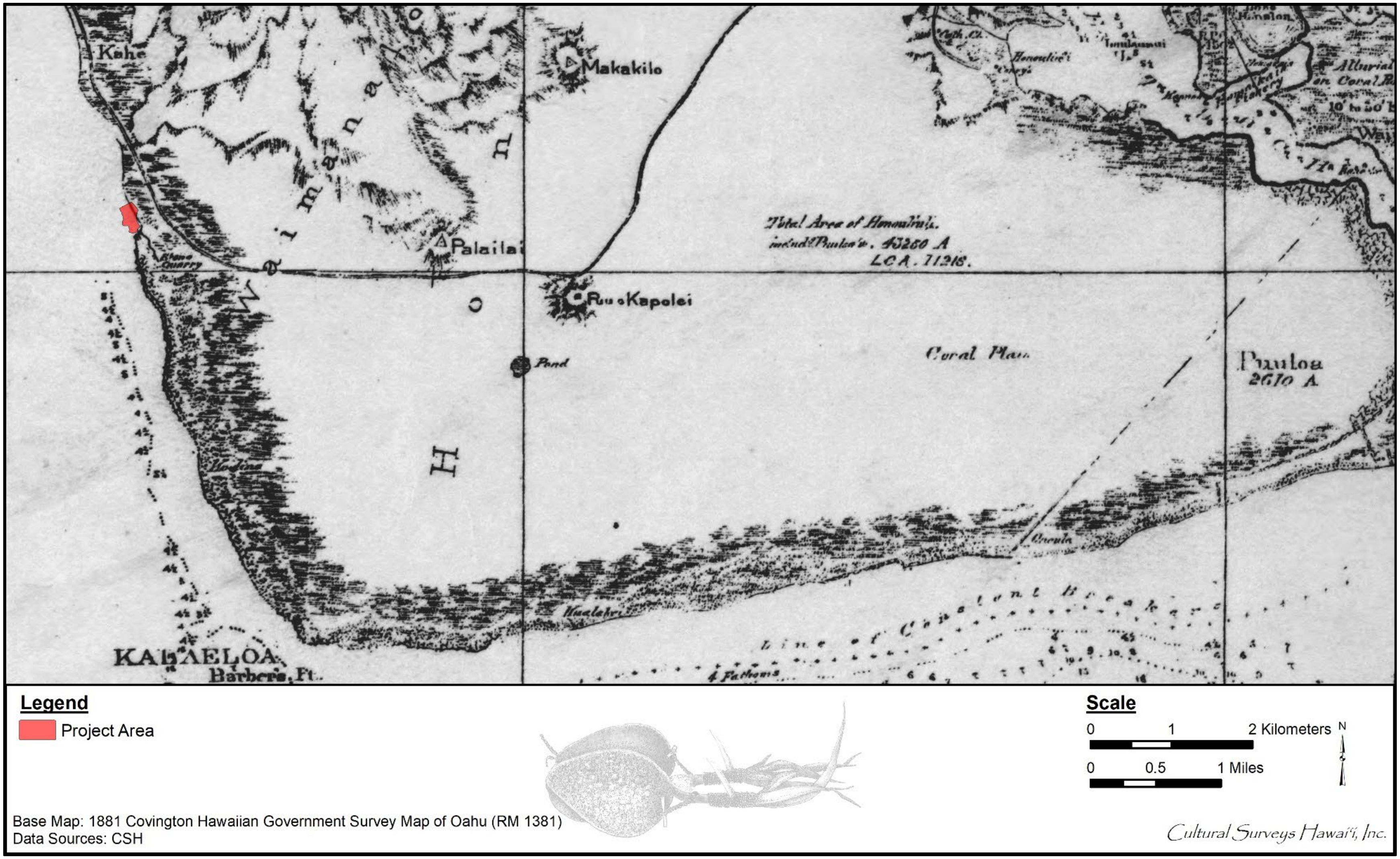


Figure 9. Portion of 1881 Covington Hawaiian Government Survey map of Oahu (RM 1381) showing the location of The Cove at Ko Olina Redevelopment project area with a stone quarry to the southeast

In 1886, Campbell and B.F. Dillingham put together the "Great Land Colonization Scheme," which was an attempt to sell Honouliuli land to homesteaders (Thrum 1886:74). This homestead idea failed, but with the water problem solved by the drilling of artesian wells, Dillingham decided the area could be used instead for large-scale cultivation (Pagliaro 1987:4). In 1889, Campbell leased his property to Benjamin Dillingham, who subsequently formed the Oahu Railway and Land Company (OR&L) as the result of a franchise granted by King Kalākaua in 1886. In 1889, Dillingham opened the first 9 miles of narrow-gauge track on the King's birthday. To attract business to his new railroad system, Dillingham subleased all land below 200 ft elevation to William Castle, who in turn sublet the area to the Ewa Plantation Company for sugarcane cultivation. Dillingham's Honouliuli lands above 200 ft elevation, which were suitable for sugarcane cultivation, were sublet to the Oahu Sugar Company. Throughout this time, and into modern times, cattle ranching continued in the area and Honouliuli Ranch—established by Dillingham—was the "fattening" area for the other ranches (Frierson 1972:15).

4.3 1900s to Present

Historic maps and aerial photographs depict little change from the early 1900s to the development of the Ko Olina area for the resort and harbor (Figure 10 through Figure 19). During the early 1900s, the Ewa Plantation Company grew quickly. When the rainy season began, they plowed ground perpendicular to the slope so that soil would be carried down the drainage ditches into the lower coral plain. After a few years, about 373 acres of coral wasteland were reclaimed in this manner (Immisch 1964). By the 1920s, the Ewa Plantation Company was generating large profits and was the "richest sugar plantation in the world" (*Paradise of the Pacific* December 1902:19–22). The 1919 U.S. Army War Department map (see Figure 11) shows plantation infrastructure including a railway, large wall, and unimproved road near the project area. A 1939 map of the Ewa Plantation indicates Field No. 1 is within the project area (see Figure 14).

By 1920, the lands of Honouliuli were used primarily for sugarcane cultivation and ranching (Frierson 1972:18). Much of the lands in western Honouliuli unsuitable for commercial sugar cultivation remained pasture land for grazing livestock. In the late 1920s, the main residential communities were at the northeast edge of the ʻEwa Plain. The largest community was still at Honouliuli village. ʻEwa was primarily a plantation town, focused around the sugar mill, with a public school as well as a Japanese School. Additional settlement was in Waipahu, centered around the Waipahu sugar mill, operated by the Oahu Sugar Company.

Beginning in 1939, Alice Kamokilaikawai Campbell, daughter of James and Abigail Kuaihelani Maipinepine Campbell, resided in Lanikūhonua, adjacent to the project area for nearly 30 years. Mrs. Campbell named the area Lanikūhonua which means "where the heavens meet the earth" (Lanikūhonua Cultural Institute 2019). Cultural descendant Nettie Fernandez Tiffany, current caretaker of the Lanikūhonua Institute, stated that her mother, Leilani Fernandez, was a close friend of Alice Campbell (personal communication October 2019). Mrs. Fernandez owned a beach home within the current project area and was the previous caretaker of the Campbell Estate property (see Figure 19).

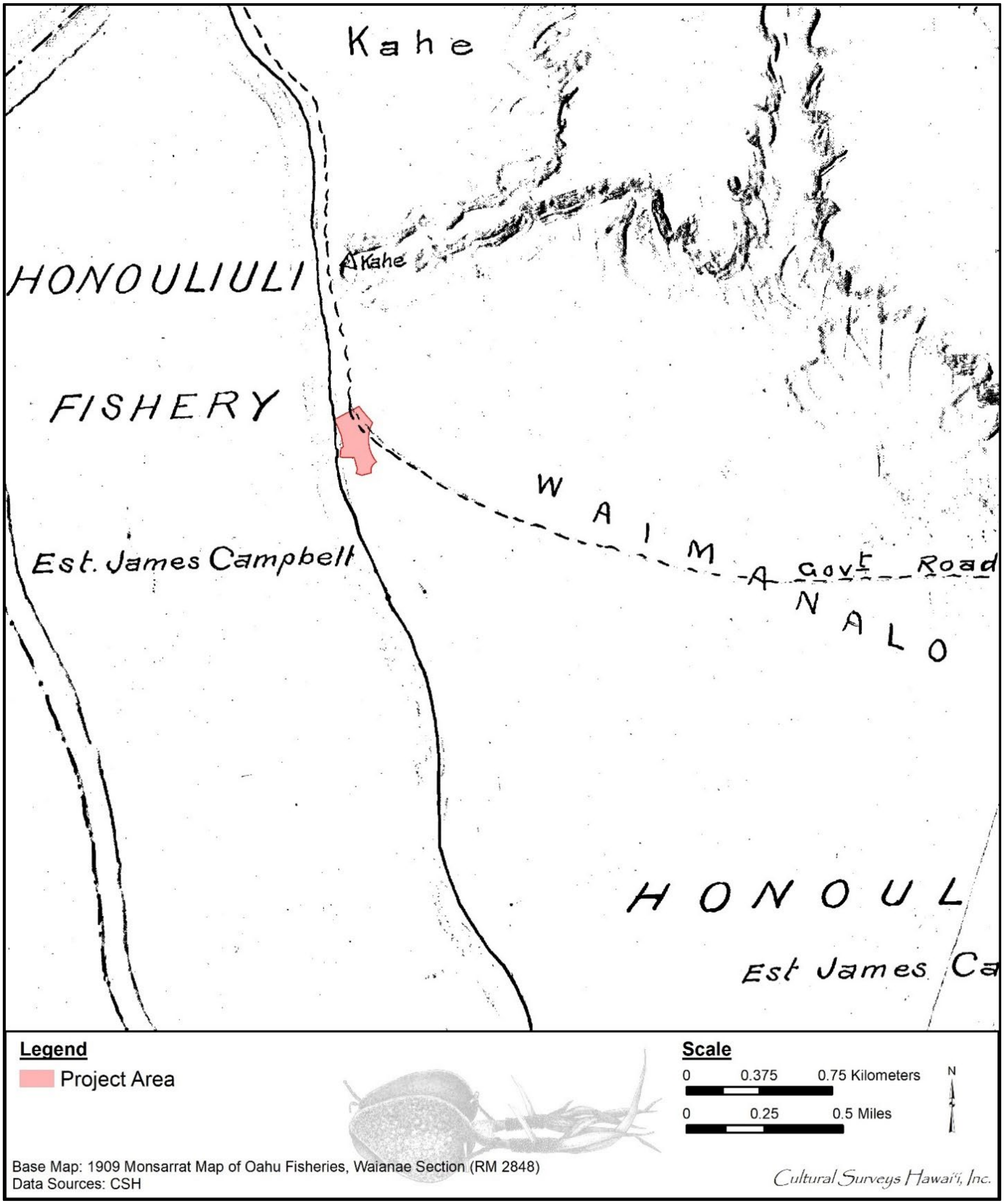


Figure 10. Portion of a 1909 Monsarrat map of Oahu Fisheries, Waianae Section (RM 2848) showing the location of The Cove at Ko Olina Redevelopment project area

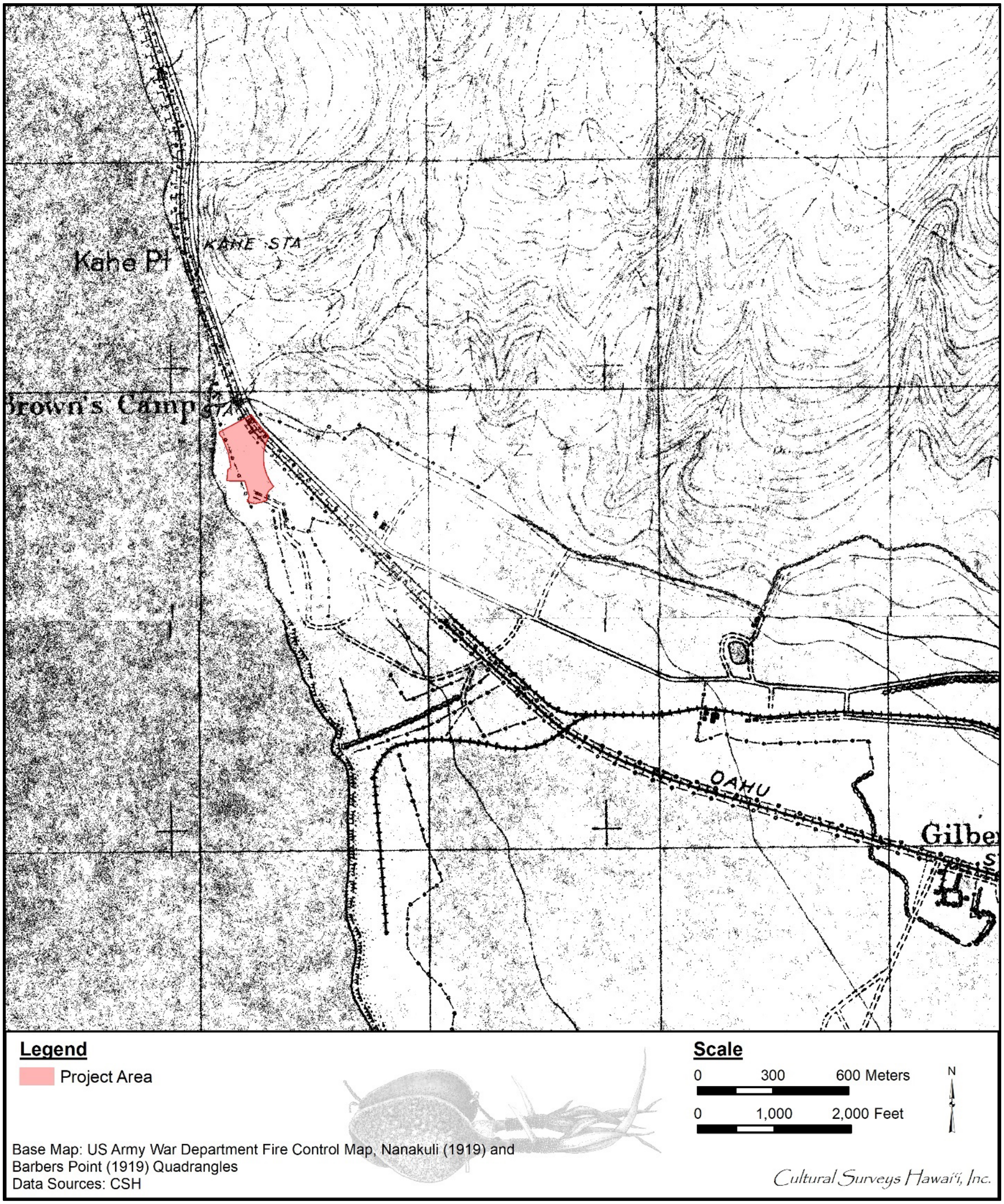


Figure 11. Portion of 1919 U.S. Army War Department fire control map, Nanakuli and Barbers Point quadrangles, showing the location of The Cove at Ko Olina Redevelopment project area showing the OR&L Railroad to the northeast

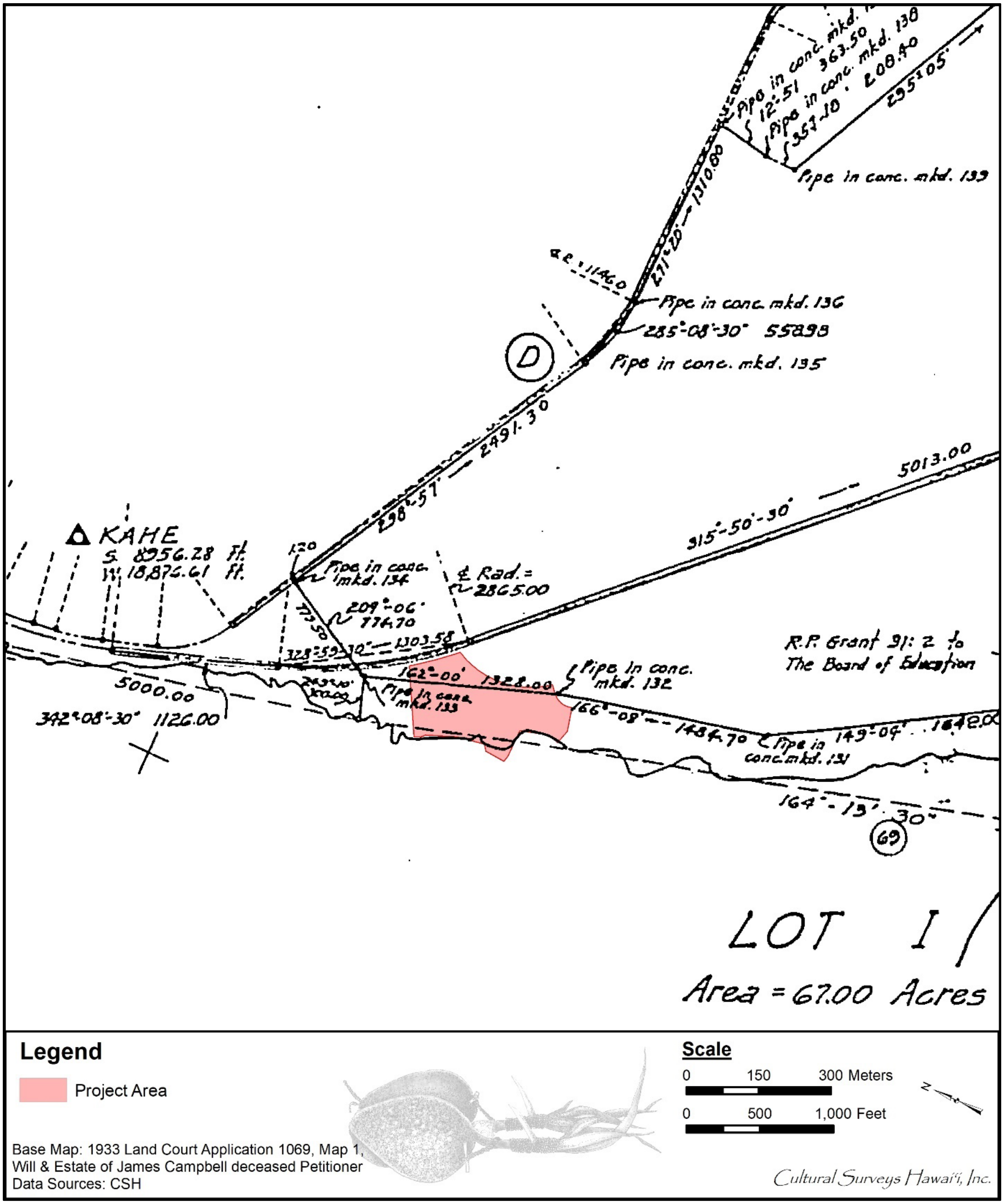


Figure 12. Portion of a 1933 Land Court Application 1069, Map 1, Will and Estate of James Campbell deceased Petitioner, showing the location of The Cove at Ko Olina Redevelopment project area

Figure 13. Portion of the 1936 U.S. Army War Department terrain map, Waianae and Barbers Point quadrangles showing the location of The Cove at Ko Olina Redevelopment project area (the white area east of the project area is likely sugarcane lands)

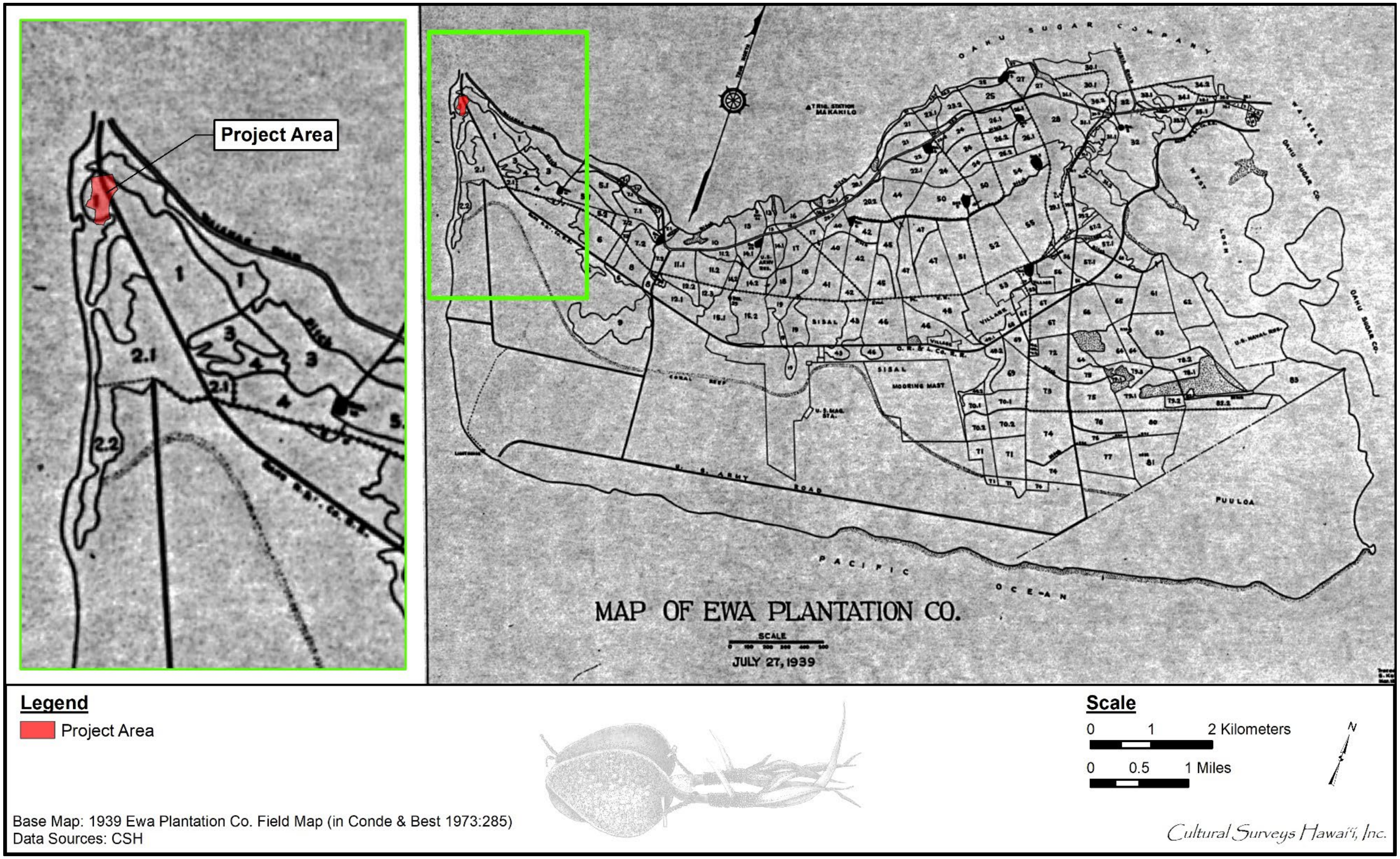


Figure 14. 1939 field map of Ewa Plantation Company, showing the location of The Cove at Ko Olina Redevelopment project area as mostly within sugarcane cultivation Field 1 (Condé and Best 1973:285)

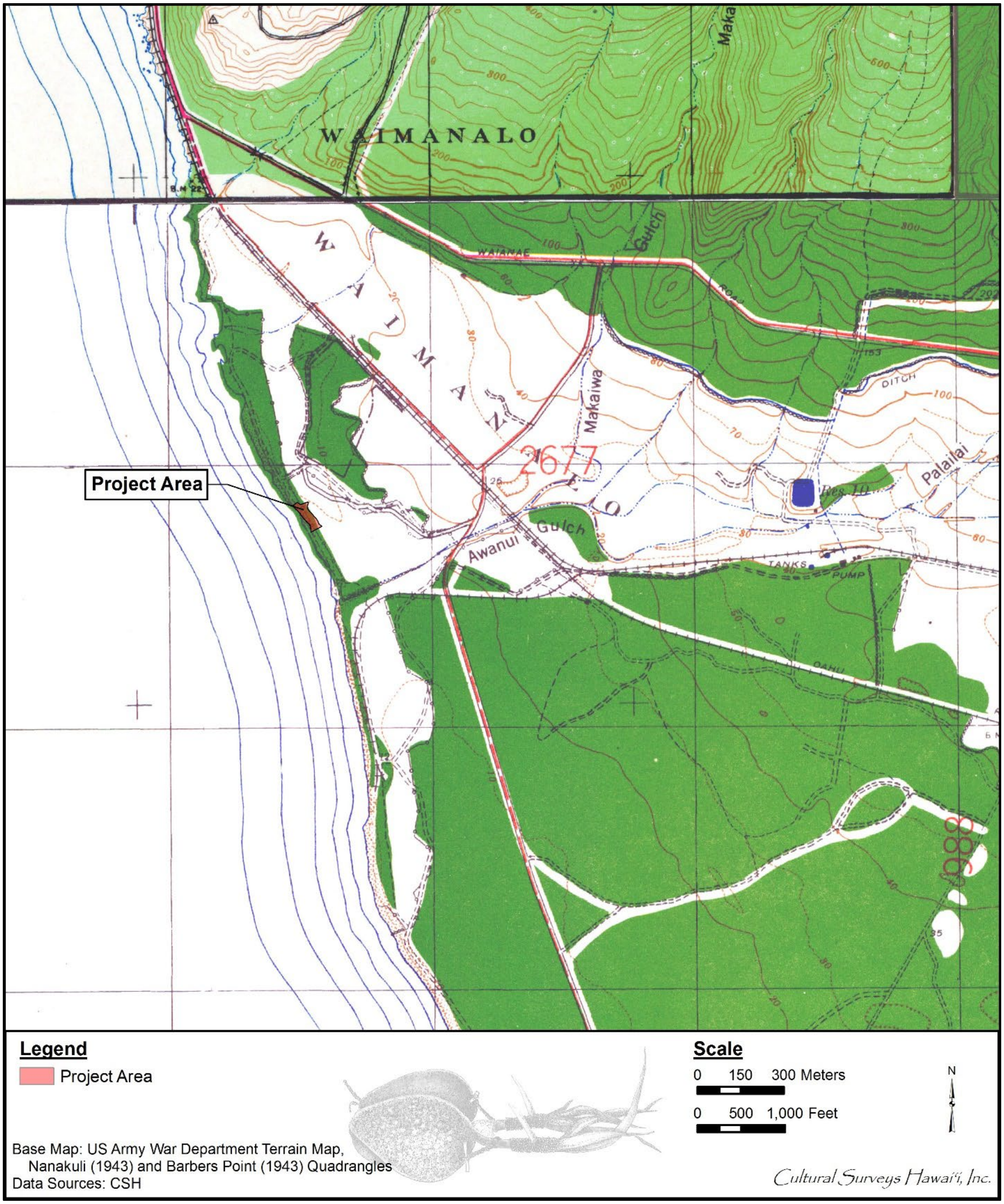


Figure 15. Portion of 1943 U.S. Army War Department terrain map, Nanakuli and Barbers Point quadrangles, showing the location of the project area (the white area east of the project area is likely sugarcane lands)

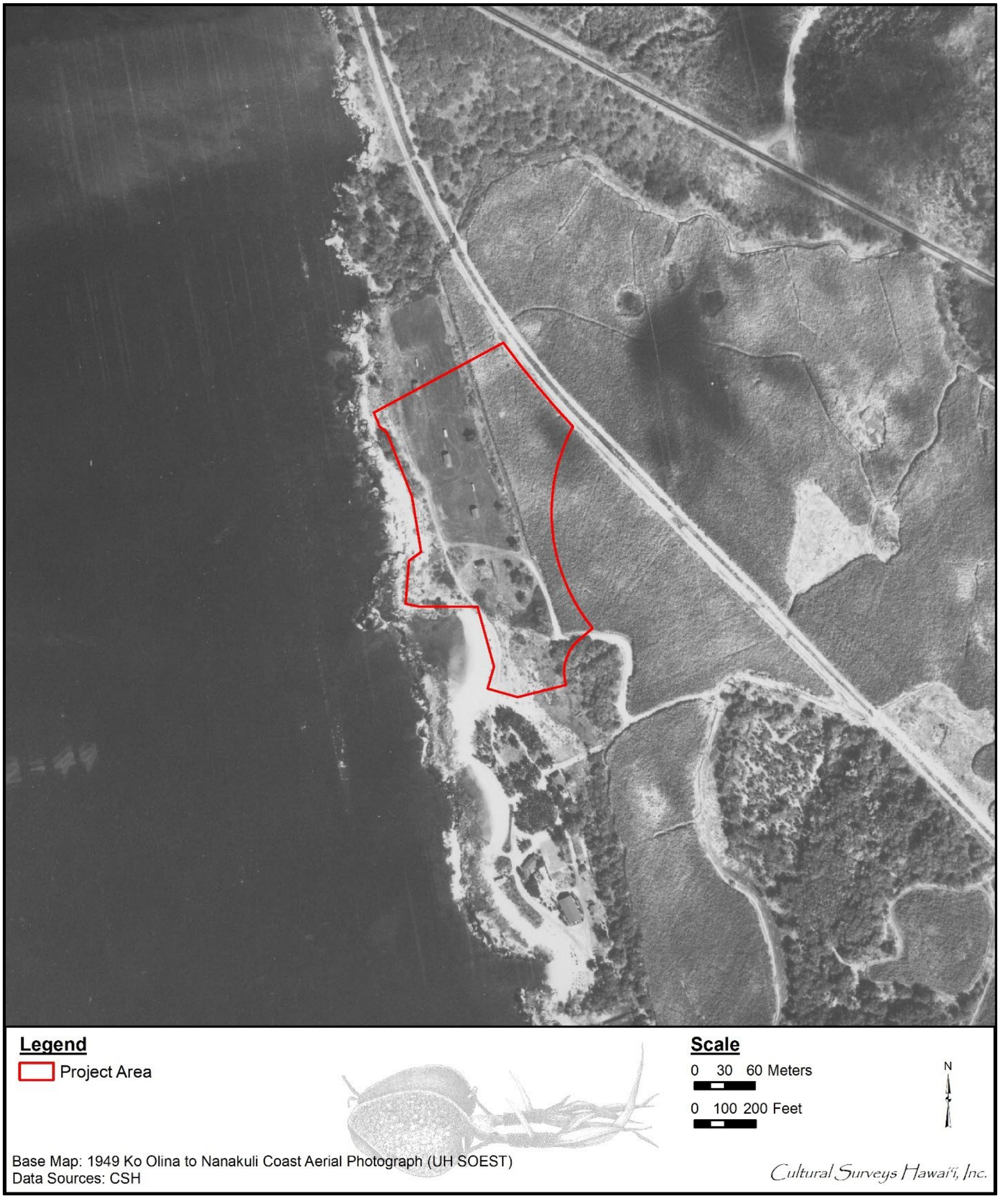


Figure 16. 1949 Ko Olina to Nanakuli Coast aerial photograph (UH SOEST), showing development of a few structures in the project area

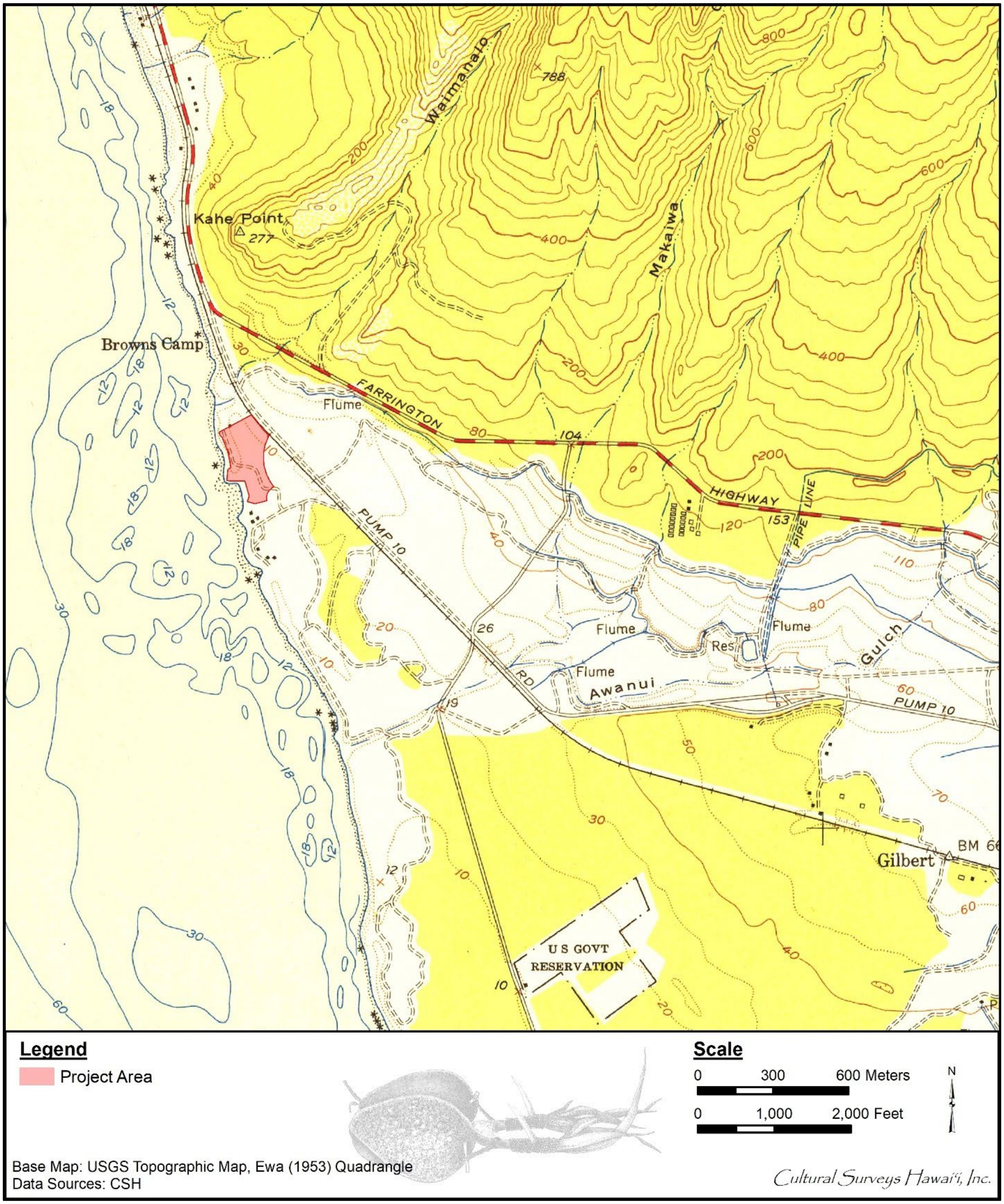


Figure 17. Portion of the 1953 Ewa USGS topographic quadrangle showing the location of The Cove at Ko Olina Redevelopment project area

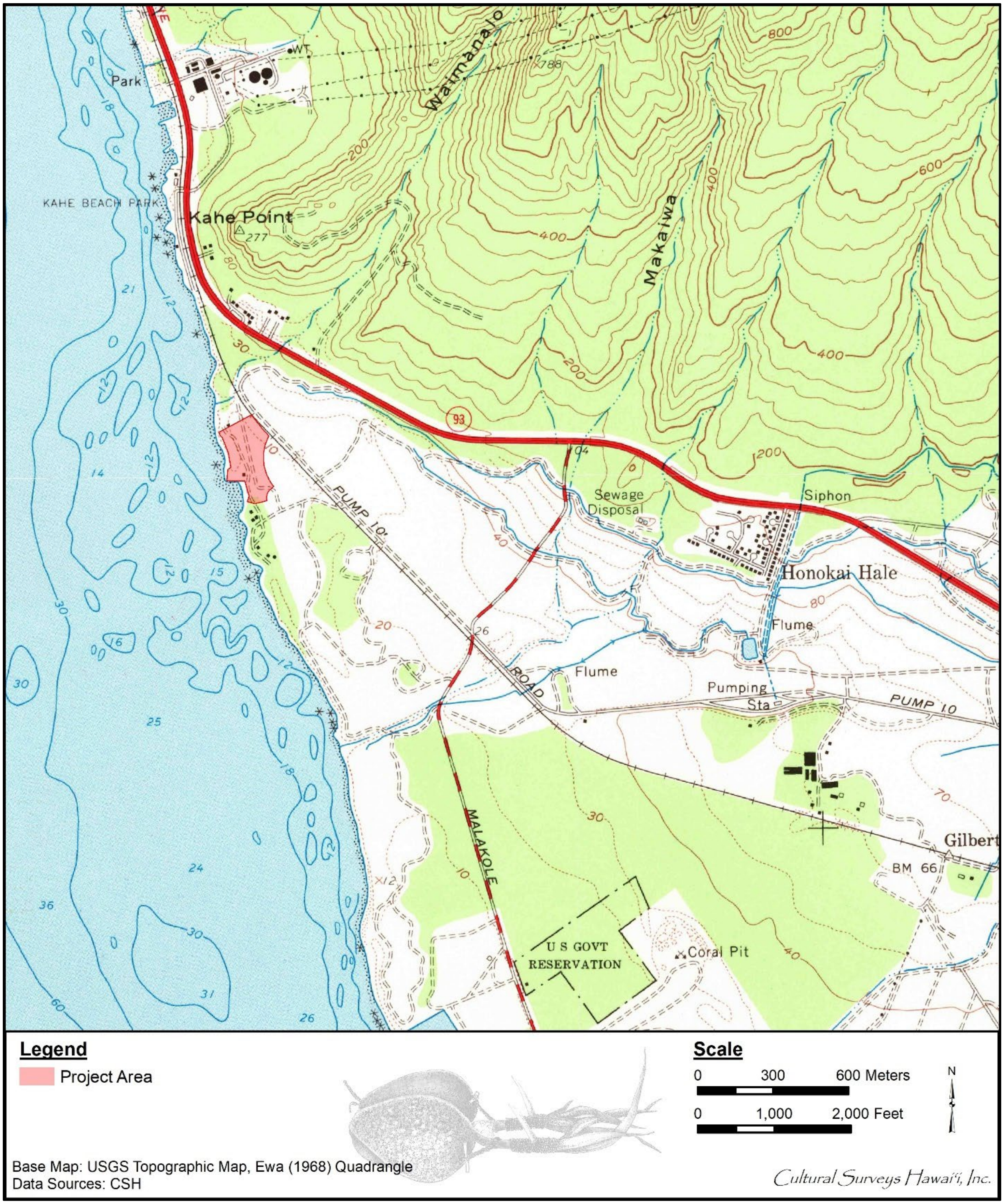


Figure 18. Portion of the 1968 Ewa USGS topographic quadrangle showing the location of The Cove at Ko Olina Redevelopment project area

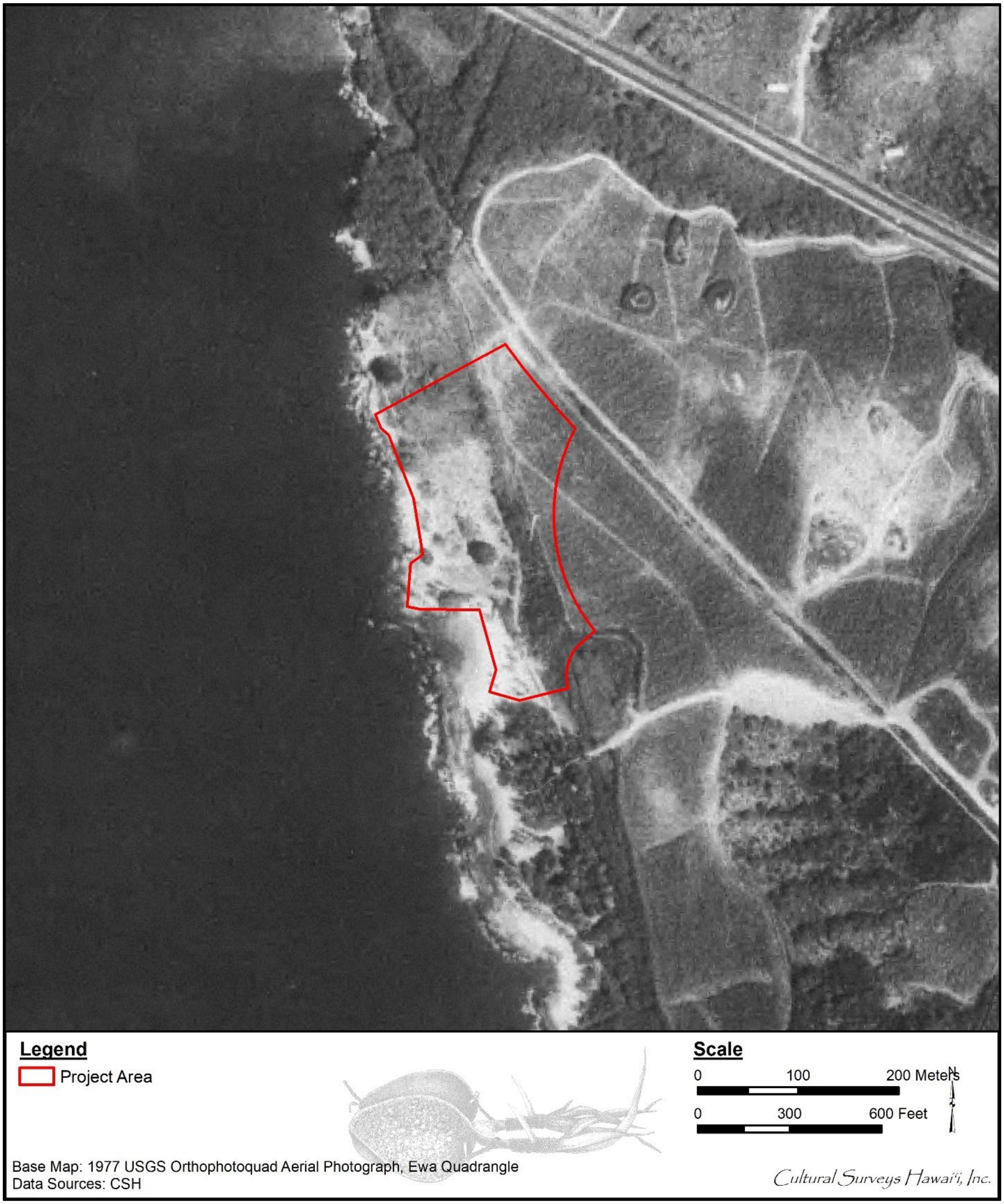


Figure 19. 1977 USGS Orthophotoquad aerial photograph, Ewa quadrangle, depicting no structures or development in the project area

Major land use changes came to western Honouliuli when the U.S. military began development in the area. Military installations were constructed both near the coast and in the foothills and upland areas (Figure 20). Barbers Point Military Reservation (formerly Battery Barbers Point from 1937–1944) at Barbers Point Beach was used beginning in 1921 as a training area for firing 155 mm guns (Payette 2003). Also in the vicinity were Camp Malakole Military Reservation (formerly Honouliuli Military Reservation), used from 1939, and Gilbert Military Reservation, used from 1922–1944. The 1919 U.S. Army war map (see Figure 11) indicates the Gilbert Station, understood as the site of a very small Gilbert Camp associated with the railway and Ewa Plantation, and Waimanalo Camp in the vicinity but well outside the project area.

Barbers Point Naval Air Station, in operation from 1942 to the 1990s, was the largest and most significant base in the area. It housed numerous naval and defense organizations, including maritime surveillance and anti-submarine warfare aircraft squadrons, a U.S. Coast Guard Air Station, and components of the U.S. Pacific Fleet. Fort Barrette (a.k.a. Kapolei Military Reservation and Battery Hatch) atop Puʻuokapolei was in use from 1931–1948 for housing four 3-inch anti-aircraft batteries (Payette 2003). In the 1950s, the site was used as a Nike missile base. Palailai Military Reservation was built in 1921 atop Puʻu Pālailai in Makakilo and housed Battery Palailai and Fire Control Station B (Payette 2003).

The OR&L railroad alignment is northeast/northwest of the project area (see Figure 14). Throughout World War II, the railway served a critical function in transporting military personnel and equipment. However, the development of an improved road system and increasing numbers of cars on the island began to cut into passenger totals on the OR&L. According to the National Register of Historic Places (NRHP) inventory forms on file at SHPD, on 12 December 1947, all operations outside Honolulu ceased.

In 1950, the U.S. Navy purchased the track and right-of-way from Pearl Harbor to the Naval Ammunition Depot (NAD) access road in Nānākuli for $1.00 in the name of "National Defense." The NAD maintained this 25.5-mile stretch of track until the early 1950s, when a 6.5-mile stretch from Pearl Harbor to Waipahu was ceded to the Territory of Hawaiʻi. A further 6 miles was ceded to the Territory in 1954 after a heavy flood. The final 13-mile stretch was in use until 1968, when it too was ceded to the state. In 1970, the Hawaiian Railway Society was formed to preserve and restore remaining portions of the OR&L. The Society restored 6.5 miles of track from ʻEwa to Nānākuli, including the portion adjacent to the current project area, and continues to use and maintain the railroad for historical tours.

The 1980s saw a joint venture between Japanese construction giant Kumagai Gumi and Hawaiʻi developers Horita Corporation and TSA International for the development of a $6 billion resort (*The Age*, 3 December 1986:34). The development was originally called "West Beach," and construction began on the lagoon and harbor in November 1986 (Figure 21 and Figure 22). Four man-made lagoons were constructed, as well as an 18-hole golf course, luxury condominiums, and a hotel (*Honolulu Star-Bulletin*, 20 August 1998). In 1991, the developers of West Beach, West Beach Estates, purchased Paradise Cove Luau (*Honolulu Advertiser*, 16 November 1991). The project stalled as a result of the Japanese investment bubble bursting in the early 1990s (*Honolulu Star-Advertiser*, 24 December 2010). The area is now known officially as Ko Olina and has recently seen a reinvigoration of development.

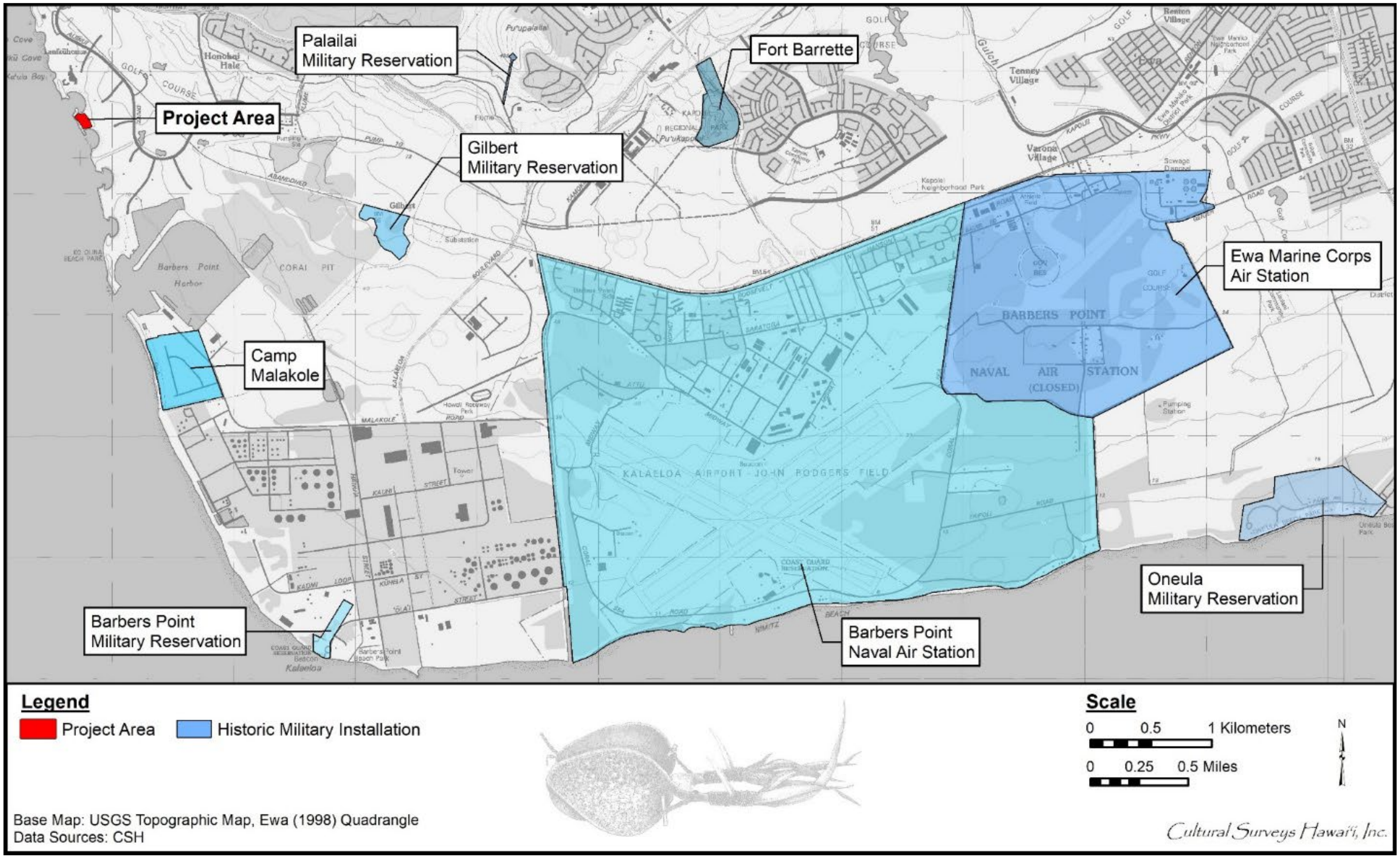


Figure 20. Portion of the 1998 Ewa USGS topographic quadrangle, showing the project area with an overlay of the locations of historic military installations

Figure 21. Aerial photo of early Ko Olina development with project area in upper left (Ko Olina Development, LLC, n.d.)

Figure 22. Aerial photo of early Ko Olina development with the project area in the middle left (Ko Olina Development, LLC, n.d.)

Section 5 Previous Archaeological Research

The project area and its vicinity has been the subject of many archaeological and paleo-ecological studies, which are summarized below. Previously conducted modern archaeological studies are depicted in Figure 23 and listed in Table 2. These studies identified numerous historic properties, which are depicted in Figure 24 and listed in Table 3.

The first effort to record historic properties in Honouliuli was made by Thrum (1906:46), who references "a heiau on Kapolei hill, 'Ewa—size and class unknown. Its walls thrown down for fencing." The former *heiau* was on Pu'uokapolei, approximately 5.5 km southeast of the current project area.

In his 1930 surface survey of the island of O'ahu, archaeologist J. Gilbert McAllister recorded the specific locations of important archaeological and cultural sites, and the general locations of some sites of lesser importance. McAllister (1933:107–108) recorded seven sites at Honouliuli (McAllister Site #s 133 through 139/ State Inventory of Historic Places (SIHP) #s 50-80-08-133 through -138 and 50-80-13-139), and these became the first seven sites in the Bishop Museum's Site Numbering System (50-Oa-B6-1 through 50-Oa-B6-7). The nearest of these specific sites to the project area is McAllister Site 138, which includes the Pu'uokapolei Heiau and an adjacent rock shelter located far east of the project area. Additionally, McAllister (1933:109) designated Site 146, which comprises archaeological features covering a large but poorly defined area along the coast. His impressions of Site 146 are recorded as follows:

> 'Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near the Pu'uloa Salt Works belongs to the ranching period of about 75 years ago [ca. 1850s]. It is probable that the Hawaiians formerly used the holes and pits in the coral. Frequently the soil on the floor of larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here. [McAllister 1933:109]

These archaeological sites of the 'Ewa coral plains would be the subject of some 50 or so archaeological studies conducted in the 1970s and 1980s and another score by the end of the century.

From the period between McAllister's 1930 study and the flurry of work that began in 1969, there are only a few sporadic pieces of poorly documented research.

"In 1933, Dr. Kenneth P. Emory examined a well-preserved house site and a possible *heiau* in the western part of the coral plain; these sites were later destroyed by sugar-cane planting" (Sinoto 1976:1). In 1959, William Kikuchi removed several burials from a burial cave (Bishop Museum Site 50-Oa-B6-10/SIHP # 50-80-12-2317) at the Standard Oil Refinery; the cave was subsequently destroyed (Barrera 1975:1). Kikuchi recovered 12-16 incomplete primary and/or secondary burials cached in a sinkhole or crevice exposed during construction activities near the big bend of Malakole Street, southeast of the project area (Kikuchi 1959; Davis 1990:146–147). In 1960, Yosi Sinoto and Elspeth Sterling made note of a house site (Bishop Museum Site 50-Oa-B6-8/SIHP # 50-80-08-1176). Davis (1990:147) stated that "In 1962, Lloyd Soehren recorded

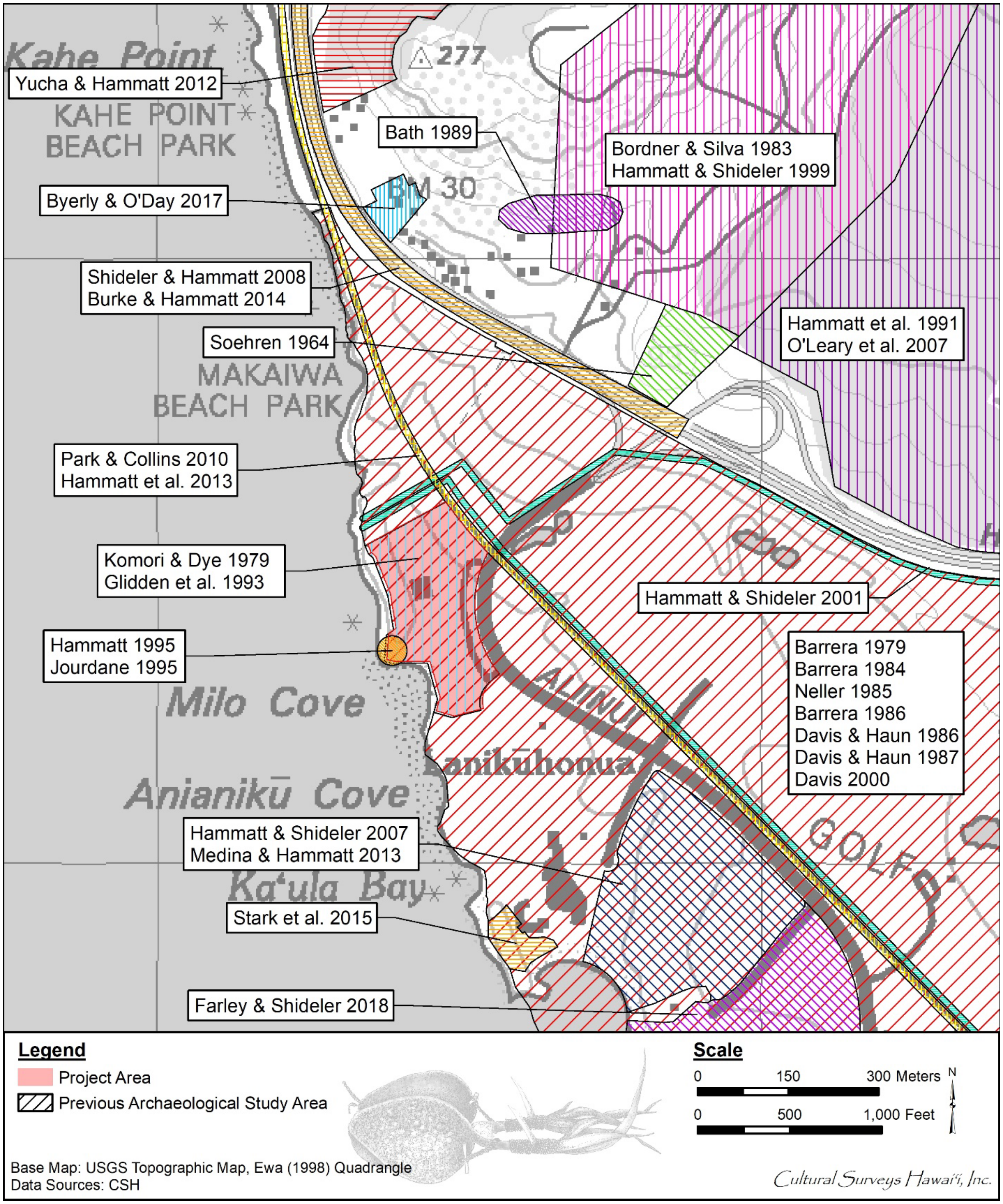


Figure 23. Portion of a 1998 Ewa USGS 7.5-minute topographic quadrangle depicting previous archaeological studies in the vicinity of the project area

Table 2. Previous archaeological studies in the vicinity of the project area

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Soehren 1964	Archaeological field investigation	Waimānalo Gulch	Documented one house site (SIHP # -2317)
Barrera 1979	Archaeological survey	West Beach	Recorded ten historic properties, none in project area per se; properties documented included walls, enclosures, midden scatters, and a fishing shrine
Komori and Dye 1979	Archaeological testing	West Beach	Excavated six small (0.5 sq m) test pits in two transect lines; substantial historic disturbance already in much of area; no traditional Hawaiian features noted
Bordner and Silva 1983	Archaeological reconnaissance and historical documentation	Proposed Waimānalo Gulch landfill site	One possible WWII-era encampment identified
Barrera 1984	Archaeological status report	West Beach	Reviewed and summarized work back to 1979 and second phase of work completed in July 1984; within and in vicinity of project area
Neller 1985	Review and evaluation	West Beach	Neller, finding fault in previous archaeological work, called for more work to address "inadequacies of the historic preservation measures being taken and proposed for the West Beach project"
Barrera 1986	Archaeological investigations	West Beach	Summary of archaeological investigations spanning six years clearly trying to respond to Neller's (1985) critiques; gives formal SIHP numbers for Neller-numbered sites
Davis and Haun 1986	Archaeological status report	West Beach	Reviewed and summarized archaeological field work completed in 1986
Davis and Haun 1987	Intensive survey and test excavations	West Beach	Detailed historic property descriptions in vicinity and a radiocarbon date from a hearth feature at SIHP # -3352-2 with a range of AD 1235-1420
Bath 1989	Site visit report	Waimānalo Gulch	Three petroglyphs (SIHP # -4110) documented

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Hammatt et al. 1991	Archaeological inventory survey	Makaīwa Hills project site, TMKs: [1] 9-1-015:005 and 017; 9-2-003:002, 005, and 084	Identified 34 sites, including prehistoric habitation and agricultural features, rock shelters, petroglyphs, *ahu* (altar), and various sugarcane cultivation infrastructure
Glidden et al. 1993	Data recovery excavations	Paradise Cove	Bernice Pauahi Bishop Museum (BPBM) Applied Research Group conducted subsurface backhoe testing at Paradise Cove, excavating nine backhoe trenches; Trenches 1–6 lacked a cultural component and were basically sterile; Trenches 7–9 showed post-Contact cultural activity; Trench 7 indicated traditional Hawaiian activity
Hammatt 1995	Response to inadvertent discovery of human remains	Paradise Cove	Following initial burial find of SIHP # -4968 by Jourdane (1995), five burials documented in a gas line excavation
Jourdane 1995	Burial documentation	Paradise Cove	Documents discovery of human remains (minimum # of individuals [MNI] 1) disturbed during excavation for gas lines at Paradise Cove; little specific information could be determined; assigned SIHP # -4968
Hammatt and Shideler 1999	Archaeological inventory survey	Waimānalo Gulch Sanitary Landfill	No historic properties observed within proposed project area, however, two sites in Waimānalo Gulch property, but not proposed project area including a WWII and Civil Defense complex known as “Battery Arizona” and a contemporary Hawaiian shrine incorporating “sacred stones”; additional petroglyph site also reported on property
Davis 2000	Data recovery	West Beach	Four-volume data recovery study completes data recovery work carried out in 1980s; identified several historic properties in or very close to present project area

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Hammatt and Shideler 2001	Archaeological inventory survey	North of Barbers Point	Two historic properties confirmed: SIHP # -1433, a *ko‘a* or traditional Hawaiian fishing shrine, and SIHP # -1434, related to a complex of walls and an enclosure (Barrera 1979; Davis and Haun 1987:D-6); six other previously reported properties in vicinity include SIHP #s -1435, a historic retaining wall; -1464, a remnant historic wall (ranching or sugar); -3358, a shell midden deposit; -3359, an agricultural cairn; -3360, a habitation (midden) deposit; and -3361, another habitation (midden) deposit searched for but not confirmed
Hammatt and Shideler 2007	Archaeological literature review and field inspection	Ko Olina	Four historic properties (two traditional Hawaiian habitation deposits and two WWII sites) previously identified within approx. 21.2-acre project area but had been addressed to satisfaction of SHPD (now either obliterated or buried)
O’Leary et al. 2007	Archaeological inventory survey	Makaīwa Hills	Identified two historic properties: SIHP # -6870, a terrace, three springs, and a small rock shelter; and SIHP # -6871, a paved area situated on a ridge top
Shideler and Hammatt 2008	Letter report	Farrington Hwy and Haleakalā Rd to Ali‘i Nui Dr	Letter addressing architectural concerns including historic bridges post-dating 1940 needing assessment for historical significance; includes a culvert north of Nānāikapono School, Piliokoe Bridge, and bridge crossing Keone‘ō‘io Gulch at Tracks Beack Park
Park and Collins 2010	Archaeological monitoring	Kahe Water Pipeline project, TMKs: [1] 9-1-015:002 and 9-2-003:011	Although trenching took place within OR&L railway right-of-way (ROW), no portion of railway structure (tracks) impacted; no subsurface human remains or cultural deposits observed during archaeological monitoring, although modern garbage and several historic-period bottle fragments and ceramic fragments observed within fill materials

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Yucha and Hammatt 2012	Archaeological inventory survey	Kahe Valley	Identified ten historic properties including military-related defensive position/observation post complex (SIHP # -7137) on ridge north of current project area
Hammatt et al. 2013	Archaeological inventory survey	Tracks Beach Park, TMK: [1] 9-2-003:011	Addressed 13.4-km (8.3-mile), 12.2 m (40-ft wide) corridor (40.4 acres total) project area, but subsurface testing limited to six test excavations in Tracks Beach area; no new significant historic properties; discusses OR&L, SIHP # -9714, previously placed on NRHP
Medina and Hammatt 2013	Archaeological monitoring	Aulani Walt Disney Resort, Ko Olina	No historic properties identified
Burke and Hammatt 2014	Archaeological monitoring	Farrington Hwy between Haleakalā Rd and Aliʻi Nui Dr	No historic properties identified
Stark et al. 2015	Archaeological assessment (no finds AIS)	Four Seasons Resort at Ko Olina	No historic properties identified
Byerly and O'Day 2017	Archaeological inventory survey	1.83-acre area on *mauka* side of Farrington Hwy where it meets the sea (Hawaiki Submarine Cable Landing project), TMKs: [1] 9-2-049:001, 002, and 005; 9-2-051:001 por., 010, and 011; and Farrington Hwy	No historic properties identified on surface of terrestrial parcels; however, one NRHP listed historic property identified intersecting route of subterranean horizontal directional drilling (HDD) bore: OR&L ROW (SIHP # -97l4); because HDD bore will run 45 to 50 m below surface, reasonably concluded project would have no effect on the OR&L ROW

Reference	Type of Study	Location	Results (SIHP # 50-80-12****)
Farley and Shideler 2018	Archaeological literature review and field inspection	Atlantis Resort and Residence, Ko Olina	Background research indicates five previously identified historic properties in project area including SIHP # -1436, a lime kiln; SIHP # -1438, a four-component beach midden with Feature 3 comprising a subsurface cultural layer containing shell midden, faunal remains, traditional Hawaiian artifacts, pit features, and a human burial; SIHP # -1453, a cave/unmodified sinkhole with a midden deposit; SIHP # -3351, habitation complex comprising seven relatively distinct surface deposits and a shelter cave; and SIHP # -3362, which comprises entirety of low ground behind coastal sand dunes including a former coastal marsh; evidence of only SIHP # -1436 observed during field inspection; preservation plan for SIHP # -1436 recommended along with archaeological monitoring at locations of SIHP #s -1438 and -3351

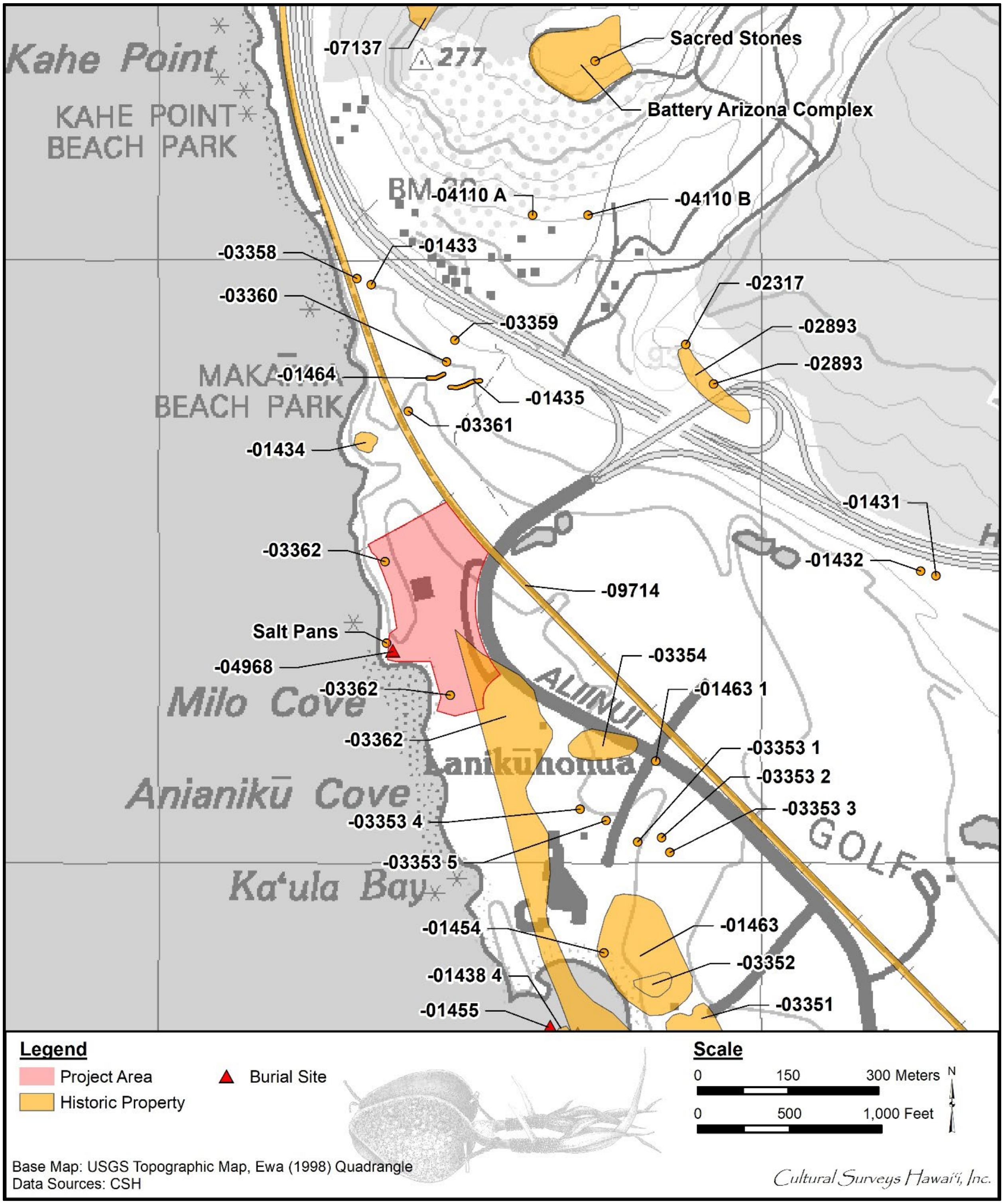


Figure 24. Portion of a 1998 Ewa USGS 7.5-minute topographic quadrangle depicting previously identified historic properties in the vicinity of the project area

Table 3. Previously identified historic properties in the vicinity of the project area

SIHP # 50-80-12-	Type	Source	Comments
1431	Wall	Davis 2000	Indeterminate age; dry masonry
1432	Wall	Davis 2000	Indeterminate age; likely related to animal control functions
1433	*Koa* (shrine)	Hammatt et al. 2013	Pre-Contact
1434	Habitation complex	Davis 2000	Both pre- and post-Contact; includes two enclosure/platforms and a wall
1435	Retaining wall	Davis 2000	Post-Contact, possible erosion control wall
1438-4	Subsurface cultural deposit	Barrera 1979, Davis and Haun 1987, Davis 2000	Four-component midden; Feature 3 comprises charcoal-stained sand on back slope of dune without any visibly associated architectural features; testing revealed numerous fire pits, trash pits, midden, and traditional Hawaiian artifacts
1454	Military revetment (wall)	Davis 2000	Associated with twentieth century military activity (WWII); described by Davis (2000:132) as "an open emergency bunker"
1455	Burial (human)	Neller 1985, Barrera 1986, Davis and Haun 1987, Davis 2000	Davis (2000: III:60) regarded this as Neller Site N-20; human bones exposed by fishermen (antiquity uncertain)
1463	Military coastal defense complex	Neller 1985, Barrera 1986, Davis and Haun 1987, Davis 2000	Davis (2000) associates this with Neller Site N-17; concrete slabs and cast boxes; inferred function: fire control and support center for coastal defense batteries; 15 features (numbered SIHP #s -1463:1 through -1463:15)
1463-1	Military defense structure	Davis and Haun, 1987, Davis 2000	Post-Contact, fire-control/ammunition storage and auxiliary support facility possibly associated with armament at Coastal Gun Battery 3363
1464	Remnant wall	Davis and Haun, 1987, Davis 2000	Post-Contact; probable erosion control
2317	Habitation site	Soehren 1964	Waimanalo Gulch house site, age indeterminate

SIHP # 50-80-12-	Type	Source	Comments
2893	Overhang shelter and petroglyphs	Davis and Haun 1987, Davis 2000	Pre-Contact, eight sub-features including two rock shelters, two platforms, a thin surface midden scatter, and three sets of petroglyphs
3351	Habitation complex	Davis and Haun 1987, Davis 2000	Cluster of eight relatively distinct surface deposits and a shelter cave in one of more than a dozen sinkholes and shallow depressions scattered over an area of moderately sloping terrain; habitation deposits numbered SIHP #s -3351:1 through 5, 7, and 8; a structurally unmodified sinkhole/cave identified as -3351:6
3352	Habitation complex	Davis and Haun 1987, Davis 2000	Area of exposed cultural deposits scattered over moderately sloping terrain with an estimated area of 2,100 sq m; identified 21 hearths
3353-1	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre-Contact, estimated site age AD 1593–1793, subsurface cultural deposit with a thin scattering of shell midden and a few artifacts including a bone fishhook-shank fragment, a coral abrader, and eight pieces of volcanic glass (Davis and Haun 1987: B-613)
3353-2	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre-Contact, estimated site age AD 1640–1794, subsurface cultural deposit with a thin scattering of shell midden and volcanic glass (Davis and Haun 1987: B-164)
3353-3	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre-Contact modified sinkhole
3353-4	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre- and post-Contact, subsurface deposit described by Davis (2000:75) as “extremely disturbed”; consists of four relic deposits and possible habitation cave, up to 100 m apart from one another
3353-5	Open floor habitation	Davis and Haun 1987, Davis 2000	Pre- and post-Contact, subsurface deposit disturbed (Davis and Haun 1987:50)
3354	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age, open area composed of exposed coral bedrock scattered with cultural material (Davis and Haun 1987: B-168)
3358	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age, subsurface deposit containing shell midden, fire-cracked rock, and broken bowl of clay smoking pipe (Davis and Haun 1987: D-21)

SIHP # 50-80-12-	Type	Source	Comments
3359	Cairn	Davis and Haun 1987, Davis 2000	Indeterminate age, roughly piled basalt cobble and boulder structure
3360	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age; disturbed subsurface cultural layer containing shell midden, coral and fire-cracked rock, bird and rat bone, volcanic glass, a basalt flake, and piece of possibly worked stone (Davis and Haun 1987: D-24)
3361	Open floor habitation	Davis and Haun 1987, Davis 2000	Indeterminate age; subsurface deposit containing shell midden, fire-cracked rock, charcoal, corroded metal, bottle glass, various fragments of corroded metal, and two brass cartridge casings (Davis and Haun 1987: D-25)
3362	Coastal marshland (subsurface wetland deposit)	Davis and Haun 1987, Davis 2000	Feature 1, within current project area, described as coastal backwater marshland with no apparent cultural function prior to nineteenth century cultivation; Feature 2, outside current project area, is cultural deposit indicative of habitation
4110 A	Petroglyph	Bath 1989	Pre-Contact
4110 B	Petroglyph	Bath 1989	Pre-Contact
4968	Burial (human)	Jourdane 1995, Hammatt 1995	Five burials (designated SIHP # -4968: Burials 1 through 5); at least two burials post-Contact based on associated artifacts (button associated with Burial 2 and two gold earrings associated with Burial 3)
7137	Military complex	Yucha and Hammatt 2012	Post-Contact, defensive position/observation post complex consisting of 15 features
9714	OR&L ROW	NRHP Form (1975)	Narrow-gauge steel rails (36 inches) on raised roadbed of mixed materials for length of 15 miles; passes on northeast edge of current project area
No SIHP assigned	Sacred stones	Hammatt and Shideler 1999	Indeterminate age
No SHIP assigned	Battery Arizona Complex	Hammatt and Shideler 1999	Post-Contact
No SIHP assigned	Salt pans	Komori and Dye 1979	Pre-Contact

another secondary human burial in a sinkhole at the Barbers Point Naval Air Station.” In 1966, Lloyd Soehren “carried out salvage excavations at a possible fishing shrine (BPBM Site # 50-Oa-B6-13/SIHP # -9645).” The site was reported as destroyed by construction (Barrera 1975:1), but Davis (1990:148) confirmed the shrine and performed additional excavations in 1982. In 1969, artifacts were recovered by Roger Green from a beach midden site (50-Oa-B6-14/SIHP # 50-80-12-2722) south of the barge harbor.

5.1 West Beach Studies

Studies conducted for the West Beach development include field surveys to extensive data recovery projects. In the West Beach Study Area (see Figure 23), numerous identified historic properties include paleoecological sites (e.g., sinkholes), traditional Hawaiian sites including burials and habitation complexes, plantation-era infrastructure (e.g., the OR&L ROW), and military infrastructure. Of particular concern to developers in Hawai‘i, as well as the community, is the prospect of finding human remains in the course of development. Documented finds of human remains are shown with the approximate geographic locations of burial finds (Figure 25 and Table 4). In general, there appears to be a pattern of burial interment immediately adjacent (within 100 m) to the (former, natural) coast. However, scattered burials have been reported from more inland locations. Approximately 26 burials are known to have been encountered in the greater West Beach/Ko Olina project area. One burial, SIHP # -4968, is within the southeastern portion of the project area (see Figure 24).

Studies conducted for the West Beach development are described below.

5.1.1 Barrera 1979

William Barrera, Jr. (1979) carried out the first archaeological survey of what would eventually become the Ko Olina Resort area, but which was known at the time as “West Beach.” His introductory remarks under his “Conclusion and Recommendations” merit relating:

> When compared with the archaeological remains discovered during the various surveys of the deep draft harbor site on the south side of the project area, the West Beach remains are rather sparse and, to the untrained eye, unimpressive. This is not an indication of lack of interest on the part of the aboriginal population, but is more a function of the extensive clearing of large areas for sugarcane production […] The remains reported in this volume, then, represent only a small fraction of what once existed at West Beach, and therefore assume added significance. [Barrera 1979:14]

Barrera recorded ten historic properties (SIHP #s 50-80-12-1430 through -1438 and -2721) in his study. These included walls, enclosures, midden scatters, and a fishing shrine (the shrine is still preserved well north of the current project area). None of the historic properties are within the project area.

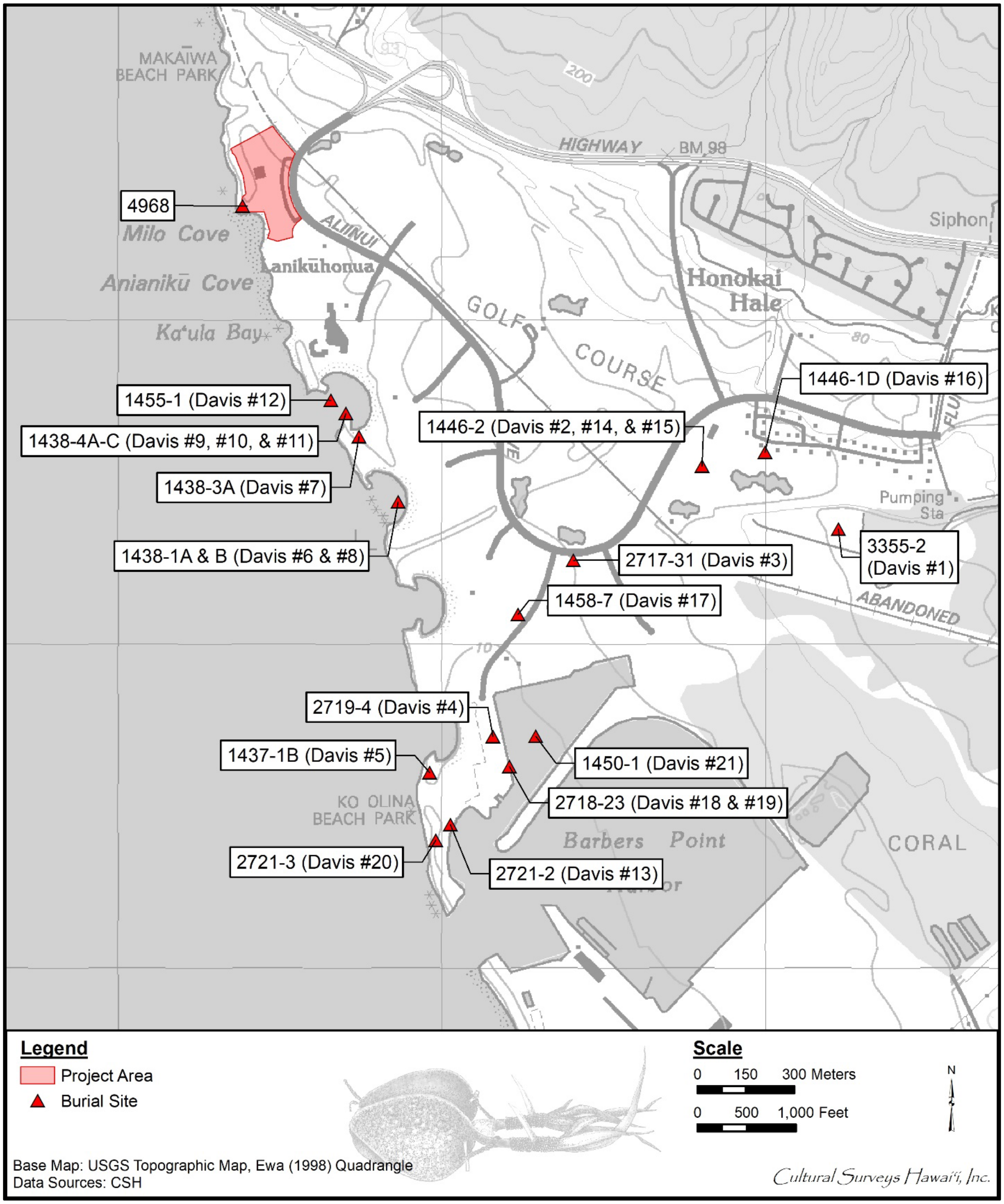


Figure 25. Portion of the 1998 Ewa USGS topographic quadrangle showing the approximate locations of previously identified human burials within and near the project area

Table 4. West Beach burials

SIHP # 50-80-12-	Burial #	Source
1437:1b	Davis #5	Davis 2000:4:6.1
1438:1A	Davis #6	Davis 2000:4:6.2
1438:1B	Davis #8	Davis 2000:4:6.2
1438:3A	Davis #7	Davis 2000:4:6.2
1438:4A	Davis #9	Davis 2000:4:6.2
1438:4B	Davis #10	Davis 2000:4:6.2
1438:4C	Davis #11	Davis 2000:4:6.2
1446:1D	Davis #16	Davis 2000:4:6.3
1446:2	Davis #2	Davis 2000:4:6.1
1446:2	Davis #14	Davis 2000:4:6.2
1446:2	Davis #15	Davis 2000:4:6.3
1450:1	Davis #21	Davis 2000:4:6.3
1455:1	Davis #12	Davis 2000:4:6.2
1458:7	Davis #17	Davis 2000:4:6.3
2717:31	Davis #3	Davis 2000:4:6.1
2718:23	Davis #18	Davis 2000:4:6.3
2718:23	Davis #19	Davis 2000:4:6.3
2719:4	Davis #4	Davis 2000:4:6.1
2721:2	Davis #13	Davis 2000:4:6.2
2721:3	Davis #20	Davis 2000:4:6.2
3355:2	Davis #1	Davis 2000:4:6.1
4968	–	Jourdane 1995; Hammatt 1995

5.1.2 Komori and Dye 1979

Eric Komori and Thomas Dye (1979) carried out archaeological testing at Lanikūhonua (the present location of Paradise Cove Luau) within the current project area. Six small (0.5 sq m) test pits were excavated in two transect lines. Komori and Dye (1979) noted substantial historic disturbance had already disturbed much of the area and noted no traditional Hawaiian features. However, they did note the presence of charcoal flecks indicated early human activity and therefore recommended archaeological monitoring.

5.1.3 Barrera 1984

William Barrera, Jr. produced an archaeological status report (1984) that reviewed and summarized work going back to 1979, as well as a second phase of work completed in July 1984. Much of the work reported on was south of the present project area, but the results of further study of the SIHP # 50-80-12-1438 midden deposit are presented (Barrera Jr. 1984:25–29). Barrera's report also includes a brief study by architect Glen Mason (1984) on the SIHP # 50-80-12-1436 lime kiln.

5.1.4 Neller 1985

Earl Neller, then of SHPD, produced a preliminary review and evaluation of archaeological studies and recommendations (Neller 1985). Neller found much to fault in the status of archaeological work up to that time and called for more archaeological work to address "the inadequacies of the historic preservation measures being taken and proposed for the West Beach project" (Neller 1985:6). Neller also produced a sketch of historic properties and cave concentrations (Figure 26) that indicates the caves are east and southeast of the project area. However, it should be noted that Neller's fieldwork in the West Beach area was quite brief, comprising only a day or two, and that his location of historic properties and caves was probably not intended to be highly accurate. Neller's (1985) sites are given as temporary site numbers prefixed with an "N" for "Neller Number."

5.1.5 Barrera 1986

William Barrera, Jr. (1986) produced a summary of his archaeological investigations spanning six years, clearly in response to the critiques of Neller's (1985) review. Barrera also gave formal SIHP number designations for the Neller-numbered sites.

5.1.6 Davis and Haun 1986

Bertell Davis and Alan Haun (1986) produced a *Preliminary Report Upon Completion of Field Work* summarizing Phase 2 intensive survey and test excavation work at West Beach. They include no maps but relate, largely in tabular form, data regarding historic properties and the work accomplished. During Phase 2 excavations, four spatially separate activity areas were recorded as component features of SIHP # 50-80-12-1438, numbered 1 through 4 from south to north. Excavation at SIHP # -1438:3, which is south of the project area, included three test units. In 1987, Davis and Haun followed up their preliminary report on survey and test excavations with an "Interim Report." The interim report includes information on all three historic properties east of the project area, including the results of test excavation at SIHP #s -1438 and -3362 (within the project area). The interim report would not be followed by a final report for more than 13 years (see Davis 2000 discussion below).

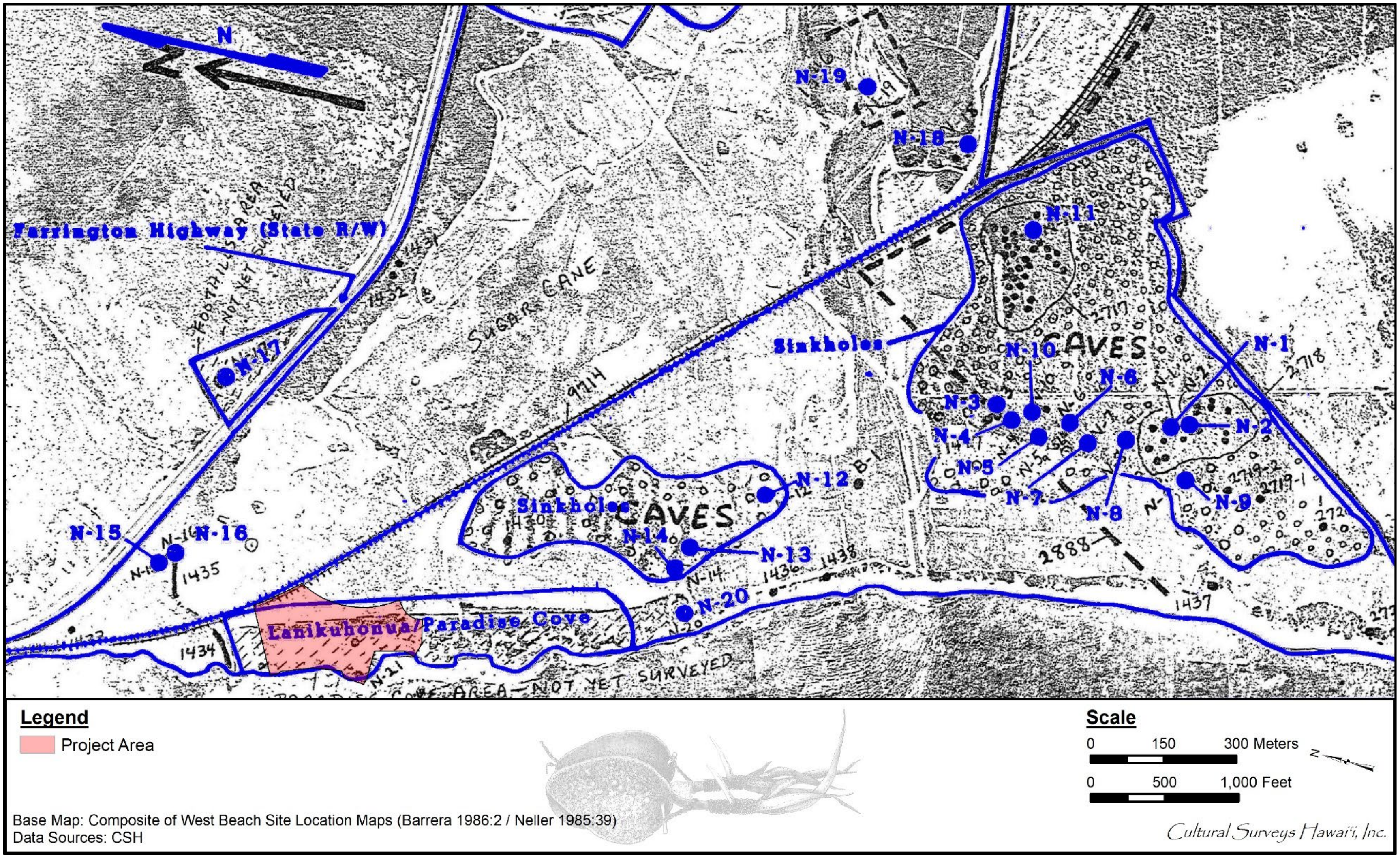


Figure 26. Composite of West Beach site location maps (Neller 1985 and Barrera 1986) in relation to the project area

5.1.7 Glidden et al. 1993

Subsurface backhoe testing consisting of nine trenches at Paradise Cove was conducted by Glidden et al. (1993). Trenches 1 through 6 lacked a cultural component and were determined to be sterile. Trenches 7 through 9 indicated post-Contact cultural activity, and Trench 7 indicated traditional Hawaiian activity. This study is within the current project area.

5.1.8 Jourdane 1995 and Hammatt 1995

Jourdane (1995) documented the discovery of human remains disturbed during excavation for gas lines at Paradise Cove within the current project area. Little specific information could be determined, and the remains were designated as SIHP # 50-80-12-4968. Jourdane suggested a private CRM firm should investigate the findings, and this was completed by CSH in 1995 (Hammatt 1995). CSH documented an excavation associated with a gas line wrapping around the main stage at Paradise Cove that included five burials (designated SIHP # -4968: Burials 1 through 5). It was documented that at least two of the burials were post-Contact based on associated artifacts (a button associated with Burial 2 and two gold earrings associated with Burial 3). SIHP # -4968 is in the southwest portion of the project area.

5.1.9 Davis 2000

The data recovery work at West Beach was largely carried out in the 1980s but was not completed until Davis' four-volume data recovery study came out in 2000. Davis (2000) is a culmination of the previous studies for West Beach, which cumulatively recorded 157 historic properties within six eco-zones. These properties were distributed throughout the West Beach Study Area, and their type and function vary greatly within both traditional Hawaiian and post-Contact contexts. Based on the results of the Phase 2 survey and test excavations reported by Davis and Haun (1987), Phase 4 data recovery excavations were recommended for two sites (SIHP #s 50-80-12-1438 and -3362). During these excavations, a new feature component of SIHP # -3362 was identified and designated as SIHP # -3362:2; however, this feature component was outside the project area. The results of Phase 2 intensive survey and test excavations, initially reported by Davis and Haun (1986, 1987; see discussion above), as well as subsequent Phase 4 data recovery investigations, are presented by Davis (2000).

5.2 Other Modern Archaeological Studies

In more recent times, archaeological studies have been conducted for smaller and more discrete project areas. These studies are primarily within the West Beach and/or Barbers Point Harbor study areas and were conducted for recent developments.

5.2.1 Bordner and Silva 1983

An archaeological reconnaissance of Waimānalo Gulch was conducted by Bordner and Silva in 1983. One possible World War II-era encampment was identified "at roughly the 175-foot mark" within the study area (Bordner and Silva 1983:C-3). No further work was recommended.

5.2.2 Bath 1989

In 1989, the SHPD was notified of petroglyphs located in the lower elevations at the mouth of Waimānalo Gulch. Three petroglyphs were observed "pecked into black lava rock" (Bath 1989).

Two of the petroglyphs were anthropomorphic, while one petroglyph consisted of abstract symbols. The site was briefly documented and designated SIHP # 50-80-12-4110.

5.2.3 Hammatt et al. 1991

In 1991, CSH conducted an archaeological inventory survey (AIS) of the Makaīwa Hills development project (Hammatt et al. 1991). The project area included a 1,915-acre parcel in Honouliuli Ahupuaʻa, located between the town of Makakilo and Waimānalo Gulch, and bounded to the south by Farrington Highway and to the north by Pālehua Road. A total of 34 historic properties were identified, including prehistoric habitation structures (temporary and permanent), agricultural features (terraces and mounds), rock shelters, petroglyphs, *ahu* (altar), and various sugarcane cultivation infrastructure. Within the Makaīwa Hills project area, habitation sites were found to be clustered in higher elevations above 1,000 ft and in lower elevations below 500 ft (Hammatt et al. 1991). The higher elevations would have contained ample forest subsistence resources for gathering on both a continual basis, as well as during times of famine and drought. The lower elevations would be close to the shoreline and bountiful coastal resources.

5.2.4 Hammatt and Shideler 1999

In 1999, CSH conducted and AIS for the approximately 200-acre Waimānalo Gulch Sanitary Landfill property (Hammatt and Shideler 1999). No historic properties were observed within the proposed project area, however, two sites were in the Waimānalo Gulch property, but not the proposed project area including a World War II and Civil Defense complex known as “Battery Arizona” and a contemporary Hawaiian shrine incorporating “sacred stones.” An additional petroglyph site was also reported on the property.

5.2.5 Hammatt and Shideler 2001

The field investigation conducted by Hammatt and Shideler (2001) indicated cable corridors going through areas intensively disturbed by prior sugarcane cultivation, modern construction activity associated with transportation infrastructure, and by recent Ko Olina development. Based on background research and fieldwork results, no further archaeological research was recommended. Only two historic properties were identified within 50 m (164 ft) of a proposed fiber optic cable alignment: the OR&L railroad (SIHP # -9714) and Ewa Plantation Sugar Company irrigation infrastructure (SIHP # -4341).

5.2.6 O’Leary et al. 2007

In 2006 CSH conducted an addendum AIS for the Makaīwa Hills project (O’Leary et al. 2007). The project’s original AIS was completed by CSH in 1991 (Hammatt et al. 1991). The original AIS documented 17 historic properties, five of which were recommended for preservation. Due to the time gap, CSH conducted a reconnaissance to relocate the 17 historic properties and found two additional historic properties. The two historic properties include SIHP # -6870, a terrace, three springs, and a small rock shelter; and SIHP # -6871, a paved area situated on a ridge top.

5.2.7 Park and Collins 2010

Pacific Consulting Services, Inc. (Park and Collins 2010) reported on archaeological monitoring in support of a Kahe Reverse Osmosis Water Pipeline project (TMKs: [1] 9-1-015:002 and 9-2-003:011) along a 4-mile portion of the OR&L ROW. A variety of stratigraphic sequences were observed and documented in 13 profile locations along the pipeline corridor, but no new subsurface archaeological features or deposits were encountered.

5.2.8 Yucha and Hammatt 2012

In 2010 and 2011, CSH conducted an archaeological inventory survey for the Hawaiian Electric Co. (HECO) Kahe Power Plant master plan update (Yucha and Hammatt 2012). During the survey, ten historic properties were identified. One of these is a military-related defensive position/ observation post comprising 15 features on a ridge north of the current project area. The remainder of the historic properties are located within Kahe Valley.

5.2.9 Hammatt et al. 2013

CSH (Hammatt et al. 2013) reported on AIS testing at Tracks Beach Park for a proposed Leeward Bikeway project (TMK: [1] 9-2-003:011). A 13.4-km (8.3-mile) long, 12.2-km (40-ft) wide corridor (total area of 40.4 acres) project area was addressed but subsurface testing was limited to six test excavations in the beach park area. No new significant historic properties were identified; however, the OR&L (SIHP # 50-80-12-9714), previously placed on the NRHP, is discussed.

5.2.10 Medina and Hammatt 2013

The report produced by Medina and Hammatt (2013) regarding archaeological monitoring for the Aulani Disney Resort and Spa at Ko Olina indicates no cultural materials were identified. Stratigraphic profiles included a series of mixed fills over coral shelf. Interestingly, a dark brown clay loam was observed resting on the coral shelf. This was interpreted as natural alluvial sediments by Medina and Hammatt (2013:58).

5.2.11 Burke and Hammatt 2014

CSH produced an archaeological monitoring report for the Farrington Highway Part 1, Phases A and B, 12-inch and 24-inch Water Main Installation project (Burke and Hammatt 2014). No historic properties were identified.

5.2.12 Byerly and O’Day 2017

Garcia & Associates (Byerly and O’Day 2017) produced an AIS report for a 1.83-acre area on the *mauka* side of Farrington Highway where it meets the sea for a Hawaiki Submarine Cable Landing project, TMKs: [1] 9-2-049:001, 002, and 005; 9-2-051:001 por., 010, and 011; and Farrington Highway. No historic properties were identified on the surface of the terrestrial parcels. However, one NRHP and Hawai‘i Register of Historic Places-listed historic property was identified intersecting the route of the subterranean HDD bore: the OR&L ROW (SIHP # -97l4). Because the HDD bore will run 45 to 50 m below surface, however, it was reasonably concluded that the project would have no effect on the OR&L ROW.

Section 6 Community Consultation

6.1 Introduction

Throughout the course of this assessment, an effort was made to contact and consult with Native Hawaiian Organizations (NHO), agencies, and community members including descendants of the area, in order to identify individuals with cultural expertise and/or knowledge of the *ahupuaʻa* of Honouliuli. CSH initiated its outreach effort in June 2021 through letters, email, telephone calls, and in-person contact. CSH completed the community consultation in October 2022.

6.2 Community Contact Letter

Letters (Figure 27, Figure 28, and Figure 29) along with a map and an aerial photograph of the project were mailed with the following text:

> Aloha mai kāua,
>
> On behalf of the James Campbell Company, LLC. (JCC), Cultural Surveys Hawaiʻi, Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed The Cove at Ko Olina Redevelopment Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu Island, Tax Map Key (TMK):[1] 9-1-057:027. The project area is depicted on portions of the ʻEwa (1998) U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1) and a 2013 aerial photograph (Figure 2).
>
> **<u>Project Description</u>**
>
> The Applicant, JCC, plans to redevelop the 10.85-acre property as The Cove at Ko Olina. The proposed improvements will be the first major enhancement of existing amenities on the property in over 25 years. The conceptual land use plan is provided in Figure 3.
>
> The intent of the upcoming property improvement is to create an authentic Hawaiian gathering place with an inclusive, spiritual, genuine, surprising, and welcoming character for *kamaʻāina* (Hawaiʻi residents) and visitors. When completed, new amenities will celebrate the traditions, beauty, and spirit of ancient Hawaiʻi in an immersive coastal setting unlike any place on Oʻahu. The revitalized property will be comprised of a unique mix of Hawaiian music and entertainment, dining, shopping, and other activities that will stand out to the community for its unique setting and memorable experiences. The history of the place will be recognized.
>
> Redevelopment of the site will include a new entertainment/performing arts venue capable of housing a daily-run entertainment experience focused on Hawaiian culture. A show will continue as the main entertainment offering. To activate the property throughout the day, the property will also serve as a landscaped gathering area where educational activities could occur during the daytime hours. Other planned improvements may include small-scale retail shops, an open-air marketplace hosting goods made in Hawai'i, restaurants showcasing local cuisine

Cultural Surveys Hawai‘i, Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai‘i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: HONOULIULI 182 **kkaapana@culturalsurveys.com** www.culturalsurveys.com

July 2021

Aloha mai kāua,

On behalf of the James Campbell Company, LLC. (JCC), Cultural Surveys Hawai‘i, Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed The Cove at Ko Olina Redevelopment Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island, Tax Map Key (TMK):[1] 9-1-057:027. The project area is depicted on portions of the ‘Ewa (1998) U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure **1**) and a 2013 aerial photograph (Figure **2**).

Project Description

The Applicant, JCC, plans to redevelop the 10.85-acre property as The Cove at Ko Olina. The proposed improvements will be the first major enhancement of existing amenities on the property in over 25 years. The conceptual land use plan is provided in Figure **3**.

The intent of the upcoming property improvement is to create an authentic Hawaiian gathering place with an inclusive, spiritual, genuine, surprising, and welcoming character for *kama‘āina* (Hawai‘i residents) and visitors. When completed, new amenities will celebrate the traditions, beauty, and spirit of ancient Hawai‘i in an immersive coastal setting unlike any place on O‘ahu. The revitalized property will be comprised of a unique mix of Hawaiian music and entertainment, dining, shopping, and other activities that will stand out to the community for its unique setting and memorable experiences. The history of the place will be recognized.

Redevelopment of the site will include a new entertainment/performing arts venue capable of housing a daily-run entertainment experience focused on Hawaiian culture. A show will continue as the main entertainment offering. To activate the property throughout the day, the property will also serve as a landscaped gathering area where educational activities could occur during the daytime hours. Other planned improvements may include small-scale retail shops, an open-air marketplace hosting goods made in Hawai‘i, restaurants showcasing local cuisine and agricultural products, and welcoming and engaging common areas. Potential programming may include commercial activities highlighting the sense of the place, daytime activities that fit appropriately within the coastal setting, cultural workshops, or coordinated events and programs with the neighboring Lanikūhonua Cultural Institute. Design of the structures will be inspired by Hawaiian architecture, and will provide a beautiful, authentic, and modern setting. The project will be designed to provide an open, welcoming space with landscaped pedestrian walkways to create an inviting environment that enhances the beauty of the surrounding shoreline area. Retail and dining options will attract guests throughout Ko Olina Resort and families in the ‘Ewa and Wai‘anae

Figure 27. Consultation Letter – Page One

HONOULIULI 182- The Cove at Ko Olina Cove Redevelopment Project Page 2

regions looking for a unique experience in a friendly, authentic setting. Conceptual land uses within the project site have been identified into the following areas: Arrival/Mauka Village, Performing Arts Area, Makai Village, and Beach Village, with designated areas to provide open space/circulation, parking, and a service area.

Construction of the project will support economic recovery in the Kapolei area of O‘ahu and the state, particularly considering the significant economic impacts resulting from the COVID-19 pandemic. The redevelopment is estimated to create 490 long-term, full-time jobs and contribute to the economic diversity in the West O‘ahu region. The coastal development will also serve as a major recreation resource, visual amenity, and economic generator for the community. Structures will be set well back from the shoreline considering long-term planning to address climate change, events, the natural and cultural sensitivity of the near shore areas, and to ensure open access shoreline paths. The redevelopment anticipates maintaining the current level of public beach access, to protect the natural cove and lagoon that is a special natural resource in the area.

Improvements are planned to start as early as 2023 and may be completed by 2025.

Occupancy and other figures provided reflect pre-COVID-19 operations under the assumption that they will be reflective of operations after the current crisis abates.

Current Project Setting and Description

The property is bounded and accessed by Ali‘inui Street, with Ko Olina Golf Club located to the east, the Pacific Ocean to the west, Lanikūhonua Cultural Institute to the south, and public beach access at the planned Makaīwa Beach Park to the north. The project is situated in the Ko Olina Resort, Aulani Disney Resort and Spa, Marriott’s Ko Olina Beach Club, timeshares, and the public beach areas of the Ko Olina lagoons.

The property is a self-contained, premier entertainment venue that covers approximately 10.85 acres of land. The current commercial *lū‘au* dinner and show operates daily from 5:00 p.m. to 9:00 p.m., and can accommodate approximately 1,000 visitors. Attendance averages 500 patrons each evening, with between 700 to 900 guests on the weekends and during peak visitor months. In addition to the *lū‘au*, the property also houses services, amenities, and activities, including a greeting and photo arrival area and Hawaiian games and arts and crafts demonstrations. Restrooms are provided for guests, and a back of house area is also included to support site operations. A commercial wedding chapel was constructed in the early 1990s. Figure **4** indicates existing structures on the site. Structures on the site are comprised of portable and intact buildings and modern *lū‘au* huts that support existing commercial uses. Public use of the beach/cove adjacent to the property are also allowed.

A portion of the site is currently used as open space. The existing landscaping includes coconut trees (*Prosopis pallid*), naupaka (*Scaevola sericea*), mimosa trees (*Albizia julibrissin*), and various exotic shrubs. Activities such as the Hawaiian games and arts and crafts, are hosted in the open space areas.

Figure 28. Consultation Letter - Page Two

HONOULIULI 182- The Cove at Ko Olina Cove Redevelopment Project **Page 3**

Purpose of the CIA

The purpose of this CIA is to gather information about the project area and its surroundings through research and interviews with individuals knowledgeable about this area in order to assess potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* and guidance regarding the following aspects of our study:

- **General history as well as present and past land use of the project area**
- **Knowledge of cultural sites which may be impacted by future development of the project area—for example, historic and archaeological sites, as well as burials**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing**
- **Cultural associations of the project area, such as *moʻolelo* and traditional uses**
- **Referrals of *kūpuna* or elders and *kamaʻāina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupuaʻa* lands**
- **Any other cultural concerns the community might have related to Hawaiian or other ethnic cultural practices within or in the vicinity of the project area**

If you contribute to this effort and with your permission, we would like to use your name in the report to give you proper credit.

Due to the current situation with COVID-19, CSH has temporarily halted in-person consultation as a necessary precaution. We are available to speak with you over the phone, by video chat, or you may also submit a written statement regarding the project, project area, and/or your knowledge of the area. If you prefer to submit a written statement, CSH is able to provide a questionnaire that you may use as a guideline or you may answer the questionnaire directly. Please choose what is convenient for you, though the questionnaire is not necessary. A pre-stamped envelope will be provided to send your statement back to us.

With respect to social-distancing, we are working primarily from home and are available at any time through email. If you would prefer to meet in-person, we can schedule a date to meet with you while still following the safety guidelines. Your patience, understanding, and cooperation is greatly appreciated, and we pray for the safety of you and your loved ones.

If you are interested in participating in this study, please contact Kamuela Kaapana by email at kkaapana@culturalsurveys.com or by phone at (808) 262-9972.

Mahalo nui loa,

Kamuela Kaapana
Cultural Researcher

Figure 29. Consultation Letter - Page Three

and agricultural products, and welcoming and engaging common areas. Potential programming may include commercial activities highlighting the sense of the place, daytime activities that fit appropriately within the coastal setting, cultural workshops, or coordinated events and programs with the neighboring Lanikūhonua Cultural Institute. Design of the structures will be inspired by Hawaiian architecture, and will provide a beautiful, authentic, and modern setting. The project will be designed to provide an open, welcoming space with landscaped pedestrian walkways to create an inviting environment that enhances the beauty of the surrounding shoreline area. Retail and dining options will attract guests throughout Ko Olina Resort and families in the ʻEwa and Waiʻanae regions looking for a unique experience in a friendly, authentic setting. Conceptual land uses within the project site have been identified into the following areas: Arrival/Mauka Village, Performing Arts Area, Makai Village, and Beach Village, with designated areas to provide open space/circulation, parking, and a service area.

Construction of the project will support economic recovery in the Kapolei area of Oʻahu and the state, particularly considering the significant economic impacts resulting from the COVID-19 pandemic. The redevelopment is estimated to create 490 long-term, full-time jobs and contribute to the economic diversity in the West Oʻahu region. The coastal development will also serve as a major recreation resource, visual amenity, and economic generator for the community. Structures will be set well back from the shoreline considering long-term planning to address climate change, events, the natural and cultural sensitivity of the near shore areas, and to ensure open access shoreline paths. The redevelopment anticipates maintaining the current level of public beach access, to protect the natural cove and lagoon that is a special natural resource in the area.

Improvements are planned to start as early as 2023 and may be completed by 2025.

Occupancy and other figures provided reflect pre-COVID-19 operations under the assumption that they will be reflective of operations after the current crisis abates.

Current Project Setting and Description

The property is bounded and accessed by Aliʻinui Street, with Ko Olina Golf Club located to the east, the Pacific Ocean to the west, Lanikūhonua Cultural Institute to the south, and public beach access at the planned Makaīwa Beach Park to the north. The project is situated in the Ko Olina Resort, Aulani Disney Resort and Spa, Marriott's Ko Olina Beach Club, timeshares, and the public beach areas of the Ko Olina lagoons.

The property is a self-contained, premier entertainment venue that covers approximately 10.85 acres of land. The current commercial *lūʻau* dinner and show operates daily from 5:00 p.m. to 9:00 p.m., and can accommodate approximately 1,000 visitors. Attendance averages 500 patrons each evening, with between 700 to 900 guests on the weekends and during peak visitor months. In addition to the *lūʻau*, the property also houses services, amenities, and activities, including a greeting and photo arrival area and Hawaiian games and arts and crafts demonstrations. Restrooms are provided for guests, and a back of house area is also included to support site operations. A commercial wedding chapel was constructed in the early 1990s. Figure 4 indicates existing structures on the site. Structures on the site are comprised of portable and intact buildings and modern *lūʻau* huts that support existing commercial uses. Public use of the beach/cove adjacent to the property are also allowed.

A portion of the site is currently used as open space. The existing landscaping includes coconut trees (*Prosopis pallid*), naupaka (*Scaevola sericea*), mimosa trees (*Albizia julibrissin*), and various exotic shrubs. Activities such as the Hawaiian games and arts and crafts, are hosted in the open space areas.

Purpose of the CIA

The purpose of this CIA is to gather information about the project area and its surroundings through research and interviews with individuals knowledgeable about this area in order to assess potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project. We are seeking your *kōkua* and guidance regarding the following aspects of our study:

- **General history as well as present and past land use of the project area**
- **Knowledge of cultural sites which may be impacted by future development of the project area—for example, historic and archaeological sites, as well as burials**
- **Knowledge of traditional gathering practices in the project area, both past and ongoing**
- **Cultural associations of the project area, such as moʻolelo and traditional uses**
- **Referrals of kūpuna or elders and kamaʻāina who might be willing to share their cultural knowledge of the project area and the surrounding ahupuaʻa lands**
- **Any other cultural concerns the community might have related to Hawaiian or other ethnic cultural practices within or in the vicinity of the project area**

If you contribute to this effort and with your permission, we would like to use your name in the report to give you proper credit.

Due to the current situation with COVID-19, CSH has temporarily halted in-person consultation as a necessary precaution. We are available to speak with you over the phone, by video chat, or you may also submit a written statement regarding the project, project area, and/or your knowledge of the area. If you prefer to submit a written statement, CSH is able to provide a questionnaire that you may use as a guideline or you may answer the questionnaire directly. Please choose what is convenient for you, though the questionnaire is not necessary. A pre-stamped envelope will be provided to send your statement back to us.

With respect to social-distancing, we are working primarily from home and are available at any time through email. If you would prefer to meet in-person, we can schedule a date to meet with you while still following the safety guidelines. Your patience, understanding, and cooperation is greatly appreciated, and we pray for the safety of you and your loved ones.

In most cases, two or three attempts were made to contact individuals, organizations, and agencies. Community outreach letters were sent to a total of 80 individuals or groups, 11 responded, and one of these *kamaʻāina* and/or *kupuna* met with CSH for a more in-depth interview.

6.3 Community Contact Table

Below in Table 5 are names, affiliations, dates of contact, and comments from NHOs, individuals, organizations, and agencies contacted for this project. Results are presented below in alphabetical order.

Table 5. Community contact table

Name	Affiliation	Comment
Aila, Jr., William	Interim Chair of Hawaiian Homes Commission/ Director of Department of Hawaiian Homelands	Letter and figures sent via USPS 24 June 2021 Letter and figures sent via email 25 June 2021 Mr. Aila replied 25 June 2021, suggested speaking with Shad Kane and Nettie Tiffany. Mr. Aila also mentioned there is a "*Kuahu* [altar] located to the west of Lanikuhonua just beyond the housing but within the County Park that is unimproved. My understanding is that it is a fishing shrine. When I was younger 40 years ago, fishermen left ho'okupu [offerings] on it. I also believe that *Uau Kani* (Wedge tail shearwater) continue nest in the area surrounding it." CSH reached out to Shad Kane (ʻEwa Moku Representative, Aha Moku; Kalaeloa Heritage and Legacy Foundation) but received no response
Caceres, Mana Kaleilani	OIBC Representative for ʻEwa	Letter and figures sent via email 25 June 2021 Mr. Caceres replied 28 June 2021 recommending speaking with Shad Kane CSH reached out to Shad Kane but received no response
Holt Takamine, Victoria	Executive Director, PAʻI Foundation	Letter and figures sent via USPS 24 June 2021 Letter and figures sent via email 25 June 2021 Letter and figures sent via USPS 29 July 2021 Letter and figures sent via email 30 July 2021 Ms. Holt-Takamine replied 31 July 2021 CSH replied 2 August 2021 CSH followed up via email 15 October 2021 CSH followed up via telephone 4 November 2021

Kai, G. Umi	President, ‘Aha Kāne	Letter and figures sent via USPS 24 June 2021 Letter and figures sent via email 25 June 2021 Letter and figures sent via USPS 29 July 2021 Letter and figures sent via email 30 July 2021 Mr. Kai replied to CSH 30 July 2021 recommending contacting Shad Kane CSH reached out to Shad Kane but received no response
Lewis, Kūhiō	Chief Executive Officer (CEO) for the Council for Native Hawaiian Advancement (CNHA)	Letter and figures sent via email 4 August 2022 Nicholas Carroll replied on behalf of Mr. Lewis via email 8 August 2022 CSH met with Mr. Lewis via zoom 19 August 2022 Interview summary sent for review 29 August 2022 Mr. Lewis approved summary 20 September 2022
Lopes, Tracie and Keawe	*Kumu Hula*	Letter and figures sent via email 4 August 2022 Letter and figures sent via email 25 August 2022 Ms. Lopes replied via email 31 August 2022 CSH met with Ms. Lopes via zoom 13 October 2022 Ms. Lopes provided written testimony 8 November 2022
National Park Service Honouliuli National Monument		Letter and figures sent via USPS 24 June 2021 Letter and figures sent via email 25 June 2021 Ms. Wakatsuki replied 28 June 2021 recommending reaching out to the Historic Hawai‘i Foundation CSH reached out to Kirsten Faulkner (Historic Hawai‘i Foundation) but received no response
Norman, Keala	Cultural/lineal descendant	Letter and figures sent via email 25 June 2021 Ms. Norman replied 25 June 2021 recommending contacting Nettie Tiffany and Shad Kane Ms. Norman replied 26 June 2021 recommending contacting Hawaiian Civic Clubs in the area CSH reached out to Shad Kane, Hailama Farden, and Jalna Keala, (Association of Hawaiian Civic Clubs), Rona Rodenhurst (‘Ahahui Siwila Hawai‘i o Kapolei Hawai‘i O Kapolei [Kapolei Hawaiian Civic Club]); Marleen Kau‘i Serrao and Lawrence A. Woode Jr., (‘Ewa-Pu‘uloa Hawaiian Civic Club) but received no response
Perry, La‘akea	*Kumu hula*, Ke Kai O Kahiki	Letter and figures sent via email 4 August 2022 Mr. Perry replied via email 6 August 2022

		CSH followed up via email 25 August 2022 Mr. Perry replied via email 30 August 2022 recommending consulting with Nettie Tiffany
Ryan, Pohai	Executive Director Native Hawaiian Hospitality Association	Letter and figures sent via USPS 24 June 2021 Letter and figures sent via email 25 June 2021 Ms. Mālia Sanders (Director of Operations NaHHA) replied on 25 June 2021 recommended John Bond, Kanehili Cultural Hui, Manuel "Manny" Kuloloio, and Nettie Tiffany
Schaedel, Homelani	President, Maluʻōhai Residents Association	Letter and figures sent via USPS 24 June 2021 Letter and figures sent via email 25 June 2021 Ms. Schaedel replied on 28 June 2021 recommended contacting Nettie Tiffany
Solis, Kaʻāhiki	SHPD, Cultural Historian (Oʻahu)	Letter and figures sent via email 25 June 2021 Ms. Solis replied on 25 June 2021 suggested reviewing the federal NHO list Ms. Solis replied 28 June 2021 suggesting reviewing past CIAs done for the area for additional contacts
Tiffany, Nettie	*Kahu* for Lanikūhonua	Letter and figures sent via USPS 24 June 2021 Letter and figures sent via email 25 June 2021 CSH had phone conversation with Ms. Tiffany Tentative meeting scheduled for 5 August 2021 Ms. Tiffany needed to reschedule meeting due to not feeling well CSH called Ms Tiffany 10 August 2021 to reschedule meeting Meeting reschedule for 18 August 2021 CSH met with Ms. Tiffany 18 August 2021 Summary approved 15 September 2021

6.4 *Kama‘āina* Interviews

6.4.1 Nettie Tiffany

On 18 August 2021, CSH conducted an interview with Ms. Nettie Tiffany at the beautiful Lanikūhonua Cultural Institute regarding the proposed The Cove at Ko Olina Redevelopment project, to share her *‘ike* of the *ahupua‘a*, any cultural practices that exist within the area, as well as any concerns for the proposed project.

Upon arrival to Lanikūhonua, Ms. Tiffany, *kahu* of Lanikūhonua, gave a tour of the property to CSH cultural researcher Kamuela Kaapana, pointing out the various native vegetation, prominent land areas such as Anianikū and Kō‘ula fishponds, as well as the proposed project area, which lies west of Lanikūhonua.

While sitting in the *hālau* (long house, meeting house) by Anianikū Fishpond, Ms. Tiffany shared an array of *mo‘olelo* of the area. Although these *mo‘olelo* will not be included in this interview summary due to personal and cultural sensitivity, it is very important to note that Ms. Tiffany would like to express two main concerns and suggestions regarding the project.

Ms. Tiffany shared that there are *‘ilina* (burials) on the grounds of Paradise Cove (soon to be The Cove at Ko Olina). Burials have been identified in past years, however, there is great possibility that many more burials may be disturbed if any ground disturbance activities and/or construction takes place. It is also important to note that in the past, many religious ceremonies have taken place in the vicinity of the project area.

Ms. Tiffany would like to emphasize the importance of protection of one’s self as well as others while on the Paradise Cove property and when conducting work. It is Native Hawaiian belief that the intentions and actions of people have a way of attracting a response from those who have passed, whether it may be good or bad. It is important to be prepared when conducting work, specifically in the project area, and if one should ever come across *iwi kūpuna*, *pōhaku*, or any other culturally significant materials, it should be handled with care in both a Native Hawaiian sense as well as under the regulations and standards of the law.

6.4.2 Kūhiō Lewis

On 19 August 2022, CSH spoke with Kūhiō Lewis via video conference to discuss the CIA for The Cove at Ko Olina Redevelopment project. Mr. Lewis is Chief Executive Officer (CEO) for the Council for Native Hawaiian Advancement (CNHA). Headquartered in Kapolei, the CNHA is “a member-based 501(c)3 non-profit organization with a mission to enhance the cultural, economic, political, and community development of Native Hawaiians” (CNHA 2022). CNHA provides “access to capital, financial education and individualized financial counseling services with a focus on low and moderate-income families” (CNHA 2022). CNHA also provides “grants and loans targeting underserved communities in Hawai‘i” (CNHA 2022).

Mr. Lewis began by discussing the history of the area. He noted that in traditional times, there was not much activity in the area. The area was “where spirits would roam.” He also mentioned the importance of the Makahiki season to the history of the area. Makahiki is an “[a]ncient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war” (Pukui and Elbert 1986:225). Mr. Lewis noted that Kapolei is where the Makahiki season began. The Makahiki season would start in Kapolei with ceremonies, dancing, and games and continued across all the other islands. He suggested project proponents could curate a type of continuation of the Makahiki sense of place and celebration by incorporating traditional Hawaiian games such as spear throwing and *‘ulu maika* (ancient Hawaiian game suggesting bowling) into the storytelling of the area.

Mr. Lewis also discussed the importance of providing and maintaining access to the ocean for marine resources and recreational activities. He suggested making the ocean easily accessible because in order to access the beach now near the Lanikuhonua Cultural Institute, people have to “go around from the point.” He also noted people swim, dive, and spear fish at Milo Cove.

Mr. Lewis stated that there are “amazing opportunities” for economic development in the area. He noted, “our people need jobs, they need opportunities that don’t exist on the west side.” He emphasized that “Hawaiians need to be involved in the economy of this development.” He stated that project proponents should not bring in mainland developers.

Mr. Lewis mentioned Ko Olina is a tourist destination, likening it to the “west side Waikīkī.” He stated it is not “necessarily a bad thing, as long as there is meaningful involvement economically for the west side people.” He noted that if “Hawaiians don’t have [a] meaningful place in the development of this, it’s going to be hard for us to buy in to whatever they’re proposing.” He stated that Native Hawaiians want to be a part of the economy as “operators and administrators,” not just “waiters, cooks or cleaners.”

Mr. Lewis discussed the proposed retail shops and marketplace. He suggested the marketplace “should be run by a Hawaiian entity that can work to build up the capacity of the businesses from this area to sell their products.” He noted, “it’s not just the vendors, it’s the people running the marketplace so that the values are inclusive throughout the whole thing.” He stated the marketplace should not have mainland franchises. It should have Hawai‘i-based products from Hawaiian-based businesses grounded in Hawaiian values.

He pointed out there are “amazing businesses that practice traditional type of things that could have a place in that Ko Olina space.” He clarified that he is “not talking about people to demonstrate how to pound *poi* [the Hawaiian staff of life, made from cooked taro corms] or *kalo* [Taro; *Colocasia esculenta*], or show them how to make *kapa* [tapa; bark cloth].” He would like Hawaiian businesses involved in the “facilitation of the operations or curating the stories that are being told at those areas.”

Mr. Lewis stated that the project proponents need to focus on incorporating Hawaiian values. He noted it’s “not just putting on one plaque about Hawaiian culture” describing “what used to be.” He emphasized that the Hawaiian community should be given opportunities to curate stories that are “real and authentic to Hawai‘i.” He suggested shows performed at the proposed amphitheater should be developed and curated by Hawaiians from the area telling their stories. He also suggested the amphitheater should allow charitable uses so the local community could use it for events such as an annual *ho‘olaule‘a* (celebration), block party, or other gatherings celebrating the area’s history and traditions without paying exorbitant fees.

He emphasized that “there needs to be a sense of place for the west side community.” It should not only cater to tourists but should also be a destination for locals. He asked, “How many local people go Ko Olina?” He would like it to be a place where “locals and visitors can live together, be alongside each other.”

Mr. Lewis stated that “the best way to contribute to the perpetuation of this place” is to find meaningful opportunities for Native Hawaiians to be involved in the economy. He noted, “it’s not even just Hawaiians anymore, […] all the ethnic groups are struggling to make ends meet” and “have no meaningful involvement in the economy.” He pointed out that every day, droves from the local community are packing up their stuff, moving to the mainland and taking with them “the fabric of *aloha* (love), the connection to Hawaiʻi, the stories of Hawaiʻi.” He emphasized, “That’s how you perpetuate Hawaiʻi, you allow the people from this place to stay here.”

6.5 Written Testimony from Tracie Kaʻōnohilani Farias Lopes

On 30 October 2022, Ms. Tracie Kaʻōnohilani Farias Lopes, *Kumu Hula* (*hula* teacher) of Ka Lā ʻŌnohi Mai O Haʻehaʻe and Instructor at Hawaiʻi Pacific University, provided written testimony on behalf of herself and her husband, R. Keawe Lopes, also *Kumu Hula* of Ka Lā ʻŌnohi Mai O Haʻehaʻe and Director of the Kawaihuelani Center for Hawaiian Language at the University of Hawaiʻi at Mānoa, regarding the CIA for The Cove at Ko Olina Redevelopment project. Their statement is included below in its entirety.

> Aloha Kākou,
>
> My name is Tracie Kaʻōnohilani Farias Lopes and I submit this letter to you on behalf of myself and my husband, R. Keawe Lopes Jr. Mahalo [Thanks] for this opportunity to share our connection to Ko ʻOlina, the relationships we have with the kūpuna [elders] and our cultural practices in the area.
>
> I considered Koʻolina and Nānākuli as my second home while schooled in the hula [traditional dance] by OʻBrian Eselu and Thaddius Wilson of Nā Wai ʻEhā O Puna since 1983. I spent 15 years learning hula and training for events and competitions like Merrie Monarch on the grounds of Lanikūhonua and Paradise Cove. OʻBrian Eselu directed the lūʻau [Hawaiian feast] entertainment there for over 35 years after being asked to help with the show by Kumu Hula Vicky Takamine who also directed and performed. After years of watching the show with my kumu [teacher], I also performed as a soloist in the show after becoming Miss Aloha Hula in 1994.
>
> By my kumuʻs side, I was able to meet and form relationships with the kūpuna of the area who are kupa [native] of the land living there for generations. Aunty Agnes Cope, Uncle Kamaki Kanahele and Aunty Georgiana Kahele were very close to my kumu and they were always supportive of my endeavors in hālau [house for hula instruction] and school. In 1998, Keawe and I trained Lokalia Kahele (moʻopuna [grandchild] of Aunty Agnes and daughter of Aunty “Jana”) during her journey to becoming Miss Aloha Hula 1998 at the Merrie Monarch Festival. During my hula training at Lanikūhonua in the early 1990s, I met Aunty Nettie Tiffany. She modeled for us how to respect each other, to mālama [take care of] the ʻāina [land] of this puʻuhonua [place of refuge, peace, and safety], to work with integrity and to always acknowledge and honor your moʻokūʻauhau [genealogy] in your work. It was and still is very inspirational to be in her presence. Aunty Doreen Lindsey lived in Nānākuli and was a musician for our hālau who at one time, danced with OʻBrian at Ko ʻOlina. We shared good times on stage and off with her and her ʻohana [family] and she often shared stories of entertainment life. Aunty Doreen and Uncle

Ike Kaʻaihue also sponsored me as a scholarship recipient of the Nānāikapono Hawaiian Civic Club while I worked toward my Bachelors in Education degree at the University of Hawaiʻi at Mānoa. We performed at the Nānāikapono scholarship lūʻau in various areas including the Kahele residence every year to support their efforts to help educate students in higher education. I was included as a part of the community because of these relationships and hula experiences that continue to influence my life and my ʻohana today. While in college, I met Keawe and he brought me into his family who also grew up here.

Keawe was raised in Nānākuli. His great-grandparents William & Stella (Brede) Lopes were amongst the first homesteaders to move to Nānākuli in the 1940s and today we can account for seven generations still living on the homestead. Our ʻohana frequented the beautiful beaches from Ko ʻOlina to Neneʻu [Pōkaʻī Bay] for family gatherings. We actively fished the reefs along the coast and enjoyed manini [very common reef surgeonfish; *Acanthurus triostegus*], weke [Certain species of the *Mullidae*, surmullets or goatfish], kala [Surgeonfish, unicorn fish, *Teuthidae*; *Naso hexacanthus*, *N. unicornis*, *N. brevirostris*], maiko [surgeonfish; *Acanthurus nigroris*], heʻe [Octopus; *Polypus* sp.] and ʻōʻio [Ladyfish, bonefish; *Albula vulpes*] from Keaulana, Kalanianaʻole Beach Park, Ulehawa, Puʻuohulu-Kai, and Māʻili. Our ʻohana also entertained ~played Hawaiian music and danced the hula informally. His uncle, Nālani Kaʻehuʻaeʻa Tenorio taught hula in Nānākuli for many years. The homestead provided a rich diversity of cultural experts. Many of the families who moved to Nānākuli in the early years were native speakers of Hawaiian and cultural experts who not only knew the moʻolelo [stories] of Nānākuli and her surrounding districts but also brought with them their family lore and mannerisms as well. Keaweʻs grandmother Leialoha Kanehailua Lopes was a native speaker from Kohala and his Uncle Raymond Alapaʻi was a native speaker from Puʻuanahulu.

Together, Keawe and I are kumu hula of our hālau hula [dance school] named Ka Lā ʻŌnohi Mai O Haʻehaʻe and our very first hālau meeting was held at Lanikūhonua and we have trained and performed at both Lanikūhonua and Paradise Cove through the last 17 years of hālau. In 2000 and 2002, we were part of a ʻuniki [ceremonial graduation] process with our kumu hula, Uncle Kimo Alama Keaulana who now resides in Nānākuli. Together, we learned and continue to learn so much about hula and life from him. Through Uncle Kimo, we also met a gracious Nānākuli native named Uncle Joseph Keaulana and he shared music and so much aloha [love, kindness, grace] with us. He also taught Keawe how to play the pila kū nui or upright bass. As kumu hula, we have had the opportunity to work with Aunty Nettie, Keola Lloyd and Marie Wong as performers in the ʻMele and Hula at Lanikūhonua' fundraiser event and recently performed in August 2022. We were also recommended by Uncle Kimo to teach hula to the students at the ʻLei O Lanikūhonua' event for a couple years and Keawe and I will return to teach at the event in March of 2023. We appreciate the work that the James Campbell Company already does to support the education of our students in the moku [district] of

Waiʻanae and the cultural programs offered as well. Thank you for including us in your community efforts.

Keawe and I have three daughters and our ʻohana also has a special spiritual connection to Ko ʻOlina and Lanikūhonua. When it was time to dedicate our girls to Ke Akua [God], we took them to Anianikū to experience the ocean for the first time. The ceremony was different for all three girls but it is what binds them together spiritually to this place. We thank Aunty Nettie for this beautiful experience and spiritual guidance. It is our hope that our children will continue to honor and mālama Lanikūhonua with their families in the future. Our family also loves to spend leisure time in Ko ʻOlina when we are able to. Just being able to stay in the area for a few days is not just relaxation time but a re-connect to our past experiences and inspires future experiences as well.

The ocean and shoreline of Nānākuli and the proposed area of revitalization in Koʻolina is where I was water baptized as an adult and where I spent the most time with my kumu OʻBrian, kumu Thaddius and Charles Kaʻupu while learning hula and oli [chant]. I learned how to control my breathing and create vocal sounds for oli while sitting on the property, facing the ocean and following the wave patterns before me. OʻBrian also set aside special times of the year on property to re-unite with hālau members and time for Kapu kai or ceremonial preparations in the ocean for his dancers to meditate, spiritually cleanse and pray before important hula and life events. These experiences are so important to us as practitioners and both Keawe and I want to express our support of the revitalization plan to continue to allow ocean access to us, the hālau and cultural practitioners to practice. It's not just providing "beach access" to people who want to sightsee or swim. We suggest creating a formal agreement between practitioners, the estate and the proposed kahu mālama [caretaker] of the area to allow our people to conduct our training and formal ceremonies there as our way of reconnecting to our sources of strength and healing taught to us by our kumu and kūpuna.

I have been doing hula all my life and from the late 1980s, I learned hula at Paradise Cove near the Ocean Garden and other areas of the property after the hālau left Aunty Verna Wilsonʻs home on Pualaʻa Street in Hālawa. I have so many memories of hosting entertainers and community members at our hālau fundraisers, training, event performances, cultural practices and special event openings here. Four years after OʻBrianʻs passing in 2012, I heard that a new show was needed at Paradise Cove at an event inducting our kumu to the Hawaiian Music Hall of Fame. About a month later, I was asked by Keith Horita to return to the cove to create the new show at the Paradise Cove Lūʻau. After an initial meeting with Keawe and I, I decided to return to take on that kuleana [responsibility] and asked my hula brother, Laʻakea Perry to join in. It was a yes to the company but also a decision to return to honor and continue the work of our kumu. Upon returning in 2016 as one of the new entertainment directors, we were greeted by long time employees like family members you have not seen for a while but still remember. What a warm welcome it was.

With the helpful insight and research of Keawe, the memories of many past shows, the collaboration of cultural resource people, a template from kumu to work from and kumu/director guided practices with all cast members, we were able to open three new shows in only 5 months. To ensure that our show was unique, Keawe and I composed and selected songs celebrating Oʻahu and Hawaiʻi while incorporating traditional and contemporary elements. Choreography was then created and taught to the dancers to perform by the kumu hula and one of the songs born from this process was ʻNani Koʻolina.ʼ

ʻNani Koʻolinaʼ was written for the hula presentation at the imu [underground oven] amphiteatre show. This mele [song] honors place and people and recognizes that where we come from is a part of who we are. It speaks of the surrounding sea, the kaunaʻoa [*Cuscuta sandwichiana*] that once flourished seaside, our aliʻi [chief] Kākuhihewa who found peace here and the legacy of kumu OʻBrian Eselu. It is our hope that more mele like this can be composed to share as hula presentations at the proposed entertainment venue that features what is truly Hawaiian thought in poetic expression. The key is to bring creative and culturally grounded kumu who are connected to the area and culture to build a solid Hawaiian show. Keawe and I want to share that we are willing to be a part of the process. At this time, we share our mele, ʻNani Koʻolinaʼ as an example of how a carefully selected repertoire can specifically honor people and place.

Nani Koʻolina
Composed and Copyrighted by: Keawe & Tracie Lopes

A he nani Koʻolina i kaʻu ʻike ʻIke ʻia ē ka mili a ka ʻehu kai	How beautiful is Koʻolina when I look at her Seen is the caress of the sea spray
Kai nehenehe i ke kahaone Kahaone lei ʻia i ke kaunoʻa	It is a sea that gently moves upon the sand A sandy beach embraced by the kaunoʻa
Kau aku ka ʻōnohi o ke aloha He aloha ē se luana a ke aliʻi	The focus of my affection is placed there Beloved is the enjoyment of the chief
He aliʻi nui ʻoe e Kākuhihewa Hewa ʻole ē ka leo o ka heahea	You are a great chief Kākuhihewa Sincere (not wrong) is the voice of welcome
Hea aku ka puana no ka Paradaiso A he nani Koʻolina i kaʻu ʻike	Rendered is the refrain for Paradise (Cove) How beautiful is Koʻolina when I look at her

In reference to the proposed project description from the James Campbell Company, I read that ʻThe revitalized property will be comprised of a unique mix of Hawaiian music and entertainment, dining, shopping, and other activities that will stand out to the community for its unique setting and memorable experiences. The history of the place will be recognized. Redevelopment of the site will include a new entertainment/performing arts venue capable of housing a daily-run entertainment experience focused on Hawaiian culture. A show will continue as the main entertainment offering.ʼ

Including mele like ʻNani Koʻolinaʼ in the show, repopulating the seashore with kaunaʻoa, sharing stories of Kākuhihewa and sharing mele that tell of the delicacies of the ocean, food preparation and fishing practices perhaps can all support the vision of the entertainment aspect of the project. The most important is to have a kumu hula who is trained and culturally grounded lead the entertainment.

No one can dispute that ʻŌlelo Hawaiʻi [Hawaiian language] is the foundation of our flourishing cultural art forms and hula ʻōlapa [dancer or type of hula] or hula kahiko [ancient dance] is an important element to also include in entertainment if we are to provide authentic Hawaiian expression. Both Keawe and I are Hawaiian Language professors and Keawe is the director of the Kawaihuelani Center for Hawaiian Language at UH Mānoa. When planning for the kahiko in the Paradise Cove show, we decided to honor Kākuhihewa. Keawe discovered a mele in the Hawaiian language newspapers that took us to Kūkaniloko at the birth of Kākuhihewa who would spend leisure time in Koʻolina. We share the mele with you here.

He Mele Inoa No Kuhihewa
Published in the Hawaiian Language Newspapers

[Ka Holomua October 10, 1914]

Eia Kuihewa Kalani Alii nui
Ke kuahue o Halawalawa ka Io
Ka pua kakoililani a Manuia
Ka weolani no Kukaniloko -a
Kani kuʻilua Hawea ka pahu alii
Kuʻi nakolokolo o ka Aumakua

Kani oeoe kani omeku ka Iwa
O Ihukolo ke kahuna alii
Uuina nakolo nakulukulu
Kani kuʻi ka hekili pamalo
Olapa e lalapa mai ka uwila
Mo ka piko o ke alii - e, Aiala
He punua, he Lale manu no Kaiona
O Kuihewa Kalani a Ku-e
E noho i ka moku Oahunui
Ua-ike-a

This hula noho [sitting hula] was choregraphed by Keawe and I as a hula noho puniu [a sitting hula that incorporates a small knee drum made of a coconut shell with fish skin cover] presentation and we taught it to the cast. It is unlike any other kahiko presentation found on Oʻahu and it challenged the cast to know more about what they are performing and who they honor in these mele hula. This hula aligns with the revitalization project vision because this hula ʻōlapa recognizes place, is authentic and it celebrates the birth of the new King at Kūkaniloko, Oʻahu. In this chant, the elemental manifestations appear to honor a king while sharing traditional

Hawaiian and the choreography engages both dancer and audience. Authenticity is so important to us so the use of live instruments and chanting is part of the presentation. In reference to the project description again, I read that the ‘intent’ of this land improvement is to create an ‘authentic Hawaiian gathering place with an inclusive, spiritual, genuine, surprising, and welcoming character for kamaʻāina (Hawaiʻi residents) and visitors. When completed, new amenities will celebrate the traditions, beauty, and spirit of ancient Hawaiʻi in an immersive coastal setting unlike any place on Oʻahu.’

As kumu hula, educators and creative show directors, the vision for this development is exciting because Hawaiʻi, the people of Hawaiʻi and the visitors who visit our home deserve to see authentic Hawaiian entertainment in Hawaiʻi and this will be a beautiful setting for that. Hawaiʻi needs a show that will only focus on the traditions, beauty and excitement of **Hawaiian** culture and dance and not have to journey through Polynesia for a great experience. The Hawaiian experience is great on its own and we know this because we live this. It’s time to put Hawaiʻi first in the entertainment industry here.

We thank the James Campbell Company for the initiative to use this land to promote, celebrate and perpetuate our Hawaiian cultural art forms, language and moʻolelo for all ages to experience. This will be a significant step forward and the James Campbell Company will be at the forefront of this significant movement with mele like ‘Nani Koʻolina’ and ‘He Mele Inoa No Kuhihewa’ and the collective creativity of our kanaka [Hawaiian people] today, the show and other cultural elements can provide magical and meaningful experiences for both kamaʻāina and malihini [tourist].

Keawe and I are willing to participate and creatively collaborate with Aunty Nettie, our kumu, Uncle Kimo Alama Keaulana and our dear friend and hoa kumu [fellow teacher], Twyla Mendez who all have connections with Campbell Estate and are respected in our hula community. We all uphold legacy and create beautiful experiences in all educational and entertainment settings so this would be exciting. We are also grateful that this project has the potential of creating numerous jobs for residents in the area. This is so important! By offering Hawaiian marketplace and authentic Hawaiian entertainment like this, we believe that many hula practitioners will want to be a part of it and will travel from all moku of Oʻahu to do so.

In regards to the marketplace. We strongly support the concept that Hawaiian Artisans can be featured there. When I travel, I want to learn about the culture specific to that place and what I bring home to my family has to mean something. If it is made by the artists of that area themselves, these items are not just souvenirs but can become family heirlooms in the future. We have so many artists in Hawaiʻi and being able to feature authentic Hawaiian work in galleries or in shops to purchase in this area is exciting and offers our malihini and kamaʻāina a unique shopping experience while supporting our community. Workshops shared by these artists would be a wonderful experience as well.

In regards to our kūpuna resting there, as dancers training in the area, we were reminded that kūpuna were buried there and that we should always be respectful when entering the property or near sites. Thank you for taking care of these areas when the project begins and mahalo to Aunty Nettie for holding the ʻike [knowledge] of the locations of these resting places of our kūpuna.

At the Ocean Garden, there are two hula mounds. We want to express our support to keep these mounds in its current location and condition. The larger mound faces the ocean and the other faces the entrance. Both provide natural staging for entertainment, a space for the daily educational activities and possibly hula ceremonial gatherings and presentations. They will continue to be special and very useful areas if preserved.

One final comment on entertainment. One of the most popular daily activities at any hotel or show for our malihini is the hula lesson. People visit from miles around to come to Hawaiʻi and many of them want to experience learning the hula. I speak for myself that sometimes these activities can be too commercial and sometimes inappropriate when taught for the mass because how we run our hālau is very, very different. For me, if an authentic Hawaiian show in the evening is presented, this can be a wonderful prelude to the show. For us, itʻs important to entertain but to also educate. In February 2021, I wrote a song specifically for this area that I thought would be a perfect hula to teach because it is in English and it acknowledges nature that surrounds you while on the property and also shares some cultural practices as well in a fun way. The chorus of this song ʻHula In Paradise’ is printed below to share an example of how culture and entertainment can be incorporated and still be tasteful to all.

Hula In Paradise by Tracie Lopes

Chorus:
Neath the coco palms above
Near the ocean shore I love
I can see the beauty right before me
ʻO ʻoe a ʻo au, just you and me

In closing, Koʻolina is indeed a home to us and a beautiful pana ʻāina [celebrated land] that is caressed by the ocean, shaded by the many coconut trees and a place where we all spend time together. This is a place we all personally invest in to protect and preserve for us today and for future generations. We thank the James Campbell Company and Cultural Surveys Hawaiʻi for this opportunity to share our story with you.

[…]

Mahalo

Section 7 Traditional Cultural Practices

Timothy R. Pauketat succinctly describes the importance of traditions, especially regarding the active manifestation of one's culture or aspects thereof. According to Pauketat:

> People have always had traditions, practiced traditions, resisted traditions, or created traditions […] Power, plurality, and human agency are all a part of how traditions come about. Traditions do not simply exist without people and their struggles involved every step of the way. [Pauketat 2001:1]

It is understood that traditional practices are developed within the group, in this case, within the Hawaiian culture. These traditions are meant to mark or represent aspects of Hawaiian culture that have been practiced since ancient times. As with most human constructs, traditions are evolving and prone to change resulting from multiple influences, including modernization as well as other cultures. It is well known that within Hawai‘i, a "broader 'local' multicultural perspective exists" (Kawelu 2015:3). While this "local" multicultural culture is deservedly celebrated, it must be noted that it has often come into contact with "traditional Hawaiian culture." This contact between cultures and traditions has undoubtedly resulted in numerous cultural entanglements. These cultural entanglements have prompted questions regarding the legitimacy of newly evolved traditional practices. The influences of "local" culture are well noted throughout this section, and understood to represent survivance or "the active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name. Native survivance stories are renunciations of dominance, tragedy and victimry" (Vizenor 1999:vii). Acknowledgement of these "local" influences help to inform nuanced understandings of entanglement and of a "living [Hawaiian] contemporary culture" (Kawelu 2015:3). This section strives to articulate traditional Hawaiian cultural practices as were practiced within the *ahupua‘a* in ancient times, and the aspects of these traditional practices that continue to be practiced today; however, this section also challenges "tropes of authenticity," (Cipolla 2013) and acknowledges the multicultural influences and entanglements that may "change" or "create" a tradition.

This section integrates information from Sections 3–6 in examining cultural resources and practices identified within or in proximity of the project area in the broader context of the encompassing Honouliuli landscape. Excerpts from interviews are incorporated throughout this section where applicable.

7.1 Gathering of Plant and Aquatic Resources

Lying in the lee of the Wai‘anae mountain range, the project area is one of the driest areas of O‘ahu with most of the area averaging about 550 mm (22 inches) of rain on the coastal and inland region of the *ahupua‘a* and about 1,200 mm (39 inches) in the northern region up into the Wai‘anae mountain range (Giambelluca et al. 2013). The area is drained by Kalo‘i Gulch and Honouliuli Gulch. These gulches are believed to rarely run with water. Historic maps also indicate a spring located to the north. Such infrequent springs may have been key to the early human activity on the southeast Wai‘anae slope.

Despite the relative lack of rainfall in this area, there exists a traditional rain name associated with the *ahupua‘a* of Honouliuli. This rain, known as the Nāulu, is described as a sudden shower and is more commonly associated with Kawaihae, Hawai‘i and Ni‘ihau (notoriously dry locations as well) (Akana and Gonzalez 2015:187). The general lack of distinctive, traditional rain names is indicative of historic environmental conditions within the *ahupuaʻa*. Due to these conditions, *makaʻāinana* living within the *ahupuaʻa* were forced to modify or utilize freshwater resources in innovative ways.

Fresh water remains available below the surface of Honouliuli. Dissolution "pit caves" (Mylroie and Carew 1995) or "sink holes" would accumulate water within them via a subterranean water or karst system; this water also contained nutrient-rich sediment that allowed for the cultivation of significant plant resources such as *kalo, kī*, and *noni*. McAllister documented examples of traditional agricultural activity in Honouliuli, writing that the *kamaʻāina* of the *ahupuaʻa* utilized the soil on the floor of caves for cultivation. At the time of his survey in the 1930s both *maiʻa* (bananas) and *kō* (sugarcane) were still being cultivated within these pits.

The lowlands fronting West Loch of Pearl Harbor (Kaihuopalaʻai) were suitable for the cultivation of the traditional Hawaiian staple crop, *kalo*. The production (and consumption) of *kalo* was vitally important to many communities of Native Hawaiians living in ʻEwa. Captain James King, visiting Hawaiʻi in 1779, noted that "the natives of these islands are, in general, above the middle size and well made; they walk very gracefully, run nimbly and are capable of bearing great fatigue" (Shintani 1993:10). Accordingly, the high level of physical activity and physical fitness described by Captain King was a normal part of Hawaiian life and was largely attributable to the availability of plant and food resources such as *kalo*, *ʻuala* (sweet potato; *Ipomoea batatas*), *niu*, *maiʻa*, *limu*, and *iʻa* (fish). Besides the observed contributions to stamina and health, *kalo* was also a revered staple food, believed to have derived from the first-born son of Wakea and Papa.

> […] the supreme god Kane ʻin the form of Wakea (a form associated with the earth) produced two sequential offspring: the first became kalo (taro) plant, the second became Hāloa, the ancestor of man […] thus, in kinship terms, the taro is the elder brother and the senior branch of the family tree, mankind belongs to the junior branch, stemming from the younger brother.' [Trask 2012:75]

ʻEwa was also famous for a rare taro called the "*kāī o ʻEwa*," which was grown in mounds in marshy locations (Handy and Handy 1972:471). The cultivation of this prized and delicious taro led to the saying, "*Ua ʻai i ke kāī-koi o ʻEwa*, He has eaten the Kāī-koi taro of ʻEwa" (Pukui 1983:305).

Traditional Hawaiian diets were also supplemented with ocean-based proteins. Native Hawaiians historically fished the reefs, farmed fishponds, and utilized the freshwater springs in the *ahupuaʻa* of Honouliuli. The lochs of Pearl Harbor were ideal for the construction of fishponds and fish traps. References to the abundance of ocean resources can be found within *moʻolelo*, *wahi pana*, and *ʻōlelo noʻeau* associated with Honouliuli Ahupuaʻa.

The *moʻolelo* "Legend of the Children" describes the coastal area of Kūalakaʻi as being plentiful in fish. Clark (1977:74) and Pukui et al. (1974:119) describe Kūalakaʻi as a type of sea cucumber (*Tethys*) that squirts purple fluid when squeezed. The *ʻōlelo noʻeau,* "*Kai a hali a ka makani*," translates to "the fish fetched by the wind" which describes the migration of the *ʻanae* that travels from the leeward coast to the windward coast of Oʻahu.

During a tour of the Lanikūhonua Cultural Institute, *kahu* Nettie Tiffany pointed out various native vegetation that are present. She also pointed out Anianikū and Kōʻula fishponds which are located west of the proposed project area.

Kūhiō Lewis discussed the importance of providing and maintaining access to the ocean for marine resources and recreational activities. He suggested making the ocean easily accessible because in order to access the beach now near the Lanikuhonua Cultural Institute, people have to "go around from the point." He also noted that people swim, dive, and spear fish at Milo Cove.

Tracie Kaʻōnohilani Farias Lopes stated their *ʻohana* has "frequented the beautiful beaches from Ko ʻOlina to Neneʻu [Pōkaʻī Bay] for family gatherings." They have also "actively fished the reefs along the coast and enjoyed manini, weke, kala, maiko, heʻe and ʻōʻio from Keaulana, Kalanianaʻole Beach Park, Ulehawa, Puʻuohulu-Kai, and Māʻili."

7.2 Cultural Sites

There exist a myriad of cultural sites or *wahi pana* for ʻEwa Moku; however, for the *ahupuaʻa* of Honouliuli trails, plains, and temples were of particular importance.

Trails were and continue to be valuable resources for Native Hawaiian culture and life ways. In the past, trails were well-used for travel within the *ahupuaʻa* between *mauka* and *makai* and laterally between *ahupuaʻa*. A historical trail system existed in Oʻahu extending from Honolulu to Waiʻanae. A cross-*ahupuaʻa* (east-west) trail that bordered Pearl Harbor, passed through Honouliuli north of Puʻuokapolei, and continued along the coast to Waiʻanae following the route of the modern Farrington Highway. A *mauka-makai* (north-south) trail branched off the cross-*ahupuaʻa* trail into two offshoots that led to the settlements of Kūalakaʻi and Oneʻula which are located along the southern coast, southeast of the project area.

The ʻEwa coastal plain was also a place of spiritual significance as it was associated with the *ao kuewa*, the realm of homeless souls. According to Samuel Kamakau, there existed three spirit realms, the *ao kuewa*, *ao ʻaumakua*, and *ke ao o milu*. Upon death, the spirit of the recently deceased was said to leave the body and then proceed toward a *leina* where they would leap into Pō, the world of the unseen (Handy and Pukui 1972:146). The spirit was guided to and over the *leina* and into Pō by their *ʻaumakua* (Handy and Pukui 1972:146), however, if the soul of the deceased had no place in the *ʻaumakua* realm, or was abandoned by an *ʻaumakua*, they were destined to wander the *wiliwili* grove of Kaupeʻa until such time that they were rescued by their *ʻaumakua*. Fornander (1919:6[2]:292) states that Puʻuokapolei may have been a *leina,* a jumping off point associated with the wandering souls who roamed the plains of Kaupeʻa and Kānehili, *makai* of the hill.

Mr. Lewis noted that in traditional times, there was not much activity in the area. The area was "where spirits would roam."

Puʻuokapolei was also known to be the home of Kamapuaʻa's grandmother, Kamaunuaniho, (Nakuina 1904:50). There was once a large rock shelter on the *makai* side said to have been the residence of Kamapuaʻa and his grandmother (McAllister 1933:108). After conquering the majority of Oʻahu, he established his grandmother as queen (Pukui 1974:203). Another account (*Ka Loea Kālaiʻāina*, 13 January 1900 in Sterling and Summers 1978:34) stated that Kekeleʻaikū, the older brother of Kamapuaʻa, also lived on Puʻuokapolei.

The plain of Pukaua is also located near Puʻuokapolei, east of the project area. Two distinct *moʻolelo* are connected with this cultural site. The first of these two stories was presented in the 13 January 1900 edition of *Ka Loea Kālaiʻāina* which states two old women with supernatural powers were heading to their home to Pukaua following an evening of fishing at the village of Kualakaʻi. As the sun began to rise, the women hid to avoid being seen and their bodies turned to stone. The second *moʻolelo* involves Hiʻiaka, and is spread across several daily editions of *Ka Hōkū o Hawaiʻi* from February 1927. According to the *moʻolelo*, the two women were *moʻo*. The women met Hiʻiaka as she journeyed toward the ʻEwa coast. They were afraid Hiʻiaka would kill them, so they transformed into their lizard form and hid from Hiʻiaka (*Ka Hōkū o Hawaiʻi*, 15 February 1927, translated in Maly 1997:19). This stone was known as "Peʻe-kāua," which translates to "we two hidden."

Kūalakaʻi is the name of an ancient fishing village located on the southwestern side of Honouliuli Ahupuaʻa, southeast of the project area. Kūalakaʻi is mentioned in the "Legend of the Children" which foretells the breaking of the eating *kapu* by the *aliʻi* (*Ka Loea Kālaiʻāina*, 22 July 1899:15, translation in Sterling and Summers 1978:7). This area was also once the site of a spring called Hoaka-lei ("lei reflection"), where according to *moʻolelo*, Hiʻiaka picked *lehua* and saw her reflection in the water (Pukui et al. 1974:119).

Kalaeloa is an area located south of the project area at the southwestern point of Oʻahu. Kalaeloa Point was the home of Uhu Makaikai, a *kupua* who could take the form of a man or a giant parrotfish (*uhu).* He is mentioned in several legends concerning the hero Kawelo and with Kawelo's struggles with ʻAikanaka, the ruling chief of Kauaʻi (Hawaiian Ethnological Notes, Bishop Museum Vol. II:114, translation in Sterling and Summers 1978:41).

Mr. Lewis also mentioned the importance of the Makahiki season to the history of the area. He noted Kapolei is where the Makahiki season began. The Makahiki season would start in Kapolei with ceremonies, dancing, and games and continued across all the other islands. He suggested project proponents could curate a type of continuation of the Makahiki sense of place and celebration by incorporating traditional Hawaiian games such as spear throwing and *ʻulu maika* into the storytelling of the area.

Cultural practices within Honouliuli of late have been inspired by traditional understandings of caring for natural and cultural resources. The Kalaeloa Heritage and Legacy Foundation has adopted practices wherein the community can *mālama* cultural sites, and in turn benefit from the knowledge inherent in such sites. Previously documented cultural sites within the Kalaeloa Heritage Park are actively cared for while also the subject of numerous university-level studies. These sites have been established as important centers for an *ʻāina*-based education.

Several *heiau* stood in Honouliuli Ahupuaʻa including Puʻuokapolei Heiau, Puʻu Kuʻua Heiau, and two unidentified *heiau* located at the foot of Puʻu Kanehoa and Puʻu Kuina, respectively. Each year, a ceremony commemorating the changing of the seasons is still observed in the beginning of May at Waikīkī and Honouliuli. Sam ʻOhukaniʻōhiʻa Gon III, Na Waʻa Lalani Kahuna O Puʻu Koholā, and the late Kumu Hula John Keola Lake's *hula hālau* perform *oli* and *hula* during the ceremony (Genz et al. 2012). The ceremony occurs at Puʻuokapolei Heiau which is oriented so that it views the setting of the sun behind Puʻulaʻilaʻi farther west, and maintains a line of sight extending eastward from Puʻulaʻilaʻi toward Papaʻenaʻena Heiau, located in Waikīkī.

7.3 *Hula*

In *Unwritten Literature of Hawaii: The Sacred Songs of the Hula*, Nathaniel B. Emerson discusses the significance of the art of *hula* in traditional Hawaiian society. He notes,

> […] the hula stood for very much to the ancient Hawaiian; it was to him in place of our concert-hall and lecture-room, our opera and theater, and thus became one of his chief means of social enjoyment. Besides this, it kept the communal imagination in living touch with the nation's legendary past. […] The Hawaiian song, its note of joy par excellence, was the *oli*, but it must be noted that in every species of Hawaiian poetry, *mele* whether epic or eulogy or prayer, sounding through them all we shall find the lyric note. [Emerson 1965:7]

Emerson continues,

> The hula was a religious service, in which poetry, music, pantomime, and the dance lent themselves, under the forms of dramatic art, to the refreshment of men's minds. Its view of life was idyllic and it gave itself to the celebration of those mythical times where gods and goddesses moved on the earth as men and women and when men and women were as gods. As to subject-matter, its warp was spun largely from the bowels of the old-time mythology into cords through which the race maintained vital connection with its mysterious past. Interwoven with these, forming the woof, were threads of a thousand hues and of many fabrics, representing the imaginations of the poet, the speculations of the philosopher, the aspirations of many a thirsty soul, as well as the ravings and flame-colored pictures of the sensualist, the mutterings and incantations of the kahuna, the mysteries and paraphernalia of Polynesian mythology, the annals of the nation's history-the material, in fact, which in another nation and under different circumstances would have gone to the making of its poetry, its drama, its opera, its literature. [Emerson 1965:11–12]

Traditionally, the art of *hula* was practiced by a "body of trained and paid performers" who were educated in both song and dance (Emerson 1965:13). According to Emerson,

> The ancient Hawaiians did not personally and informally indulge in the dance for their own amusement, as does pleasure loving society at the present time. Like the Shah of Persia, but for very different reasons, Hawaiians of the old time left it to be done for them by a body of trained and paid performers. This was not because the art and practice of the hula were held in disrepute quite the reverse-but because the hula was an accomplishment requiring special education and arduous training in both song and dance, and more especially because it was a religious matter, to be guarded against profanation by the observance of tabus and the performance of priestly rites. [Emerson 1965:13]

Mrs. Lopes stated that she considered Ko ‘Olina and Nānākuli her "second home" while being "schooled in the hula by O‘Brian Eselu and Thaddius Wilson of Nā Wai ‘Ehā O Puna since 1983." She "spent 15 years learning hula and training for events and competitions like Merrie Monarch on the grounds of Lanikūhonua and Paradise Cove." She noted, "O‘Brian Eselu directed the lū‘au entertainment there for over 35 years after being asked to help with the show by Kumu Hula Vicky

Takamine who also directed and performed." Mrs. Lopes also "performed as a soloist in the show after becoming Miss Aloha Hula in 1994."

Since the late 1980s, Mrs. Lopes has "learned hula at Paradise Cove near the Ocean Garden and other areas of the property." She has "so many memories of hosting entertainers and community members at our hālau fundraisers, training, event performances, cultural practices and special event openings here."

Mrs. Lopes has met and formed relationships with the "kūpuna of the area who are kupa of the land living there for generations" including "Aunty Agnes Cope, Uncle Kamaki Kanahele and Aunty Georgiana Kahele." During her *hula* training at Lanikūhonua in the early 1990s, Mrs. Lopes met Aunty Nettie Tiffany who modeled for them "how to respect each other, to mālama the ʻāina of this puʻuhonua, to work with integrity and to always acknowledge and honor your moʻokūʻauhau in your work."

Mr. and Mrs. Lopes are *kumu hula* of Ka Lā ʻŌnohi Mai O Haʻehaʻe. Their very first *hālau* meeting was held at Lanikūhonua and they have trained and performed at both Lanikūhonua and Paradise Cove through the last 17 years. As *kumu hula*, they have worked with Aunty Nettie, Keola Lloyd, and Marie Wong for the "Mele and Hula at Lanikūhonua" fundraiser event as recently as August 2022. They have also taught students at the "Lei O Lani Kūhonua" for a "couple of years" and will "return to teach at the event in March of 2023." The Lei ʻO Lanikūhonua Hula Festival is

> […] an annual hula festival unlike any other. A gift of hula masters coming together to share their knowledge with high school-age hula students in a one-day celebration of Hawaiian culture and dance. Since its debut in 2007, the Lei ʻO Lanikūhonua Hula Festival has grown in stature and popularity. In 2010, the Festival drew more than 90 students from ten (10) public and private schools. By 2014, that number had tripled to 279 students. This year's event, an estimated 500 students will be participating in the Festival. [Lanikuhonua 2022]

In 2016, Mrs. Lopes was asked to create a new show at the Paradise Cove Lūʻau. She recalled that, "With the helpful insight and research of Keawe [Lopes], the memories of many past shows, the collaboration of cultural resource people, a template from kumu to work from and kumu/director guided practices with all cast members," they were able to "open three new shows in only 5 months." To ensure the show was unique, Mr. and Mrs. Lopes "composed and selected songs celebrating Oʻahu and Hawaiʻi while incorporating traditional and contemporary elements. Choreography was then created and taught to the dancers to perform by the kumu hula." One of the songs was "Nani Koʻolina." She noted,

> ʻNani Koʻolina' was written for the hula presentation at the imu amphiteatre show. This mele honors place and people and recognizes that where we come from is a part of who we are. It speaks of the surrounding sea, the kaunaʻoa that once flourished seaside, our aliʻi Kākuhihewa who found peace here and the legacy of kumu OʻBrian Eselu.

Mrs. Lopes expressed her hope that "more mele like this can be composed to share as hula presentations at the proposed entertainment venue that features what is truly Hawaiian thought in poetic expression." She noted the "key is to bring creative and culturally grounded kumu who are connected to the area and culture to build a solid Hawaiian show." Mr. and Mrs. Lopes are "willing to be a part of the process."

Mrs. Lopes stated that including "mele like ʻNani Koʻolinaʼ in the show, repopulating the seashore with kaunaʻoa, sharing stories of Kākuhihewa and sharing mele that tell of the delicacies of the ocean, food preparation and fishing practices perhaps can all support the vision of the entertainment aspect of the project." She emphasized, "The most important is to have a kumu hula who is trained and culturally grounded lead the entertainment."

Mr. Lopes also discovered a *mele* named "He Mele Inoa No Kuhihewa" in the Hawaiian language newspapers celebrating the birth of the *aliʻi* Kākuhihewa, who was born at Kūkaniloko and spent "leisure time in Koʻolina." Mr. Lopes choregraphed a *hula noho* and Mrs. Lopes created a *hula noho puniu* presentation that they taught to the cast. Mrs. Lopes noted the presentation "challenged the cast to know more about what they are performing and who they honor in these mele hula." She emphasized that this "hula aligns with the revitalization project vision because this hula ʻōlapa recognizes place, is authentic and it celebrates the birth of the new King at Kūkaniloko, Oʻahu."

Ms. Lopes emphasized that "As kumu hula, educators and creative show directors, the vision for this development is exciting because Hawaiʻi, the people of Hawaiʻi and the visitors who visit our home deserve to see authentic Hawaiian entertainment in Hawaiʻi." She stated Ko ʻOlina will be a "beautiful setting" for *kamaʻāina* and visitors to see "authentic Hawaiian entertainment." She emphasized that "Hawaiʻi needs a show that will only focus on the traditions, beauty and excitement of **Hawaiian** culture and dance and not have to journey through Polynesia" for a great experience." She added, "The Hawaiian experience is great on its own and we know this because we live this. It's time to put Hawaiʻi first in the entertainment industry here."

Mrs. Lopes mentioned there are "two hula mounds" at the Ocean Garden. "The larger mound faces the ocean and the other faces the entrance." She expressed her "support to keep these mounds in its current location and condition." She stated that the mounds "provide natural staging for entertainment, a space for the daily educational activities and possibly hula ceremonial gatherings and presentations." She emphasized that "They will continue to be special and very useful areas if preserved."

Mrs. Lopes stated, "For us, itʻs important to entertain but to also educate." She noted, "One of the most popular daily activities at any hotel or show for our malihini is the hula lesson," however, she feels that "sometimes these activities can be too commercial and sometimes inappropriate when taught for the mass because how we run our hālau is very, very different." She suggests the song, "Hula In Paradise," which she composed specifically for this area would be a "perfect hula to teach because it is in English and it acknowledges nature that surrounds you while on the property and also shares some cultural practices as well in a fun way." The chorus of the song is an example of "how culture and entertainment can be incorporated and still be tasteful to all."

Mrs. Lopes emphasized that "Koʻolina is indeed a home to us and a beautiful pana ʻāina that is caressed by the ocean, shaded by the many coconut trees and a place where we all spend time together. This is a place we all personally invest in to protect and preserve for us today and for future generations"

7.4 Religious Practices

A variety of religious practices were conducted by Native Hawaiians which included prayers and chants to help clense the land, *ho‘oponopono* or the practice of reconciliation, and others.

Although not specifically identified, Ms. Tiffany shared that religious practices did occur on the project area and within the surrounding vicinity.

In an email response, Mr. Aila mentioned there is a “Kuahu [altar] located to the west of Lanikuhonua just beyond the housing but within the County Park that is unimproved.” He shared his understanding “that it is a fishing shrine.” He recalled, “When I was younger 40 years ago, fishermen left ho‘okupu [offerings] on it.” Mr. Aila also shared his belief that “Uau Kani (Wedge tail shearwater) continue nest in the area surrounding it.”

The Lopes ‘Ohana has a “special spiritual connection to Ko ‘Olina and Lanikūhonua.” Mrs. Lopes shared, “When it was time to dedicate our girls to Ke Akua, we took them to Anianikū to experience the ocean for the first time. The ceremony was different for all three girls but it is what binds them together spiritually to this place.”

Mrs. Lopes mentioned their family loves to spend leisure time in Ko ‘Olina. She noted that “being able to stay in the area for a few days is not just relaxation time but a re-connect to our past experiences and inspires future experiences as well.” It is their hope that “our children will continue to honor and mālama Lanikūhonua with their families in the future.”

Mrs. Lopes noted the “ocean and shoreline of Nānākuli and the proposed area of revitalization in Ko‘olina” is where she was “water baptized as an adult” and where she “spent the most time with my kumu O‘Brian, kumu Thaddius and Charles Ka‘upu while learning hula and oli.” She added, “I learned how to control my breathing and create vocal sounds for oli while sitting on the property, facing the ocean and following the wave patterns before me.” Her *kumu* O’Brian set aside “special times of the year on property to re-unite with hālau members,” as well as “time for Kapu kai or ceremonial preparations in the ocean for his dancers to meditate, spiritually cleanse and pray before important hula and life events.” She emphasized that “these experiences are so important to us as practitioners.”

Mr. and Mrs. Lopes expressed their “support of the revitalization plan to continue to allow ocean access to us, the hālau and cultural practitioners to practice.” Mrs. Lopes noted, “It’s not just providing ‘beach access’ to people who want to sightsee or swim.” She suggested,

> […] creating a formal agreement between practitioners, the estate and the proposed kahu mālama of the area to allow our people to conduct our training and formal ceremonies there as our way of reconnecting to our sources of strength and healing taught to us by our kumu and kūpuna.

7.5 Burials

Native Hawaiians are protective of their *iwi kūpuna* as it is their *mana* (spiritual essence) that flows within these lands. As stated by the State Historic Preservation Division,

> When departing kupuna was laid to rest there was never a doubt that their remains would empower their descendants until they themselves were reduced to earth.

> Some kupuna were covered by stacked stones while others were buried with no surface markers at all, frequently in sand dunes. [SHPD, n.d.]

It is believed that the *mana* of a person is held within the *iwi* (bones). Therefore, *iwi kūpuna* were treated with upmost respect. For example, remains of a passing *ali‘i* were usually buried in the cover of night to protect the *iwi* from possible poachers, or those who might steal them to utilize the *mana* of the passing *ali‘i* (SHPD, n.d.).

‘Ewa was famous for the many limestone caves formed in the uplifted coral, called the “Ewa Karst.” In traditional Hawaiian times, the areas of exposed coral outcrop were undoubtedly more extensive. Where not covered by alluvium or stockpiled material, this Pleistocene limestone outcrop has characteristic dissolution “pit caves” (Mylroie and Carew 1995). The caves of Pu‘uloa were sometimes also used as burial caves. Following the death of Keali‘iahonui, son of Kaua‘i’s last king, Kaumuali‘i, in 1849, his body was buried in Pu‘uloa (Alexander 1907:27).

Ms. Tiffany shared that there are burial remains that have been previously identified within the project area. Therefore, there is a probability of disturbing other burials not previously identified if construction and development of this proposed project should continue.

She stated that all work conducted for the project should be done with *pono* and workers need to be *maka‘ala*. She pointed out that it is the intentions and actions of people that guide a reaction from the spirits. If any disturbance of *iwi kūpuna* should occur, both Native Hawaiian and legal protocols need to be followed.

Mrs. Lopes noted there are burials within the property and “we should always be respectful when entering the property or near sites.” She thanked Aunty Nettie Tiffany for “holding the ‘ike of the locations of these resting places of our kūpuna,” as well as the project proponents for “taking care of these areas when the project begins.”

Section 8 Summary and Recommendations

8.1 Results of Background Research

Background research for this study yielded the following results, presented in approximate chronological order:

1. Honouliuli is the largest *ahupuaʻa* in the *moku* of ʻEwa. Honouliuli translates literally as "dark water," "dark bay," or "blue harbor," and thus is named for the waters of Pearl Harbor which mark the eastern boundary of the *ahupuaʻa* (Jarrett 1930:22). Another source translates Honouliuli as "The blue bays or inlets" (*Saturday Press*, 11 August 1883). Honouliuli appears in the "Moʻolelo of Lepeamoa," the chicken-girl of Pālama, where Honouliuli is the name of the husband of the chiefess Kapālama, and grandfather of Lepeamoa (Westervelt 1923:164–184).
2. Generally, Honouliuli was described as very hot and dry. Evidence of drought-like conditions is further supported by the relative lack of traditional rain names associated with Honouliuli Ahupuaʻa. The Nāulu rain is the only known associated rain name for Honouliuli. Due to the lack of rainwater, freshwater resources were accessed via a karstic system.
3. In traditional Hawaiian times, the areas of exposed coral (Pleistocene limestone) outcrop were undoubtedly more extensive. According to McAllister (1933), holes and pits in the coral were generally accessed for water, while larger pits, often containing soil, were used for cultivation. McAllister additionally remarked that at the time of his 1930s survey *maiʻa* (banana; *Musaceae*) and *kō* (sugarcane; *Saccharum officinarum*) were being cultivated within the pit caves (sinkholes) (McAllister 1933:109).
4. The traditional *kaʻao* associated with the area speak of the *akua* brothers, Kāne and Kanaloa. It was their supernatural feat of hurling *pōhaku* across the island that determined the boundaries of land divisions (Sterling and Summers 1978:1). Additional *moʻolelo* speak of Hiʻiaka and her travels across the plains of ʻEwa. In particular, the *wahi pana* of Kaupeʻa is described. Kamakau describes Kaupeʻa as a wide plain where a grove of *wiliwili* (*Erythrina sandwicensis*) stands (Kamakau 1991a:47). This plain is an *ao kuewa*, a realm belonging to homeless souls. In general, the *kamaʻāina* of both Honouliuli Ahupuaʻa and ʻEwa District made a point to avoid this place.
5. Puʻuokapolei is a prominent hill located on the ʻEwa coastal plain that was the primary landmark for travelers on the trail running from Pearl Harbor to Waiʻanae. A *heiau* was once on the summit of the hill, however, by the time of McAllister's survey of Oʻahu it had been destroyed (McAllister 1933:108). The hill was also used as a point of solar reference or as a place for celestial observations of the winter and summer solstice. A ceremony at a *heiau* on Puʻuokapolei provides a vantage point to capture the sun setting directly behind Puʻu Pālailai, a peak farther west in the Waiʻanae range. A coinciding ceremony at Kūpalaha Heiau in Waikīkī captures the same essence as the sun sets behind Puʻuokapolei.
6. John Papa ʻĪʻī describes a network of leeward Oʻahu trails that in later historic times encircled and crossed the Waiʻanae Range, allowing passage from West Loch to the

Honouliuli lowlands, past Pu‘uokapolei and Waimānalo Gulch to the Wai‘anae coast and onward, along the shoreline of O‘ahu (‘Ī‘ī 1959:96–98). Following ‘Ī‘ī's description, a portion of this trail network would have passed close to the present Farrington Highway alignment, north of the project area. The Malden map of 1825 indicates the nearest community just northeast of the project area along the coast.

7. In early historic times, the population of Honouliuli was concentrated at the western edge of West Loch in the vicinity of Kapapapuhi Point. This area was clearly a major focus of population due to the abundance of marine resources in close proximity to a wide expanse of well-irrigated bottomland suitable for wetland taro cultivation.

8. Following the Māhele of 1848, 96 individual land claims were made in the *ahupua‘a* of Honouliuli, with 72 claims being registered and awarded by King Kamehameha III to *maka‘āinana*. The 72 *kuleana* awards were almost all made adjacent to Honouliuli Gulch, which contained fishponds, irrigated *lo‘i*, *kula*, and house lots.

9. Beginning with the time of Western Contact, however, Hawaiian populations were introduced to many virulent western diseases which began to decimate the native populations. In 1832, a missionary census of Honouliuli recorded the population as 1,026. Within four years the population was down to 870 (Schmitt 1973:19, 22). Between 1848 and 1853, a series of epidemics of measles, influenza, and whooping cough often wiped out whole villages.

10. With the increasing foreign interests on O‘ahu Island during the last half of the nineteenth century, an array of agricultural enterprises was attempted. In 1871, John Coney rented the lands of Honouliuli to James Dowsett and John Meek, who used the land for cattle grazing. In 1877, James Campbell purchased most of Honouliuli Ahupua‘a for a total of $95,000.

11. Major land use changes came to western Honouliuli when the U.S. military began development in the area. Military installations were constructed both near the coast and in the foothills and upland areas. Barbers Point Military Reservation (formerly Battery Barbers Point from 1937–1944) at Barbers Point Beach was used beginning in 1921 as a training area for firing 155 mm guns (Payette 2003). Also in the vicinity were Camp Malakole Military Reservation (formerly Honouliuli Military Reservation), used from 1939, and Gilbert Military Reservation, used from 1922–1944. Fort Barrette (a.k.a. Kapolei Military Reservation and Battery Hatch) atop Pu‘uokapolei was in use from 1931–1948 for housing four 3-inch anti-aircraft batteries (Payette 2003). In the 1950s, the site was used as a Nike missile base. Palailai Military Reservation was built in 1921 atop Pu‘u Pālailai in Makakilo and housed Battery Palailai and Fire Control Station B (Payette 2003).

12. Beginning in 1939, Alice Kamokilaikawai Campbell, daughter of James and Abigail Kuaihelani Maipinepine Campbell, resided in Lanikūhonua, adjacent to the project area for nearly 30 years. Mrs. Campbell named the area Lanikūhonua, which means “where the heavens meet the earth” (Lanikūhonua Cultural Institute 2019). Cultural descendant Nettie Fernandez Tiffany, current caretaker of the Lanikūhonua Institute, stated that her mother, Leilani Fernandez, was a close friend of Alice Campbell (personal communication October 2019). Mrs. Fernandez owned a beach home within the current project area and was the previous caretaker of the Campbell Estate property.

13. The 1980s saw a joint venture between Japanese construction giant Kumagai Gumi and Hawaiʻi developers Horita Corporation and TSA International for the development of a $6 billion resort originally called "West Beach," (*The Age*, 3 December 1986:34). Four man-made lagoons were constructed, as well as an 18-hole golf course, luxury condominiums, and a hotel (*Honolulu Star-Bulletin*, 20 August 1998). In 1991, the developers of West Beach, West Beach Estates, purchased Paradise Cove Luau (*Honolulu Advertiser*, 16 November 1991). The project stalled as a result of the Japanese investment bubble bursting in the early 1990s (*Honolulu Star-Advertiser*, 24 December 2010). The area is now known officially as Ko Olina and has recently seen a reinvigoration of development.

8.2 Results of Community Consultation

CSH attempted to contact Hawaiian organizations, agencies, and community members as well as cultural and lineal descendants in order to identify individuals with cultural expertise and/or knowledge of the project area and vicinity. Community outreach letters were sent to a total of 80 individuals or groups; 11 responded, one of these *kamaʻāina* and/or *kūpuna* provided written testimony and one met with CSH for a more in-depth interview. Consultation was received from community members as follows:

1. Nettie Tiffany, *kahu* of Lanikūhonua Cultural Institute
2. William Aila Jr., Interim Chair of Hawaiian Homes Commission, Director of Department of Hawaiian Homelands
3. Kūhiō Lewis, Chief Executive Officer (CEO) for the Council for Native Hawaiian Advancement (CNHA)
4. Tracie Kaʻōnohilani Farias Lopes, *Kumu Hula* for Ka Lā ʻŌnohi Mai O Haʻehaʻe and Instructor at Hawaiʻi Pacific University and R. Keawe Lopes, *Kumu Hula* of Ka Lā ʻŌnohi Mai O Haʻehaʻe and Director of the Kawaihuelani Center for Hawaiian Language at the University of Hawaiʻi at Mānoa

8.3 Impacts and Actions

1. Nettie Tiffany, *kahu* of the Lanikūhonua Cultural Institute, pointed out various native vegetation present at Lanikūhonua. She also pointed out Anianikū and Kōʻula fishponds located west of the proposed project area.

2. Although not specifically identified, Ms. Tiffany shared that religious practices did occur on the project area and within the surrounding vicinity.

3. William Aila Jr. mentioned there is a "Kuahu [altar] located to the west of Lanikuhonua just beyond the housing but within the County Park that is unimproved." He believes "that it is a fishing shrine." He recalled, "When I was younger 40 years ago, fishermen left hoʻokupu [offerings] on it." Mr. Aila also shared his belief that "Uau Kani (Wedge tail shearwater) continue nest in the area surrounding it."

4. CSH recommends that the proposed project should allow access to the shoreline in the vicinity of the proposed project area for ongoing traditional cultural practices including the gathering of aquatic resources such as fish, *limu* and salt and *hula*.

5. Ms. Tiffany shared that burial remains have been previously identified within the project area. Therefore, there is a probability of disturbing other burials not previously identified if construction and development of this proposed project should continue.
6. Ms. Tiffany emphasized the importance of the protection of one's self as well as others while on the Paradise Cove property and when conducting work. She shared that all work conducted for the project should be done with *pono* and workers need to be *makaʻala*. It is the intentions and actions of people that guide a reaction from the spirits. If any disturbance of *iwi kūpuna* or any other culturally significant materials such as *pōhaku* should occur, both Native Hawaiian and legal protocols need to be followed.
7. CSH recommends the project proponents consult with the Lanikūhonua Cultural Institute during the design process to avoid potential impacts to undisclosed cultural sites and ongoing cultural practices occurring within The Cove at Ko Olina Redevelopment project area.

Based on information gathered from the community consultation, participants voiced their concerns in the following cultural context:

1. Nettie Tiffany, *kahu* of the Lanikūhonua Cultural Institute, pointed out various native vegetation present at Lanikūhonua. She also pointed out Anianikū and Kōʻula fishponds located west of the proposed project area.
2. Although not specifically identified, Ms. Tiffany shared that religious practices did occur on the project area and within the surrounding vicinity.
3. William Aila Jr. mentioned there is a "Kuahu [altar] located to the west of Lanikuhonua just beyond the housing but within the County Park that is unimproved." He believes "that it is a fishing shrine." He recalled, "When I was younger 40 years ago, fishermen left hoʻokupu [offerings] on it." Mr. Aila also shared his belief that "Uau Kani (Wedge tail shearwater) continue nest in the area surrounding it."
4. CSH recommends that the proposed project should allow access to the shoreline in the vicinity of the proposed project area for ongoing traditional cultural practices associated with the gathering of aquatic resources such as fish, *limu* (seaweed) and salt.
5. Ms. Tiffany shared that burial remains have been previously identified within the project area. Therefore, there is a probability of disturbing other burials not previously identified if construction and development of this proposed project should continue.
6. Ms. Tiffany emphasized the importance of the protection of one's self as well as others while on the Paradise Cove property and when conducting work. She shared that all work conducted for the project should be done with *pono* (proper) and workers need to be *makaʻala* (aware). It is the intentions and actions of people that guide a reaction from the spirits. If any disturbance of *iwi kūpuna* (ancestral remains) or any other culturally significant materials such as *pōhaku* (stone) should occur, both Native Hawaiian and legal protocols need to be followed.
7. CSH recommends the project proponents consult with the Lanikūhonua Cultural Institute during the design process to avoid potential impacts to undisclosed cultural sites and ongoing cultural practices occurring within The Cove at Ko Olina Redevelopment project area.

8. Kūhiō Lewis suggested that project proponents could curate a type of continuation of the Makahiki sense of place and celebration by incorporating traditional Hawaiian games such as spear throwing and *‘ulu maika* (ancient Hawaiian game suggesting bowling) into the storytelling of the area.
9. Mr. Lewis stated there are “amazing opportunities” for economic development in the area. He noted “our people need jobs, they need opportunities that don’t exist on the west side.” He emphasized that “Hawaiians need to be involved in the economy of this development.” He stated that project proponents should not bring in mainland developers.
10. Mr. Lewis suggested the marketplace “should be run by a Hawaiian entity that can work to build up the capacity of the businesses from this area to sell their products.” He noted, “it’s not just the vendors, it’s the people running the marketplace so that the values are inclusive throughout the whole thing.” He stated that the marketplace should not have mainland franchises. It should have Hawai‘i-based products from Hawaiian-based businesses grounded in Hawaiian values.
11. Mr. Lewis would like Hawaiian businesses involved in the “facilitation of the operations or curating the stories that are being told at those areas.” He pointed out there are “amazing businesses that practice traditional type of things that could have a place in that Ko Olina space.” He clarified that he is “not talking about people to demonstrate how to pound *poi* [the Hawaiian staff of life, made from cooked taro corms] or *kalo* [Taro; *Colocasia esculenta*], or show them how to make *kapa* [tapa; bark cloth].”
12. Mr. Lewis stated the project proponents need to focus on incorporating Hawaiian values. He emphasized that the Hawaiian community should be given opportunities to curate stories that are “real and authentic to Hawai‘i.” He suggested shows performed at the proposed amphitheater should be developed and curated by Hawaiians from the area telling their stories. He also suggested the amphitheater should allow charitable uses so the local community could use it for events such as an annual *ho‘olaule‘a* (celebration), block party, or other gatherings celebrating the area’s history and traditions without paying exorbitant fees.
13. Mr. Lewis emphasized that “there needs to be a sense of place for the west side community.” It should not only cater to tourists but should also be a destination for locals. He would like it to be a place where “locals and visitors can live together, be alongside each other.”
14. Mr. Lewis stated that “the best way to contribute to the perpetuation of this place” is to find meaningful opportunities for Native Hawaiians to be involved in the economy. He noted, “it’s not even just Hawaiians anymore, […] all the ethnic groups are struggling to make ends meet” and “have no meaningful involvement in the economy.” He pointed out that every day, droves from the local community are packing up their stuff, moving to the mainland and taking with them “the fabric of *aloha* (love), the connection to Hawai‘i, the stories of Hawai‘i.” He emphasized, “That’s how you perpetuate Hawai‘i, you allow the people from this place to stay here.”
15. Tracie Ka‘ōnohilani Farias Lopes stated that their *‘ohana* family has “frequented the beautiful beaches from Ko ‘Olina to Nene‘u [Pōka‘ī Bay] for family gatherings.” They have also “actively fished the reefs along the coast and enjoyed manini [very common reef surgeonfish; *Acanthurus triostegus*], weke [Certain species of the *Mullidae*, surmullets or goatfish], kala [Surgeonfish, unicorn fish, *Teuthidae*; *Naso hexacanthus*, *N. unicornis*, *N.*

brevirostris], maiko [surgeonfish; *Acanthurus nigroris*], he‘e [Octopus; *Polypus* sp.] and ‘ō‘io [Ladyfish, bonefish; *Albula vulpes*] from Keaulana, Kalaniana‘ole Beach Park, Ulehawa, Pu‘uohulu-Kai, and Mā‘ili."

16. Mrs. Lopes emphasized that "As kumu hula, educators and creative show directors, the vision for this development is exciting because Hawai‘i, the people of Hawai‘i and the visitors who visit our home deserve to see authentic Hawaiian entertainment in Hawai‘i." She stated that Ko ‘Olina will be a "beautiful setting" for *kama‘āina* and visitors to see "authentic Hawaiian entertainment."
17. Mrs. Lopes emphasized that "Hawai‘i needs a show that will only focus on the traditions, beauty and excitement of **Hawaiian** culture and dance and not have to journey through Polynesia for a great experience." She added, "The Hawaiian experience is great on its own and we know this because we live this. It's time to put Hawai‘i first in the entertainment industry here."
18. Mrs. Lopes was asked to create a new show at the Paradise Cove Lū‘au in 2016. She recalled that "With the helpful insight and research of Keawe [Lopes], the memories of many past shows, the collaboration of cultural resource people, a template for kumu to work from and kumu/director guided practices with all cast members," they were able to "open three new shows in only 5 months." To ensure the show was unique, Mr. and Mrs. Lopes "composed and selected songs celebrating O‘ahu and Hawai‘i while incorporating traditional and contemporary elements. Choreography was then created and taught to the dancers to perform by the kumu hula." One of the songs created during this process was "Nani Ko‘olina."
19. Mrs. Lopes expressed her hope that more *mele* (songs) like "Nani Ko‘olina" can be "composed to share as hula presentations at the proposed entertainment venue that features what is truly Hawaiian thought in poetic expression." She emphasized that the "key is to bring creative and culturally grounded kumu who are connected to the area and culture to build a solid Hawaiian show."
20. Mrs. Lopes stated that including "mele like ‘Nani Ko‘olina’ in the show, repopulating the seashore with kauna‘oa [*Cuscuta sandwichiana*], sharing stories of Kākuhihewa and sharing mele that tell of the delicacies of the ocean, food preparation and fishing practices perhaps can all support the vision of the entertainment aspect of the project." She emphasized that the "most important is to have a kumu hula who is trained and culturally grounded lead the entertainment."
21. Mrs. Lopes thanked James Campbell Company for "the initiative to use this land to promote, celebrate and perpetuate our Hawaiian cultural art forms, language and mo‘olelo for all ages to experience." She emphasized that "This will be a significant step forward and the James Campbell Company will be at the forefront of this significant movement with mele like " ‘Nani Ko‘olina’ and ‘He Mele Inoa No Kuhihewa’ and the collective creativity of our kanaka [Hawaiian people] today." She also noted that "the show and other cultural elements can provide magical and meaningful experiences for both kama‘āina and malihini [tourist]."
22. Mrs. Lopes stated, "For us, it‘s important to entertain but to also educate." She noted, "One of the most popular daily activities at any hotel or show for our malihini is the hula [dance] lesson," however, she feels that "sometimes these activities can be too commercial and sometimes inappropriate when taught for the mass because how we run our hālau is very,

very different." She suggests the song, "Hula In Paradise," which she composed specifically for this area would be a "perfect hula to teach because it is in English and it acknowledges nature that surrounds you while on the property and also shares some cultural practices as well in a fun way." The chorus of the song is an example of "how culture and entertainment can be incorporated and still be tasteful to all."

23. The Lopes ʻOhana has a "special spiritual connection to Ko ʻOlina and Lanikūhonua." Mrs. Lopes recalled taking her daughters to Anianikū to experience the ocean for the first time and to dedicate them to Ke Akua. She noted that visting Ko ʻOlina is "not just relaxation time but a re-connect to our past experiences and inspires future experiences as well."
24. Mrs. Lopes also noted the "ocean and shoreline of Nānākuli and the proposed area of revitalization in Koʻolina" is where she was "water baptized as an adult" and where she "spent the most time with my kumu [teacher] OʻBrian, kumu Thaddius and Charles Kaʻupu while learning hula and oli [chant]." Her *kumu* O'Brian set aside "special times of the year on property to re-unite with hālau [house for *hula* instruction] members," as well as "time for Kapu kai or ceremonial preparations in the ocean for his dancers to meditate, spiritually cleanse and pray before important hula and life events." She emphasized that "these experiences are so important to us as practitioners."
25. Mr. and Mrs. Lopes stressed the importance of maintaining access to the ocean so her *ʻohana*, her *hālau*, and other cultural practitioners may continue their practices. She suggested "creating a formal agreement between practitioners, the estate and the proposed kahu mālama [caretaker] of the area to allow our people to conduct our training and formal ceremonies there as our way of reconnecting to our sources of strength and healing taught to us by our kumu and kūpuna."
26. Mrs. Lopes noted there are burials within the property and "we should always be respectful when entering the property or near sites." She thanked Aunty Nettie Tiffany for "holding the ʻike [knowledge] of the locations of these resting places of our kūpuna," as well as the project proponents for "taking care of these areas when the project begins."
27. Mrs. Lopes mentioned there are "two hula mounds" at the Ocean Garden. "The larger mound faces the ocean and the other faces the entrance." She expressed her "support to keep these mounds in its current location and condition." She stated that the mounds "provide natural staging for entertainment, a space for the daily educational activities and possibly hula ceremonial gatherings and presentations." She emphasized that "They will continue to be special and very useful areas if preserved."
28. Mr. and Mrs. Lopes strongly support featuring Hawaiian artisans in the proposed marketplace. She stated, "If it is made by the artists of that area themselves, these items are not just souvenirs but can become family heirlooms in the future." She noted, "We have so many artists in Hawaiʻi and being able to feature authentic Hawaiian work in galleries or in shops to purchase in this area is exciting and offers our malihini and kamaʻāina a unique shopping experience while supporting our community."
29. Mr. and Mrs. Lopes also expressed gratitude that this "project has the potential of creating numerous jobs for residents in the area." She emphasized that "This is so important! By offering Hawaiian marketplace and authentic Hawaiian entertainment like this, we believe that many hula practitioners will want to be a part of it and will travel from all moku of Oʻahu to do so."

30. Mr. and Mrs. Lopes are willing to "participate and creatively collaborate" with Aunty Nettie, Uncle Kimo Alama Keaulana, and Twyla Mendez, all of whom have connections with Campbell Estate and are respected in the *hula* community. Mrs. Lopes noted, "We all uphold legacy and create beautiful experiences in all educational and entertainment settings so this would be exciting."
31. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended.
32. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Section 9 References Cited

Age, The

1986 Kumagai in $6 bill Hawaii Venture. *The Age*, 3 December.

Akana, Collette Leimomi and Kiele Gonzalez

2015 *Hanau Ka Ua: Hawaiian Rain Names*. Kamehameha Publishing, Honolulu.

Alameida, Roy Kakulu

1993 Land Tenure and Land Use in Kawaihapai, O‘ahu. Master’s thesis in History. University of Hawai‘i at Mānoa, Honolulu.

Alexander, A.C.

1873 Map of Honouliuli. Registered Map 405. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu. Available online at http://dags.hawaii.gov/survey/search.php

Alexander, W.D.

1907 The Funeral Rites of Prince Kealiiahonui. *Annual Report of the Hawaiian Historical Society f*or 1906. Hawaiian Historical Society, Honolulu.

Ava Konohiki

2015 Ancestral Visions of ‘Āina website. Available online at http://www.avakonohiki.org/.

Barrera, William M., Jr.

1975 *A Report on the Archaeological Reconnaissance Survey of the Proposed Barber’s Point Harbor Area.* Bernice Pauahi Bishop Museum, Department of Anthropology, Honolulu.

1979 *West Beach, Oahu: An Archaeological Survey.* Chiniago, Inc., Honolulu.

1984 *West Beach, Oahu: Archaeological Status Report. TMK: 9-1-14:2, 9-2-13:3,7,2 0-1-15:3,6,7,10,4.* Chiniago Inc., Honolulu.

1986 *West Beach, O‘ahu Archaeological Investigations.* Chiniago, Inc., Honolulu.

Bath, Joyce

1989 *Waimanalo Gulch Petroglyphs -80-12-4110 Waimanalo Gulch, Honouliuli, Ewa, Oahu.* State Historic Preservation Division, Kapolei, Hawai‘i.

Beckwith, M.W.

1940 *Hawaiian Mythology.* University of Hawaii Press, Honolulu.

1970 *Hawaiian Mythology*. University of Hawaii Press, Honolulu.

Bonnice, Mike

n.d. *Makakilo*. Electronic document. Available online at: http://www.mikebonnice.com/sheet_music/all_files/Makakilo%20%28G%29.pdf

Bordner, Richard M. and Carol Silva

1983 *Archaeological Reconnaissance and Historical Documentation: Waimanalo Gulch, Oahu, TMK:9-2-03:2, 40, 13 (por).* Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai‘i.

Briggs, L. Vernon

1926 *Experiences Of A Medical Student In Honolulu, and On The Island Of O‘ahu 1881.* David D. Nickerson Company, Boston.

Burke, Kelly L. and Hallett H. Hammatt

2014 *Archaeological Monitoring Report for the Farrington Highway Part 1, Phases A and B, 12" and 24" Water Main Installation Project, Nānākuli and Honouliuli Ahupua‘a, Wai‘anae and ‘Ewa Districts, Island of O‘ahu, TMK: [1] 8-9-001, 002, 005 through 007 and [1] 9-2-003.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Byerly, David and Patrick M. O'Day

2017 *Archaeological Inventory Survey Report Hawaiki Submarine Cable Landing Project, 92-384 Farrington Highway, Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu, Hawai‘i TMK (1) 9-2-049:001, 002, and 005; (1) 9-2-051:001 por., 010, and 011; and Farrington Highway.* Garcia & Associates, Honolulu.

Cipolla, Craig N.

2013 Native American Historical Archaeology and the Trope of Authenticity. *Historical Archaeology*. Vol. 47:3:12–22.

Clark, John R.K.

1977 *The Beaches of O‘ahu*. University of Hawaii Press, Honolulu.

Condé, Jesse C. and Gerald M. Best

l973 *Sugar Trains.* Glenwood Publishers, Felton, California.

Council for Native Hawaiian Advancement

2022 *Our Mission*. Electronic document, https://www.hawaiiancouncil.org/about.

Covington

1881 Hawaiian Government Survey map of Oahu. Registered Map 1381. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu. Available online at http://dags.hawaii.gov/survey/search.php

Davis, Bertell D.

1990 Human Settlement in Pristine Insular Environments: A Hawaiian Case Study from Barbers Point, Southwestern O‘ahu. Ph.D. Dissertation, University of Hawai‘i, Honolulu.

2000 *West Beach Data Recovery Phase IV Archaeological and Paleontological Excavations Ko Olina Resort Land of Honouliuli, ‘Ewa District, Island of O‘ahu* (4 Volumes). Paul H. Rosendahl, Inc., Hilo, Hawai‘i.

Davis, Bertell D. and Alan E. Haun

1986 *Preliminary Report upon Completion of Field Work: Phase 2 – Intensive Survey and Test Excavations West Beach Data Recovery Program.* Paul H. Rosendahl, Ph.D., Inc, Hilo, Hawai‘i.

1987 *Phase 2 — Intensive Survey and Test Excavations, West Beach Data Recovery Program, West Beach Resort, Honouliuli, Ewa, Island of Oahu.* Paul H. Rosendahl, Ph.D., Inc, Hilo, Hawai‘i.

De Silva, Kīhei

2003 *Hōʻalo i ka Ihu o ka Lanakila, Three Train Chants for Liliʻuokalani*. Kamehameha Schools. Electronic document, https://apps.ksbe.edu/kaiwakiloumoku/kaleinamanu/essays/hoalu_ikaihu_olanakila

Dicks, A. Merrill, Alan E. Haun, and Paul H. Rosendahl

1987 *Archaeological Reconnaissance Survey for Environmental Impact Statement, West Loch Estates Golf Course and Parks, Honouliuli, Ewa, Oahu.* Paul H. Rosendahl, Inc., Hilo, Hawaiʻi.

Emerson, N.B.

1915 *Pele and Hiiaka, A Myth From Hawaii*. Honolulu Star-Bulletin Limited, Honolulu.

1965 *The Unwritten Literature of Hawaii: The Sacred Songs of the Hula*. Collected by Nathaniel B. Emerson. Charles E. Tuttle Company, Rutland, Vermont and Tokyo.

Ewa Plantation Company

1923 *Ewa Plantation Company Annual Report*. Microfilm at University of Hawaiʻi at Mānoa, Hamilton Library, Honolulu.

Farley, Gina and David W. Shideler

2018 *Archaeological Literature Review and Field Inspection Report in Support of Consultation with SHPD for Historic Preservation Determination for the Atlantis Resort & Residence, Ko Olina Development Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMKs: [1] 9-1-057:006, 007, and 047; 9-1-059:008 (por.).* Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens

1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawaiʻi Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

Fornander, Abraham

1917 *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. IV, Part III. Memoirs of the Bernice P. Bishop Museum. Bishop Museum Press, Honolulu, Hawaiʻi.

1919 *Fornander Collection of Hawaiian Antiquities and Folklore* Vol. V, Part II. Memoirs of the Bernice P. Bishop Museum. Bishop Museum Press, Honolulu, Hawaiʻi.

Frierson, Barbara

1972 A Study of Land Use and Vegetation Change: Honouliuli, 1790-1925. Manuscript prepared for Graduate Seminar in Geography (750). University of Hawaiʻi, Honolulu.

Genz, Joseph H., Mahealani Liborio, and Hallett H. Hammatt

2012 *Draft Cultural Impact Assessment for the Division of Urban Forestry Administration Building Replacement Project, Waikīkī Ahupuaʻa, Honolulu (Kona) District, Oʻahu Island, TMK: [1] 3-1-043: por. 001*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Giambelluca, Thomas W., Michael A. Nullett, and Thomas A. Schroeder

1986 *Rainfall Atlas of Hawaiʻi.* Department of Land and Natural Resources, State Historic Preservation Division, State of Hawaiʻi, Honolulu.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte

2013 Online Rainfall Atlas of Hawaiʻi. Bulletin of the American Meteorological Society volume 94, pp. 313-316, doi: 10.1175/BAMS-D-11-00228.1. Electronic document, http://rainfall.geography.hawaii.edu.

Giambelluca, T.W., X. Shuai, M.L. Barnes, R.J. Alliss, R.J. Longman, T. Miura, Q. Chen, A.G. Frazier, R.G. Mudd, L. Cuo, and A.D. Businger

2014 Evapotranspiration of Hawaiʻi. Final report submitted to the U.S. Army Corps of Engineers—Honolulu District, and the Commission on Water Resource Management, State of Hawaiʻi. University of Hawaiʻi at Mānoa, Honolulu. Electronic resource, http://climate.geography.hawaii.edu/.

Glidden, Catherine, Maurice Major, and Boyd Dixon

1993 *Results of Subsurface Data Recovery in Selected Areas of Paradise Cove, Honouliuli, ʻEwa, Oʻahu*. Anthropology Department, Bernice Pauahi Bishop Museum, Honolulu.

Google Earth Imagery

2013 Aerial photographs of Hawaiʻi. Google Inc., Mountain View, California. Available online at www.google.com/earth.html.

Hammatt, Hallett H.

1995 Response to Inadvertent Discovery of Human Remains at Paradise Cove. Unpublished field notes. 11 January 1995 through 18 January 1995. Available at Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Hammatt, Hallett H., Jennifer Robins, Mark Stride, and Matthew McDermott

1991 *An Archaeological Inventory Survey for the Makaīwa Hills Project Site, Honouliuli, ʻEwa, Oʻahu.* Cultural Surveys Hawaiʻi, Kailua, Hawaiʻi.

Hammatt, Hallett H. and David W. Shideler

1999 *An Archaeological Inventory Survey for the Waimānalo Gulch Sanitary Landfill Project Site, Honouliuli, ʻEwa, Oʻahu*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

2001 *Archaeological Inventory Survey In Support of the Proposed 360 Fiber Optic Cable Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu, (TMK: 9-1-14 & 15)*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

2007 *Archaeological Literature Review and Field Inspection For an Approximately 21.2-Acre Project Area at Koʻolina, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu TMK: [1] 9-1-057:002 & 004*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Hammatt, Hallett H., David W. Shideler, Constance R. O'Hare, and Jon Tulchin

2013 *Archaeological Inventory Survey Testing at Tracks Beach Park For the Proposed Leeward Bikeway Project, Phase II, Federal Aid Project # STP-BW-0300(8) Honouliuli Ahupuaʻa, ʻEwa District Island of Oʻahu TMK: (1) 9-2-003:011*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Handy, E.S. Craighill and Elizabeth G. Handy

1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment.* Bishop Museum Bulletin 233. Bernice Pauahi Bishop Museum, Honolulu.

Handy E.S. and M. Pukui

1972 *The Polynesian Family System in Kaʻū*. Hawaiian Polynesian Society, Inc., Wellington, New Zealand.

Hawaiʻi Land Survey Division

1933 Land Court Application 1069 Map 1. Hawaiʻi Land Survey Division, Department of Accounting and General Services, Honolulu.

Hawaiʻi TMK Service

2016 Tax Map Key [1] 9-1-057. Hawaiʻi TMK Service, Honolulu.

Honolulu Advertiser

1991 Paradise Cove deal approved. *Honolulu Advertiser*, 16 November.

Honolulu Star-Advertiser

2010 Developer left his mark on Hawaii. *Honolulu Star-Advertiser*, 24 December.

Honolulu Star-Bulletin

1998 New owners to restart Ko Olina development. *Honolulu Star-Bulletin*, 20 August.

Hoʻoulumāhiehie

2008a *Ka Moʻolelo o Hiʻiakaikapoliopele*. Original Hawaiian text taken from series of articles in *Ka Naʻi Aupuni* 1905-1906. Awaiaulu Press, Honolulu.

2008b *The Epic Tale of Hiʻiakaikapoliopele*. As told by Hoʻoulumāhiehie. M. Puakea Nogelmeier, translator. Awaiaulu Press, Honolulu.

ʻĪʻī, John Papa

1959 *Fragments of Hawaiian History*. Mary Kawena Pukui, translator. Bishop Museum Press, Honolulu.

Immisch, George B.

1964 Land Reclamation and the Role of the Hydroseparator at Ewa Plantation: A Case Study of Some of the Effects of Mechanized Harvesting in the Hawaiian Sugar Industry. Master's thesis, University of Hawaiʻi at Mānoa, Honolulu.

Jarrett, Lorna H.

1930 *A Source Book in Hawaiian Geography.* University of Hawaiʻi, Honolulu.

Jourdane, Muffet (Elaine)

1995 *Inadvertent Discovery of Human Remains at Paradise Cove, Honouliuli, ʻEwa, Oahu, State Site No. 50-80-12-4968, SHPD #762.* Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawaiʻi.

Kahiolo, G.W.

1978 *He Moolelo No Kamapuaa, The Story of Kamapuaa*. Esther T. Mookini and Erin C. Neizmen, translators, with assistance of David Tom. Hawaiian Studies Program, University of Hawaiʻi at Mānoa, Honolulu.

Ka Naʻi Aupuni

1906 Ka Moolelo o Hiiaka-i-ka-poli-o-Pele Ka wahine i ka Hikina a ka la, a o ka Ui Palekoki Uwila o Halemaʻumaʻu. *Ka Naʻi Aupuni*, June 7, Volume II, Number:6.

Kamakau, Samuel M.

1976 *The Works of the People of Old, Na Hana a ka Poʻe Kahiko.* Bishop Museum Special Publication 61. Bishop Museum Press, Honolulu.

1991a *Ka Pōʻe Kahiko: The People of Old.* Originally published 1869-1870. Bishop Museum Press, Honolulu.

1991b *Tales and Traditions of the People of Old: Nā Moʻolelo o Ka Poʻe Kahiko.* Bishop Museum Press, Honolulu.

Kameʻeleihiwa, Lilikalā

1996 *A Legendary Tradition of Kamapuaʻa, the Hawaiian Pig-God.* Bishop Museum Special Publication 89. Bernice Pauahi Bishop Museum, Honolulu.

Kawelu, Kathleen L.

2015 *Kuleana and Commitment: Working Toward a Collaborative Hawaiian Archaeology.* University of Hawaiʻi Press, Honolulu.

Ke Aloha Aina

1904 He Moolelo Hawaii No Pakaa a me Kuapakaa. Na Kahu Iwikuamoo o Keawenuiaumi Ke alii o Hawaii, A O Na Moopuna Hoi A Laamaomao. *Ke Aloha Aina*, September 3, Volume X, Number 36.

Kelly, Marion

1983 *Na Mala o Kona: Gardens of Kona, A History of Land Use in Kona, Hawaii*, Bishop Museum Dept. Report Series 83-2. Anthropology Department, Bernice Pauahi Bishop Museum, Honolulu.

1991 Notes on the History of Honouliuli. In *Archaeological Survey of the Naval Air Station, Barber's Point Oʻahu, Hawaiʻi, Appendix A,* by A.E. Haun, Applied Research Group, Bernice Pauahi Bishop Museum, Honolulu.

Kikuchi, William K.

1959 *Standard Oil Refinery Site Letter Report* (plus maps and field notes on file). Bernice Pauahi Bishop Museum, Honolulu.

Komori, Eric K. and Thomas Dye

1979 *Archaeological Testing at Lanikuhonua, West Beach, Ewa, Oʻahu, Hawaiʻi, (TMK 9-1-13:por.10)*. Bernice Pauahi Bishop Museum, Honolulu.

Ko Olina Development, LLC

n.d. Ko Olina Resort and Marina Construction photos. Ko Olina Development, LLC, Honolulu.

Landgraf, Anne Kapulani

1994 *Nā Wahi Pana ‘o Ko‘olau Poko*. University of Hawai‘i Press, Honolulu.

Lanikūhonua Cultural Institute

2019 *The History*. Electronic document, http://www.lanikuhonua.com/the-property.

2022 *Culture*. Electronic document, https://www.lanikuhonua.com/culture/.

Malden, Lieutenant Charles R.

1825 South Coast of Oahu. Registered Map 640. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu. Available online at http://dags.hawaii.gov/survey/search.php

Malo, David

1951 *Hawaiian Antiquities (Moolelo Hawaii)*. Second edition. Nathaniel B. Emerson, translator. Bishop Museum Press, Honolulu.

Maly, Kepa

1997 Historical Documentary Research. In *Archaeological Reconnaissance Survey, Naval Magazine Lualualei, NAVMAG-West Loch, Lands of Pu‘uloa, Honouliuli, Waikele, and Waipi‘o, District of ‘Ewa, Island of O‘ahu*, by Peter M. Jensen and James Head, pp. 7–59. Paul H. Rosendahl, Ph.D., Inc., Hilo, Hawai‘i.

Maly, Kepā and Onaona Maly

2012 *He Mo‘olelo ‘Āina – Traditions and Storied Places in the District of ‘Ewa and Moanalua (in the District of Kona), Island of O‘ahu A Traditional Cultural Properties Study – Technical Report.* Kumu Pono Associates, Hilo, Hawai‘i.

Mason, Glenn E.

1984 Lime Kiln Site No. 1436. Manuscript. Spencer Mason Partnership, Honolulu.

McAllister, J.G.

1933 *Archaeology of O‘ahu.* Bishop Museum Bulletin 104. Bernice Pauahi Bishop Museum, Honolulu.

McGregor, Davianna Pōmaika‘i

1996 An Introduction to the *Hoa‘aina* and Their Rights. *The Hawaiian Journal of History* 30:1–28.

Medina, Leandra and Hallett H. Hammatt

2013 *Archaeological Monitoring Report for the Aulani Disney Resort and Spa Development Project an Approximately 21.2-Acre Project Area at Ko‘olina Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu TMK: [1] 9-1-057:002 & 004*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Monsarrat, M.D.

1909 Map of Oahu fisheries, Waianae section. Registered Map 2848. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu. Available online at http://dags.hawaii.gov/survey/search.php

Mylroie, John E. and James L. Carew

1995 Karst Development on Carbonate Islands. *Unconformities and Porosity in Carbonate Strata*, Chapter 3. D.A. Budd and A. Saller, editors. American Association of Petroleum Geologists Memoir 63.

Nakuina, Emma M.

1904 *Hawaii—Its People and Their Legends*. Hawaiʻi Promotion Committee, Honolulu.

Nakuina, Moses K.

1992 *The Wind Gourd of Laʻamaomao, The Hawaiian Story of Pākaʻa and Kūapākaʻa, Personal Attendants of Keawenuiaʻumi, Ruling Chief of Hawaii and Descendants of Laʻamaomao*. Esther T. Mookini and Sarah Nākoa, translators. Kalamakū Press, Honolulu.

Native Register

1848 Native Register of Kuleana Claims to Quiet Land Titles in the Hawaiʻi Lands (1847-53). Hawaiʻi State Archives, Honolulu.

Neller, Earl

1985 *A Preliminary Review and Evaluation of Archaeological Studies and Recommendations for the Proposed West Beach Estates at ʻEwa, Oʻahu*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawaiʻi.

Office of Hawaiian Affairs

2015 *Papakilo Database*. Office of Hawaiian Affairs cultural and historical database. Electronic document, http://papakilodatabase.com/main/index.php.

O'Leary, Owen L., David W. Shideler, and Hallett H. Hammatt

2007 *Archaeological Inventory Survey Addendum for the Makaīwa Hills Project Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMK: [1] 9-1-015:005 por. And 017; 9-2-003:002 por., 005 por., and 084 por*. Cultural Surveys Hawaiʻi, Inc., Kailua, Hawaiʻi.

Pagliaro, Penny

1987 Ewa Plantation: An Historical Survey 1890 to 1940. Manuscript. Historic Preservation Program, University of Hawaiʻi at Mānoa, Honolulu.

Paradise of the Pacific

1902 The Most Productive Sugar Plantation in the World. *Paradise of the Pacific*, December 1902:19–22. Honolulu.

Park, Valerie and Sara Collins

2010 *Archaeological Monitoring Report in Support of the Kahe Reverse Osmosis (RO) Water Pipeline Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu, State of Hawaii TMKs: (1) 9-1-015:002 & 9-2-003:011*. Pacific Consulting Services, Inc. Honolulu.

Payette, Pete

2003 *American Forts: Hawaiʻi*. Electronic document, http://www.geocities.com/naforts/hi.html (accessed 29 April 2004)

Pauketat, Timothy R.

2001 *The Archaeology of Traditions*. University Press of Florida, Gainesville, Florida.

Pukui, Mary K.

1949 Songs (Meles) of Old Kaʻu, Hawaii. *Journal of American Folklore*, July-September: 247–258.

1983 *‘Ōlelo No‘eau, Hawaiian Proverbs & Poetical Sayings.* Bishop Museum Special Publication 71. Bishop Museum Press, Honolulu.

1995 *Folktales of Hawaii: He Mau Kaao Hawaii*. Bishop Museum Press, Honolulu, Hawai‘i.

Pukui, Mary K. and Samuel H. Elbert

1986 *Hawaiian Dictionary*. Second edition. University of Hawaii Press, Honolulu.

Pukui, Mary Kawena and Laura Green

1995 *Folktales of Hawai‘i. He Mau Ka‘ao Hawai‘i*. Collected and translated by Mary Kawena Pukui with Laura S.S. Green. Bishop Museum Press.

Pukui, Mary K., Samuel H. Elbert, and Esther Mookini

1974 *Place Names of Hawaii*. University of Hawaii Press, Honolulu.

Saturday Press

1883 Dictionary of Hawaiian Localities. *Saturday Press*, 11 August.

Schmitt, Robert C.

1968 *Demographic Statistics of Hawaii: 1778-1965.* University of Hawaii Press, Honolulu.

1973 *The Missionary Censuses of Hawaii.* Bernice Pauahi Bishop Museum, Honolulu.

Shideler, David W. and Hallett H. Hammatt

2008 *Letter Report Addressing Architectural Concerns Board of Water Supply Farrington Highway Part 1 (Phase A & B) Haleakala Road to Alii Nui Drive Project Job No 03-104 TMK: [1] 8-7-008; 8-9-001, 002, 005, 006, 007; 9-1-056 & 9-2-003.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Shintani, Terry

1993 *The Wai‘anae Book of Hawaiian Health.* Waianae Coast Comprehensive Health Center, Waianae.

SHPD (State Historic Preservation Division)

n.d *Hawaiian Burials*. Electronic document https://dlnr.hawaii.gov/shpd/about/branches/ibc/hawaiian-burials/

Sinoto, Akihiko

1976 *A Report on Cultural Resources Survey at Barbers Point, Island of O‘ahu.* Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Soehren, Lloyd

1964 *Hawaiian Archaeology Survey (HAS) - Burial Cave Bishop Museum Site Number:50-Oa-A02-011. State Site Number:50-80-15-2500. Tax Map Key 3-8.* Bernice Pauahi Bishop Museum, Honolulu.

2019 *Hawaiian Place Names.* Electronic database, ulukau.org/cgi-bin/hpn?l=haw.

Stark, Richard, Megan T. Hawkins, and Hallett H. Hammatt

2015 *Archaeological Assessment Report for the Four Seasons Resort Oahu at Ko Olina Honouliuli Ahupuaa, Ewa District, Oahu TMK: [1] 9-1-057:001 (por.).* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Sterling, Elspeth P. and Catherine C. Summers (compilers)

1978 *Sites of O‘ahu.* Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Thrum, Thomas G.

1886 Great Land Colonization Scheme. *Hawaiian Almanac and Annual* for 1887. Thos. G. Thrum, Honolulu.

1906 Heiaus and Heiau Sites Throughout the Hawaiian Islands. Omiting Koas, or Place of Offering to Kuula, the Deity of Fisher Folk. *Thrum's Hawaiian Annual for 1907*. Thos. G. Thrum, Honolulu.

1922 Hawaiian Place Names. Appendix to *A Dictionary of the Hawaiian Language* by Lorrin Andrews (revised by Henry H. Parker) (1922) pp. 625 – 274. The Board of Commissioners of Public Archives of the Territory of Hawaii.

Trask, Mililani

2012 Hawaiian Perspectives GMOs and Cultural Values. *Facing Hawai‘i's Future.* Hawai‘i SEED, Koloa.

Tuggle, H. David and M.J. Tomonari-Tuggle

1997 *A Cultural Resource Inventory of Naval Air Station Barbers Point, O‘ahu, Hawai‘i, Part I: Phase I Survey and Inventory Summary*. International Archaeological Research Institute, Inc., Honolulu.

UH SOEST

1949 UH SOEST Ko Olina to Nanakuli Coast aerial photograph. University of Hawai‘i at Mānoa School of Ocean and Earth Science and Technology–Coastal Geology Group.

Ulukau

2014 *Māhele Database.* Hawaiian Electronic Library, http://ulukau.org/cgi-bin/vicki?l=en..

U.S. Army War Department

1919 U.S. Army War Department fire control map, Nankuli and Barbers Point quadrangles. USGS Information Services, Denver, Colorado.

1936 U.S. Army War Department terrain map, Waianae and Barbers Point quadrangles. USGS Information Services, Denver, Colorado.

1943 U.S. Army War Department terrain map, Nanakuli and Barbers Point quadrangles. USGS Information Services, Denver, Colorado.

USDA (U.S. Department of Agriculture)

2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/ (accessed March 2005).

USGS (U.S. Geological Survey)

1953 Ewa USGS 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

1968 Ewa USGS 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

1977 USGS Orthophotoquad, Ewa Quadrangle (Aerial photograph). USGS Information Services, Denver, Colorado.

1998 Ewa USGS 7.5-minute series topographic quadrangle. USGS Information Services, Denver, Colorado.

2005 USGS Orthoimagery (Aerial photograph). USGS Information Services, Denver, Colorado.

Vizenor, Gerald

1999 *Manifest Manners: Narratives on Postindian Survivance*. University of Oklahoma Press, Lincoln, Oklahoma.

Waihona ʻAina

2022 *The Māhele Database.* Electronic document, http://waihona.com

Westervelt, William D.

1916 *Hawaiian Legends of Volcanoes.* Ellis Press, London.

1923 Lepe-a-moa (The Chicken Girl of Palama). In *More Hawaiian Folk Tales*, compiled by Thomas G. Thrum. A.C. McClurg and Company, Chicago.

Yoklavich, Anne K., Robert Drolet, and Patricia Drolet

1995 *Preliminary Report Cultural Resources Management Overview Survey Naval Air Station, Barbers Point, Oʻahu Hawaiʻi*. Ogden Environmental and Energy Services Company, Inc., Honolulu.

Yucha, Trevor M. and Hallett H. Hammatt

2012 *Archaeological Inventory Survey Report for Portions of Kahe Valley, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu Island, TMK [1] 9-2-003:027 por*. Cultural Surveys Hawaiʻi, Inc. Kailua, Hawaiʻi

Appendix D

Traffic Impact Report

Traffic Impact Report

The Cove at Ko Olina Redevelopment

Prepared for:
James Campbell Company LLC

Prepared by:
Wilson Okamoto Corporation

March 2024

TRAFFIC IMPACT REPORT

FOR THE

COVE AT KO OLINA REDEVELOPMENT

Prepared for:

James Campbell Company LLC
1001 Kamokila Boulevard
Kapolei, HI 96707

Prepared by:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOC Ref #10609-01

March 2024

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from the redevelopment of the Cove at Ko Olina within the Ko Olina Resort on the island of Oahu. The proposed project entails the redevelopment of the existing entertainment/luau venue to include similar uses and accommodate new retail and restaurant uses.

B. Scope of Study

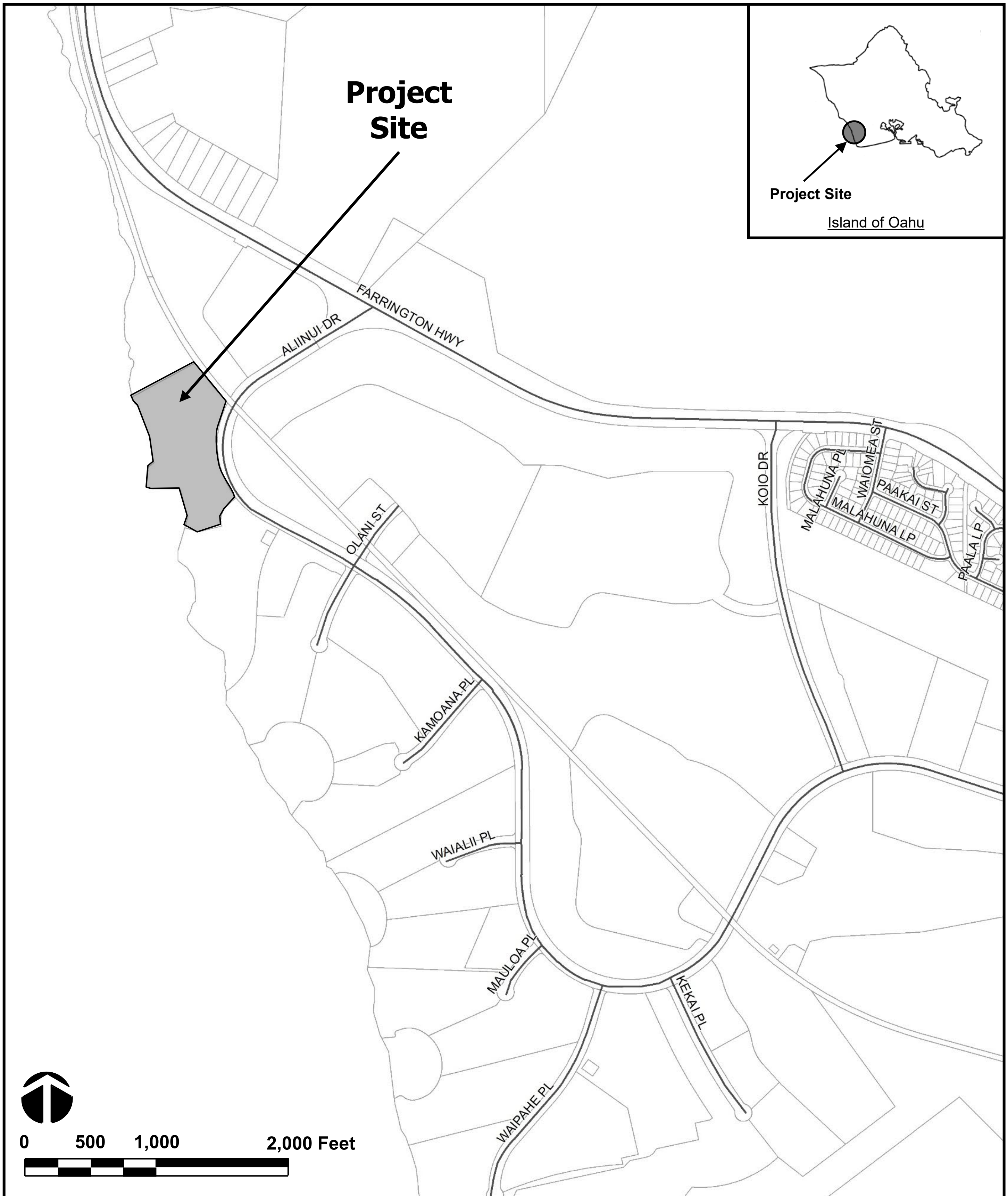
This report presents the findings and conclusions of the traffic study, the scope of which includes:

1. Description of the proposed project.
2. Evaluation of existing roadway and traffic operations in the vicinity.
3. Analysis of future roadway and traffic conditions without the proposed project.
4. Analysis and development of trip generation characteristics for the proposed project.
5. Superimposition of site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

II. PROJECT DESCRIPTION

A. Location

The project site is located adjacent to Aliinui Drive within the Ko Olina Resort on the island of Oahu (see Figure 1). The project site is bounded by Aliinui Drive to the east, the Leeward coast to the west, the Lanikuhonua Cultural Institute to the south, and a vacant parcel to the north. The project site is further identified as Tax Map Key (TMK) [1] 9-1-057:027. Access to the proposed project is expected to continue to be provided via driveways off Aliinui Drive.



WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

LOCATION MAP AND VICINITY MAP

FIGURE 1

B. Project Characteristics

The Cove at Ko Olina development is located on an approximately 10.85-acre parcel within the Ko Olina Resort and currently houses a commercial entertainment/luau venue. The venue hosts a nightly dinner show with a maximum seating capacity of 1,200 guests. The proposed project entails the redevelopment of the existing site to include the following uses:

- A new amphitheater for luau events similar to existing uses with a lower maximum seating capacity for 650 guests per show
- Three new quality restaurants (~30,240 square feet square feet (sf)) expected to be open for lunch and dinner service only
- Open-air marketplace (~8,220 sf) with local fast-food offerings and all-day service
- 18,000 sf of retail uses to feature made in Hawaii goods and services
- Ancillary spaces

Parking for the existing Cove at Ko Olina development is currently accommodated within on-site parking areas and supplemented by an adjacent off-site parking area. The on-site parking lot located near the north end of the project site is designated for employees, loading, and service operations (hereinafter referred to as the “staff lot”) while a second on-site parking area located between the two project driveways off Aliinui Drive is designated for reserved and bus parking (hereinafter referred to as the “visitor lot”). Additional parking for passenger vehicles is provided within the adjacent off-site parking lot for the Lanikuhonua Cultural Institute. With the proposed redevelopment, the staff lot is expected to be reconfigured to serve as parking stalls for valet operations, accommodate loading and service areas, and include a drop-off area to serve the existing chapel operations. In addition, the existing visitor lot will be reconfigured to reduce the number of existing bus parking stalls and provide a double loaded aisle of standard parking stalls for passenger vehicles. Access to the Cove at Ko Olina development will continue to be provided via existing driveways off Aliinui Drive with vehicles entering the project site via the northern one-way driveway and exiting via a one-way driveway connection that leads to the Lanikuhonua Cultural Institute and the southern two-way driveway. The proposed project is expected to be completed by Year 2027. See Figure 2 for the proposed site plan.

WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

PROJECT SITE PLAN

FIGURE 2

III. BASELINE TRAFFIC CONDITIONS

A. Area Roadway System

In the vicinity of the project, Aliinui Drive is a predominantly four-lane, two-way divided private roadway generally oriented in the north-south direction serving as the primary access through the Ko Olina Resort. Southeast of the project site, Alliinui Drive intersects Olani Street. At this signalized intersection, the northbound and southbound approaches of Aliinui Drive include an exclusive left-turn lane, a through lane, and a shared through and right-turn lane. Olani Street is a four-lane, two-way private roadway generally oriented in the east-west direction that provides access to the adjacent commercial and residential uses to the east and hotel uses to the west. At the intersection with Aliinui Drive, the eastbound and westbound approaches of Olani Street include a shared left-turn and through lane and a shared through and right-turn lane.

South of the intersection with Olani Street, Aliinui Drive intersects Kamoana Place. At this unsignalized T-intersection, the northbound approach of Aliinui Drive includes an exclusive left-turn lane and two through lanes while the southbound approach has a through lane and a shared through and right-lane. The west leg of the intersection is comprised of Kamoana Place, a four-lane, two-way private roadway generally oriented in the east-west direction that provides access to adjacent hotel uses and public beach parking. At the intersection with Aliinui Drive, the westbound approach of Kamoana Place includes stop-controlled exclusive left-turn and right-turn lanes.

B. Traffic Volumes and Conditions

1. General

a. Baseline Traffic Data

The traffic data used for the purpose of analysis is based on manual turning movement counts collected in September 2018 (see Appendix A). The manual turning movement count survey was conducted during the morning peak hours between 6:00 AM and 9:00 AM and during the afternoon peak hours between 3:00 PM and 6:00 PM at the following intersections:

- Aliinui Drive and Olani Street
- Aliinui Drive and Kamoana Place

In addition, screen line traffic volumes were also collected along Aliinui Drive just north of the resort's main entrance. These counts were supplemented by manual turning movement counts collected in November 2023 at the intersection of Aliinui Drive and Olani Street to verify counts from 2018 and assess traffic volumes in the vicinity after the COVID pandemic which resulted in decreased traffic volumes and changes to travel patterns. A comparison of the traffic data taken from Years 2018 and 2023 shows that traffic volumes collected in 2023 are generally less than those collected in 2018. In addition, given the project's location within the Ko Olina resort and the target marketing audience for the proposed uses, hotel occupancy data collected by the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT) was also assessed to compare hotel occupancy between Years 2018 and 2023, the years when the traffic data was collected. The data from DBEDT are aggregated based on location (i.e. Waikiki, other Oahu) and type (i.e. midscale, upscale, luxury). For the purpose of this assessment, occupancy rates for Waikiki, Other Oahu, and Upscale categories were considered. The assessment indicates that in general, occupancy rates for all the categories considered are also less in 2023 than in 2018. As such, for the purpose of this report, the Year 2018 traffic data was used to represent baseline Year 2023 conditions for a conservative assessment.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2016, and the "Synchro" software, developed by Trafficware. The analysis is based on the concept of Level of Service (LOS) to identify the traffic impacts associated with traffic demands during the peak periods of traffic.

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" unacceptable or potentially congested traffic operating conditions.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the road carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix B.

2. Baseline Peak Hour Traffic

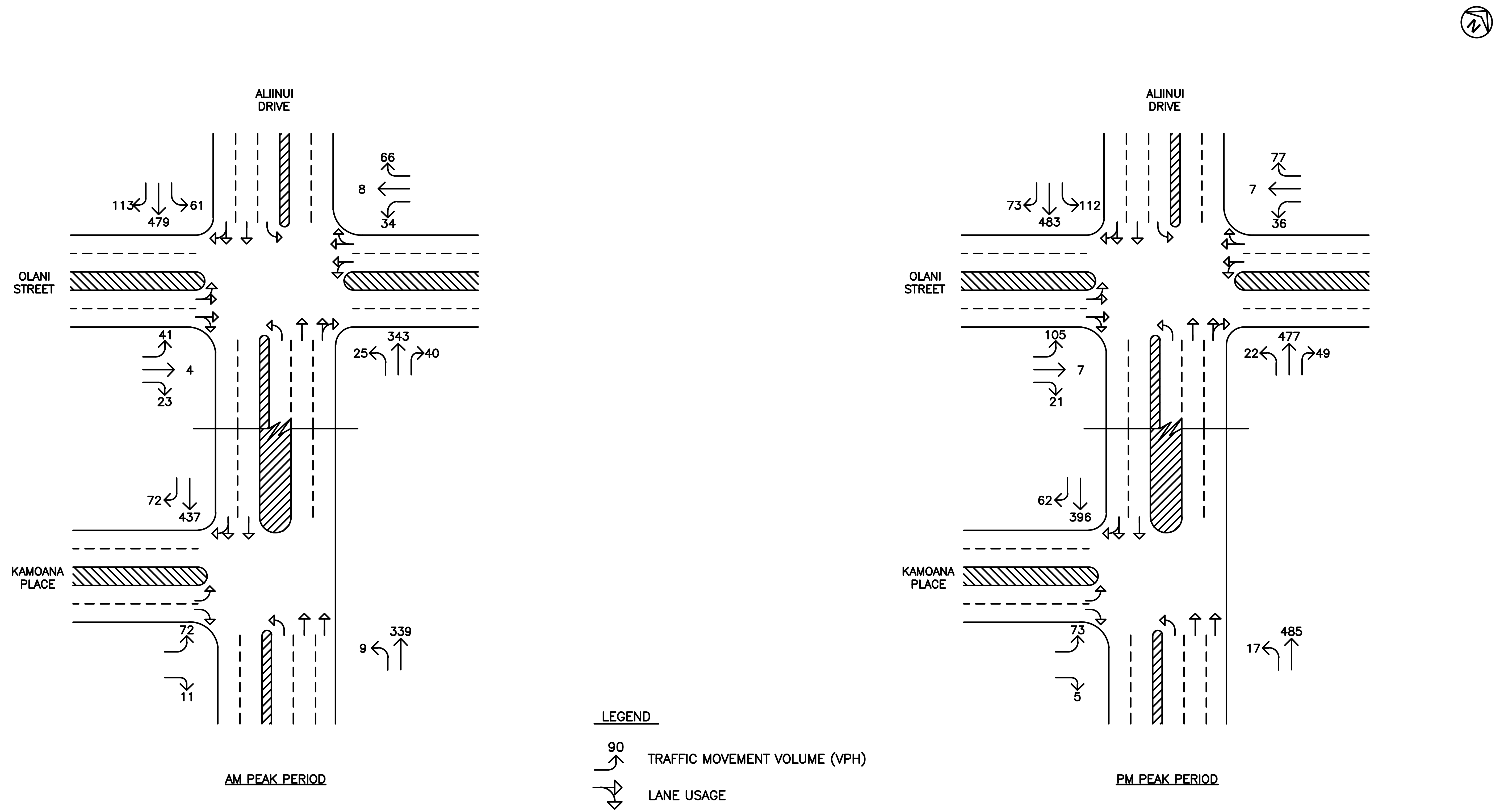
a. General

Figure 3 shows the existing lane configurations and baseline AM and PM peak period traffic volumes. The AM peak hour of traffic generally occurs between 7:30 AM and 8:30 AM. The PM peak hour of traffic generally occurs between the hours of 4:15 PM and 5:15 PM. The analysis is based on these peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. Aliinui Drive and Olani Street

At the intersection with Olani Street, Aliinui Drive carries 408 vehicles northbound and 653 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 548 vehicles travelling northbound and 668 vehicles travelling southbound. The northbound and southbound approaches operate at LOS "B" during both peak periods.

Olani Street carries 68 vehicles eastbound and 108 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 132 vehicles travelling eastbound and 120 vehicles travelling westbound. The eastbound and westbound



THE COVE AT KO OLINA

BASELINE PEAK HOURS OF TRAFFIC

FIGURE 3

approaches operate at LOS “A” during the AM peak period and LOS “B” during the PM peak period.

Crosswalks are provided across all sides of the intersection. During the AM peak period, 12 pedestrians and 157 pedestrians were observed crossing Aliinui Drive on the north and south sides of the intersection, respectively, while 6 pedestrians and 19 pedestrians were observed crossing Olani Street on the east and west sides of the intersection, respectively. During the PM peak period, 43 pedestrians and 178 pedestrians were observed crossing Aliinui Drive on the north and south sides of the intersection, respectively, while 15 pedestrians and 32 pedestrians were observed crossing Olani Street on the east and west sides of the intersection, respectively.

c. Aliinui Drive and Kamoana Place

At the intersection with Kamoana Place, Aliinui Drive carries 348 northbound vehicles and 509 southbound vehicles during the AM peak period. During the PM peak period, the overall traffic volume is greater with 502 vehicles travelling northbound and 458 vehicles travelling southbound. The northbound left-turn lane operates at LOS “A” during both peak periods.

The Kamoana Place approach of the intersection carries 83 vehicles during the AM peak period and 78 vehicles during the PM peak period. The eastbound approach operates at LOS “C” during both peak periods.

Crosswalks are provided across Kamoana Place on the west side of the intersection. During the AM peak period, 53 pedestrians were observed crossing Kamoana Place on the west side of the intersection, while 43 pedestrians were observed crossing at this location during the PM peak period.

d. Aliinui Drive North of Olani Street

North of the project site near the Ko Olina Resort entrance, Aliinui Drive carries 480 vehicles northbound and 687 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 715 vehicles travelling northbound and 729 vehicles traveling southbound.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 10th Edition," 2017. The ITE trip generation rates are developed empirically by correlating vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per 1,000 sf of development. It should be noted that a more recent edition of the Trip Generation Manual was published at the end of 2021 which included additional retail land uses. However, there is still limited data available for these uses and as such, the 2017 edition was used. As previously mentioned, the maximum capacity for the luau shows for the proposed project will be reduced from the existing Cove at Ko Olina venue. In addition, as previously discussed, the baseline traffic data used for the purpose of analysis is based on Year 2018 when traffic volumes and hotel occupancy rates were higher. Given the target market audience for the existing and proposed luau venue, majority of luau attendees are assumed to come from areas like Waikiki and hotels within the Ko Olina Resort. As such, since hotel occupancy rates were higher in 2018 which is used to represent baseline conditions, trips associated with the luau shows are assumed to be captured within the collected traffic data and additional trips associated with this use are not anticipated with the planned modifications to the venue. The trip generation included in the tables below reflect the additional new uses planned on-site. Table 1 below summarizes the additional trip generation characteristics related to the proposed project applied to the AM and PM peak hours of traffic.

Table 1: Additional Peak Hour Trip Generation

SHOPPING CENTER (RETAIL) INDEPENDENT VARIABLE: 1,000 sf of development = 18		
		PROJECTED TRIP ENDS
AM PEAK	ENTER EXIT TOTAL	11 6 17
PM PEAK	ENTER EXIT TOTAL	33 36 69
QUALITY RESTAURANT INDEPENDENT VARIABLE: 1,000 sf of development = 30.24		
		PROJECTED TRIP ENDS
AM PEAK	ENTER EXIT TOTAL	11 11 22
PM PEAK	ENTER EXIT TOTAL	158 78 236
FAST FOOD RESTAURANT WITHOUT A DRIVE-THROUGH WINDOW (MARKETPLACE) INDEPENDENT VARIABLE: 1,000 sf of development = 8.22		
		PROJECTED TRIP ENDS
AM PEAK	ENTER EXIT TOTAL	124 83 207
PM PEAK	ENTER EXIT TOTAL	117 116 233
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER EXIT TOTAL	145 100 245
PM PEAK	ENTER EXIT TOTAL	307 230 537

The trip generation methodology also includes provisions for multimodal trips. Multimodal trips are trips made using non-motorized modes of travel such as walking and biking, as well as trips made using transit. Field observations indicate that a significant portion of the patrons of the existing restaurant and commercial uses near the project site elect to walk to/from their destinations due to the close proximity of adjacent hotels, limited parking in the vicinity, and pedestrian friendly infrastructure along Aliinui Drive to facilitate these trips. Given the close proximity and compatible uses planned for the proposed project, a significant portion of the additional site-generated trips are similarly expected to be made via non-motorized modes (i.e., walking or biking) to/from adjacent uses. As such, the additional trips generated by the proposed project were adjusted to account for guests who are expected to access the project site via non-motorized modes. Table 2 summarizes the adjusted trip generation characteristics related to the proposed project applied to the AM and PM peak hours of traffic.

Table 2: Adjusted Peak Hour Trip Generation

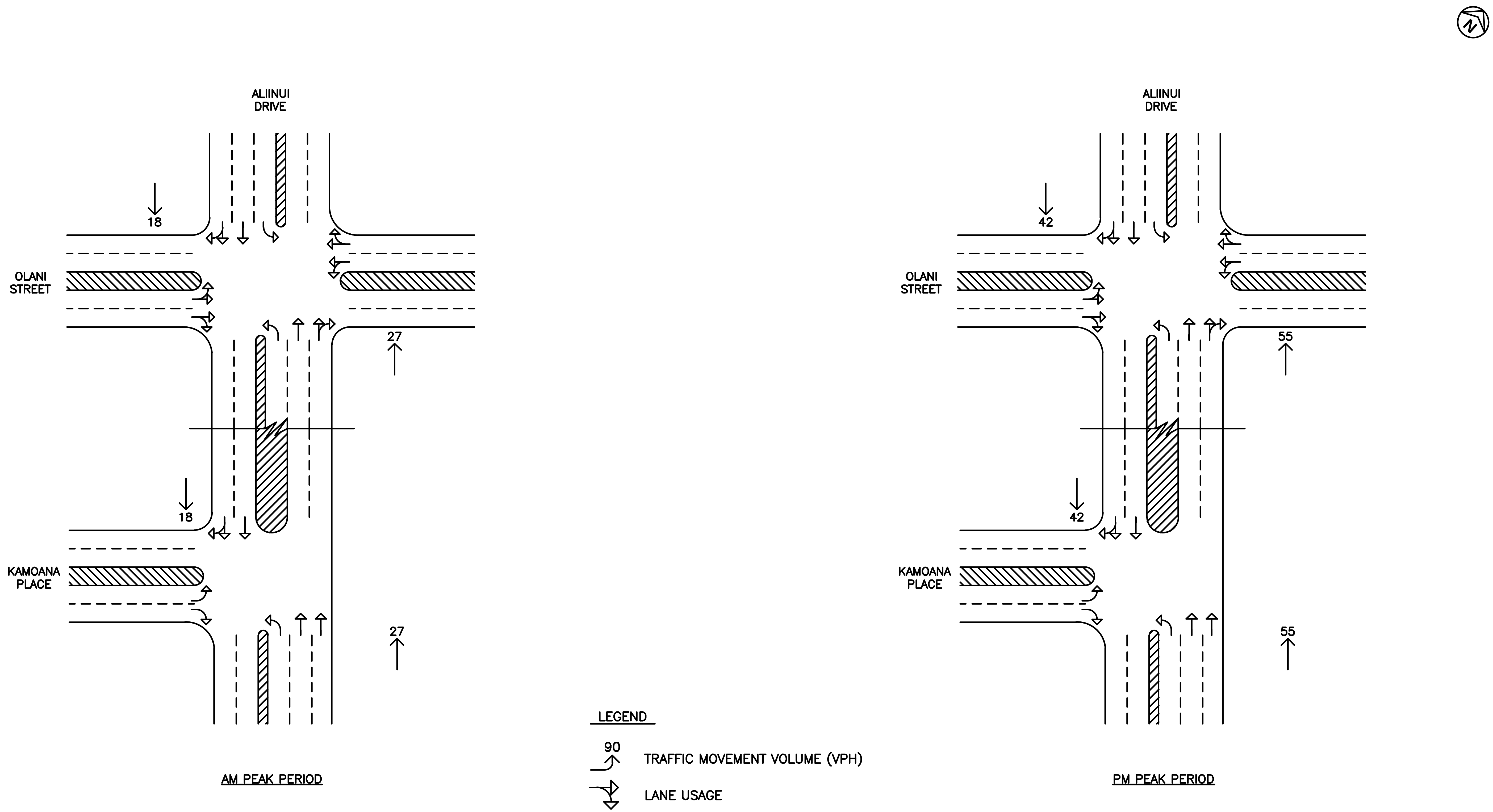
SHOPPING CENTER		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	3
	EXIT	1
	TOTAL	4
PM PEAK	ENTER	7
	EXIT	7
	TOTAL	14
QUALITY RESTAURANT		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	11
	EXIT	11
	TOTAL	2212
PM PEAK	ENTER	57
	EXIT	28
	TOTAL	85
FAST FOOD RESTAURANT WITHOUT A DRIVE-THROUGH WINDOW		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	25
	EXIT	17
	TOTAL	42
PM PEAK	ENTER	23
	EXIT	23
	TOTAL	46

Table 2: Adjusted Peak Hour Trip Generation (Cont'd)

TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	38
	EXIT	29
	TOTAL	67
PM PEAK	ENTER	87
	EXIT	58
	TOTAL	145

2. Trip Distribution

Figure 4 shows the distribution of site-generated traffic during the AM and PM peak periods. Access to the project site will continue to be provided via the existing driveways off Aliinui Drive. As previously discussed, the trips associated with the luau/entertainment venue were captured within the baseline counts. The directional distribution of those trips is expected to remain similar to baseline conditions. Additional site-generated trips associated with the proposed project are expected to be divided between those that will access the project site internally from areas within the Ko Olina Resort and those that will access the project from external. The synergy between the existing hotel, commercial, and restaurant uses within the Ko Olina resort is expected to translate to the similar uses planned by the development. In addition, it should be noted that the proposed retail spaces are expected to feature specialty products that typically cater to visitors and guests to the islands. For these reasons, the majority of the trips associated with the new commercial and restaurant uses are expected to be internal trips within the Ko Olina Resort with the exception of trips associated with the high-quality restaurant since high-quality restaurants are often associated with a celebrity name or a recognizable brand that may appeal to patrons outside of the immediate resort community. As such, 20% of the site-generated trips associated with the high-quality restaurant were assumed to be external trips with 80% assumed to be internal trips within the resort. The directional distribution of all additional site-generated trips was based upon their assumed



WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

DISTRIBUTION OF SITE-GENERATED VEHICLES WITH PROJECT

FIGURE 4

origin/destination (internal vs external), allowed turning movements, and relative convenience of the available routes.

B. Through Traffic Forecasting Methodology

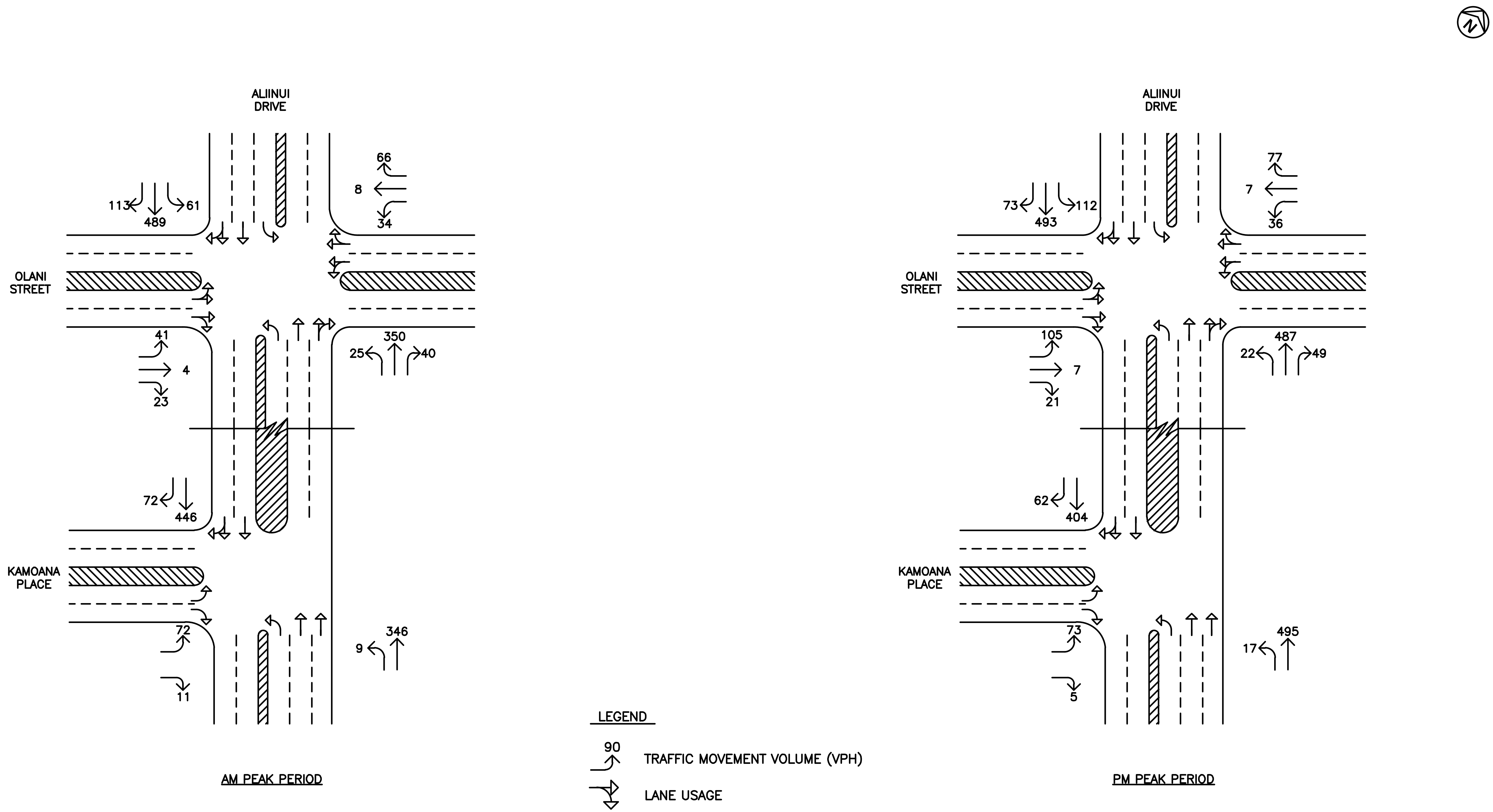
There is insufficient historical traffic data available in the immediate vicinity of the project site to determine a historical trend. However, the influence of other developments within the Ko Olina Resort area are addressed in the following section. For the purpose of this report, an average annual growth rate of 0.5% was conservatively assumed along Aliinui Drive to account for ambient growth in traffic along that roadway due to other influence. Using 2023 as the Base Year, a growth rate of 1.02 was applied to the baseline through traffic demands along Aliinui Drive to achieve the projected Year 2027 traffic demands.

C. Other Considerations

There are currently a number of undeveloped parcels adjacent to Aliinui Drive within the Ko Olina Resort. Several of these parcels were under consideration for development in recent years, but none of these development plans have moved beyond the initial planning stages at this time. As such, additional development in the region is possible in the future but is not expected to occur prior to the completion of the Cove at Ko Olina development and no additional projects were included in the without project conditions for this report. It should be noted, however, that as indicated in the previous section, an ambient growth factor was incorporated into the analysis to account of some growth by Year 2027.

D. Total Traffic Volumes Without Project

The projected Year 2027 AM and PM peak period traffic volumes and operating conditions without the redevelopment of the Cove at Ko Olina is shown in Figure 5 and summarized in Table 3. The analysis incorporates ambient growth in traffic. The baseline levels of service are provided for comparison purposes. LOS calculations are included in Appendix D.



WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

YEAR 2027 PEAK HOURS OF TRAFFIC WITHOUT PROJECT

FIGURE 5

Table 3: Baseline and Year 2027 (Without Project) LOS Traffic Operating Conditions

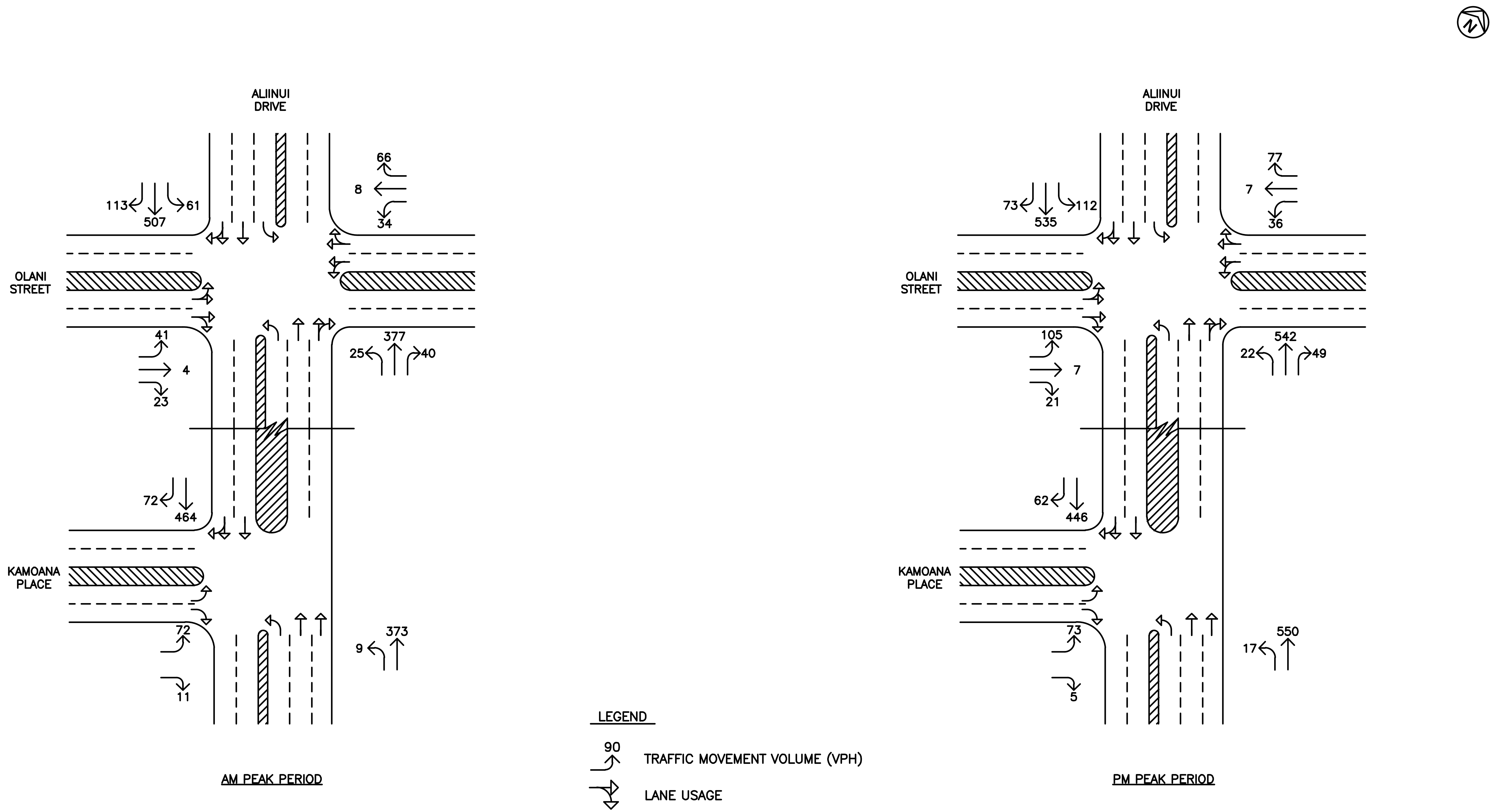
Intersection	Approach/ Critical Movement	AM		PM	
		Base-line	Year 2027 w/out Proj	Base-line	Year 2027 w/out Proj
Aliinui Dr/ Olani St	Eastbound	A	A	B	B
	Westbound	A	A	B	B
	Northbound	B	B	B	B
	Southbound	B	B	B	B
Aliinui Dr/ Kamoana Pl	Eastbound	C	C	C	C
	Northbound (LT*)	A	A	A	A

*LT = Left Turn

Under Year 2027 without project conditions, traffic operations are expected to remain similar to baseline conditions. Along Aliinui Drive, the approaches at the intersection with Olani Street are expected to continue operating at LOS "B" during the AM peak period, and LOS "B" during the PM peak period. At the intersection with Kamoana Place, traffic operations on the eastbound approach are expected to continue operating at LOS "C" or better during both peak periods, while the northbound left-turn lane along Aliinui Drive is expected to continue operating at LOS "A" or better during both peak periods. North of the project site along Aliinui Drive, minimal ambient growth in traffic is anticipated and as such, traffic operations are also expected to remain similar to baseline conditions.

E. Total Traffic Volumes With Project

Figure 6 shows the projected Year 2027 cumulative AM and PM peak hour traffic conditions resulting from the redevelopment of the Cove at Ko Olina. The cumulative volumes consist of site-generated traffic superimposed over Year 2027 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.



THE COVE AT KO OLINA

YEAR 2027 PEAK HOURS OF TRAFFIC WITH PROJECT

FIGURE 6

V. TRAFFIC IMPACT ANALYSIS

The projected Year 2027 cumulative AM and PM peak hour traffic conditions resulting from the proposed project are summarized in Table 4. The baseline and projected Year 2027 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix E.

Table 4: Baseline and Year 2027 (Without and With Project) LOS Traffic Operating Conditions

Intersection	Approach/ Critical Movement	AM			PM		
		Base-line	Year 2027		Base-line	Year 2027	
			w/o Proj	w/ Proj		w/o Proj	w/ Proj
Aliinui Dr/ Olani St	Eastbound	A	A	B	B	B	B
	Westbound	A	A	B	B	B	B
	Northbound	B	B	B	B	B	B
	Southbound	B	B	B	B	B	B
Aliinui Dr/ Kamoana Pl	Eastbound	C	C	C	C	C	C
	Northbound (LT*)	A	A	A	A	A	A

*LT = Left Turn

Under Year 2027 with project conditions, traffic operations are generally expected to remain similar to baseline and without project conditions. Along Aliinui Drive the approaches at the intersection with Olani Street are expected to continue operating at LOS "B" or better during both peak periods, whereas those at the intersection with Kamoana Place are expected to continue operating at LOS "C" or better during both periods. As previously discussed, a portion of trips are assumed to travel to/from areas external to the resort via Aliinui Drive north of the project site. With the addition of site-generated trips as result of the proposed redevelopment, traffic volumes along Aliinui Drive north of the project site are expected to increase by approximately 1% during the AM peak period and 3% during the PM peak period. These increases in the total traffic volumes are generally within the range of daily fluctuations along the surrounding roadways and represent a minimal increase in the overall traffic volumes. As such, traffic operations along Aliinui Drive near the project driveways are also expected to remain similar to without project conditions.

VI. MULTIMODAL FACILITIES

A. Pedestrian Facilities

The proposed project is located within the Ko Olina Resort, a master-planned resort and residential community that includes a network of improved pedestrian facilities that facilitate access between the various destinations within the resort. These pedestrian facilities are generally comprised of sidewalks, shared-use paths, crosswalks, and curb ramps with overhead lighting, canopy trees, and other landscaping treatments that enhance the overall pedestrian environment.

Pedestrian facilities along Aliinui Drive are predominantly located on the west side of the roadway except in the vicinity of Olani Street where commercial and restaurant uses are located. In the vicinity of the Cove at Ko Olina along Aliinui Drive, continuous improved (paved) sidewalks are provided along the west side of the roadway with wide, landscaped strips that serve as a buffer between the pedestrian zone of the walkway and vehicle travel way, and trees that provide intermittent shade. In addition, overhead street lighting is provided along both sides of the roadway to increase pedestrian comfort during the evening hours. The nearest pedestrian crossing from the project site is located at the intersection of Aliinui Drive and Olani Street. At this location, pedestrian crossings are facilitated by marked crosswalk, curb ramps, and a traffic signal system.

Along Olani Street and Kamoana Place, similar continuous improved sidewalks buffered by landscaping strips are also provided to facilitate access to the adjacent hotel and commercial uses. Trees and other landscaping treatments increase the attractiveness of these facilities and enhance the overall pedestrian experience. See Figure 7 for pedestrian facilities in the vicinity of the project.

B. Bicycle Facilities

1. Methodology

Bicycle Level of Traffic Stress (LTS) is a metric developed by the Mineta Transportation Institute used to classify a roadway segment or intersection. The LTS ranking system is based on the amount of traffic stress imposed on cyclists based on variables such as street width, prevailing vehicle speed, and average daily traffic volumes. The Level of Traffic Stress ranges

WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

PEDESTRIAN FACILITIES

FIGURE 7

from 1 to 4 and can be assessed for a given segment or intersection via six tables provided by the Mineta Transportation Institute. The general descriptions of the LTS levels are as follows:

- LTS 1: Characterized by strong separation from all except low speed, low volume traffic. Simple crossings. Suitable for children.
- LTS 2: Except in low speed/low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. There is a physical separation from higher speed and multilane traffic. Crossings are easy for an adult to navigate. This refers to a level of traffic stress that most adults can tolerate, particularly those sometimes classified as interested but concerned.
- LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. Refers to a level of traffic stress acceptable to those classified as enthused and confident.
- LTS 4: Involves interaction with higher speed traffic or close proximity to high-speed traffic. Refers to a level of stress acceptable only to those classified as strong and fearless.

It should be noted that current LTS methodology assumes no traffic stress is imposed on cyclists at signalized intersections. Guidance provided by the Mineta Transportation Institute includes categorizing signalized intersections as a LTS 2.

2. Existing Conditions and Bicycle Level of Traffic Stress

Within the Ko Olina Resort, existing bicycle facilities include bike lanes along both sides of Aliinui Drive between the Ko Olina Resort entrance and the southern terminus of Aliinui Drive. It should be noted that pavement markings along this roadway indicate that golf carts are also permitted to use this lane. Outside of the Ko Olina Resort area, there are currently limited bicycle facilities along Farrington Highway with bicyclists observed utilizing the shoulder areas of the highway.

The Level of Traffic Stress (LTS) was assessed for the roadways in the vicinity of the project to determine the level of stress imposed upon bicyclists on the prevailing speed and geometric characteristics of the roadway. Near the on-and off-ramps to Aliinui Drive, Farrington Highway is rated at LTS 4 due to the lack of dedicated bicycle facilities along this roadway thereby requiring bicyclists to be in close proximity with high-speed traffic. Along Aliinui Drive, the roadway segment between Farrington Highway and the resort entrance is rated at LTS 3. Although traffic volumes along Aliinui Drive are less, the level of traffic stress imposed upon bicyclists is influenced by the lack of dedicated bike facilities and multilane configuration of this roadway segment. South of the Ko Olina Resort entrance, Aliinui Drive improves to LTS 2 due to the provision of bike lanes along both sides of the roadway. Figure 8 depicts the existing bicycle facilities in the vicinity of the project while Figure 9 shows the existing LTS.

It should be noted that the City and County of Honolulu also has additional bike improvements planned vicinity of the project (see Figure 8). These improvements are included in the Oahu Bike Plan (updated 2019) published by the City's Department of Transportation Services. These include the provision of bikes lane along Aliinui Drive between the Ko Olina Resort entrance and Farrington Highway and conversion of the existing bike lanes along Aliinui Drive south of the main entrance to buffered bike lanes. In addition, north of the project site, a new shared-use path is planned to run alongside the heritage railway route with shoulder bikeways proposed along Farrington Highway from Piliokahi Avenue to Kalaeloa Boulevard. Although the development of these additional facilities is expected to increase the number of bicycle facilities and may reduce the level of traffic stress for bicyclists within the project vicinity, the timeline for these improvements is not known at this time.

C. Transit Facilities

1. Methodology

Transit Capacity and Quality of Service is a metric used to measure transit availability, comfort, and convenience from both the passenger and transit service provider's points of view. The framework for this metric is outlined in the Transit Cooperative Research Program (TCRP) Report 165: Transit Capacity and Quality of Service Manual (TCQSM), 3rd Edition published in 2013 which provides research-based guidance on public transit

WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

EXISTING AND PROPOSED BICYCLE FACILITIES

FIGURE 8

WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

EXISTING BIKE LEVEL OF TRAFFIC STRESS

FIGURE 9

capacity and quality of service. The quality of service concepts and methods contained in the TCQSM address real-world transit operations, comprehensive planning, and design needs. The research for and development of the TCQSM has also directly supported the development of the Multimodal Level of Service (LOS) analysis methodologies introduced in the Highway Capacity Manual (HCM) 2010 and subsequently refined in HCM 6. Multimodal LOS analyzes a roadway corridor comprised of street segments which are defined as a length of street between intersections where traffic may have to stop due to traffic control. Transit LOS can be directly compared to other transportation modes with LOS "A" representing the best quality of service and the letter "F" used to represent the worst quality of service. The assessment evaluates the quality of transit operations incorporating factors that bear all aspect of a transit trip including the pedestrian environment along the street, service frequency and reliability, and the availability of transit amenities at those stop locations.

2. Existing Conditions and Transit LOS

Transit service in the vicinity of the project is currently limited to routes along Farrington Highway. The nearest bus stop is located along the eastbound direction of that roadway approximately 2,000 feet from the project site (~ less than half a mile). That bus stop is served by "TheBus" which is operated by the Oahu Transit Service (OTS) for the City and County of Honolulu Department of Transportation Services. To verify the existing quality of service for the transit facilities in the project vicinity, an assessment of these facilities was conducted based on the methodology outlined by the TCQSM. The transit facility along this segment of Farrington Highway is rated at LOS "A" since it is served by several local and express bus routes with headways of 30 minutes or less. However, it should be noted that there are limited improved pedestrian facilities to and from this bus stop with minimal transit amenities provided. Figure 10 depicts the existing transit facilities and transit LOS in the vicinity of the project. Transit LOS calculations are included in Appendix F.

WILSON OKAMOTO CORPORATION

THE COVE AT KO OLINA

TRANSIT FACILITIES AND TRANSIT LOS

FIGURE 10

VII. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study to be incorporated in the project design.

1. Maintain sufficient sight distance for motorists to safely enter and exit all project driveways.

2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.

3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.

4. Maintain sufficient turning radii at all project driveways to avoid vehicle encroachments to oncoming traffic lanes.

5. Provide sufficient turning radii along the internal connections to accommodate all anticipated vehicle types for the proposed uses.

6. If access at the entrances to the parking areas are controlled, provide sufficient storage for entering vehicles at the parking area access controls (i.e. automatic gate, use of personnel, etc.) to ensure that queues do not extend onto the adjacent roadways. The layout and dimensions shall be determined during the design phase.

7. Maintain the existing one-way (southbound) traffic flow along the connection between the northern and southern driveways.

8. Provide sufficient passing areas within the main drop-off/arrival area to accommodate all anticipated vehicle types and minimize potential conflicts with vehicles accessing the adjacent parking stalls, facilitate through traffic flow and ensure queues do not extend onto the adjacent roadway.

9. Provide adequate wayfinding signs to direct visitors to their intended destinations.

10. Provide adequate space within the bus parking stalls to allow for loading and unloading activities to occur while parking in this area. The exact configurations and dimensions shall be determined during the design phase.

11. If valet operations are expected to be implemented, consider the location of the parking area designated for valet to minimize potential conflicts with other modes.

12. Provide adequate pedestrian connections to facilitate access between on-and off-site facilities. Pedestrian facilities should be made accessible in conformance with the Americans with Disabilities Act (ADA).

13. Incorporate on-site pedestrian improvements in the design of the project to provide adequate access between the parking areas and on-site uses, as well as to increase pedestrian visibility while traversing the project site. In particular, consideration should be given to ensure adequate access is provided between the designated ADA parking stalls within the staff lot and the uses on-site. These improvements may include marked or raised crosswalks at the internal intersections, bulb outs to reduce pedestrian crossing, and street lighting. Pedestrian facilities should be made accessible in conformance with the Americans with Disabilities Act.

14. Consider coordinating with the Ko Olina Resort management to explore the possibility of offering shuttle service to/from the Cove at Ko Olina development to increase mobility, encourage the use of alternate modes of travel, and minimize internal trips.

15. Provide improved bicycle facilities within the project boundaries to encourage the use of this alternate mode of travel. Appropriate access and lighting should be taken into consideration in the design of these facilities. It should be noted that the current plans do not include secured bike parking facilities on-site. As such, consideration should be given to providing secured parking to further encourage the use of this mode. It should be noted that the project site plan includes bicycle facilities within the north and southeast ends of the site.

16. Provide adequate connections to and from the bike parking areas to ensure convenient and safe pedestrian and bicyclist access, as well as connections to the bike lanes along Aliinui Drive adjacent to the project site.

17. Prepare a Parking and Loading Management Plan that includes parking and loading strategies to address potential issues associated with conflicts between modes on site, parking for guests and employees, and loading operations.

VIII. CONCLUSION

The proposed project entails the redevelopment of the existing Cove at Ko Olina property within the Ko Olina Resort. The redeveloped site is expected to include a new amphitheater to house luau events similar to existing uses, as well as restaurant and retail uses and ancillary spaces. In conjunction with the proposed redevelopment, the existing parking areas within the project site will be reconfigured to convert a portion of the stalls currently designated for bus parking as standard parking for passenger vehicles. Access to the project site will continue to be provided via existing driveways off Aliinui Drive with vehicles entering the project site via the northern driveway and exiting via the southern driveway. The proposed project is expected to be completed by Year 2027. Under with project conditions, traffic operations in the vicinity of the project are generally expected to remain similar to baseline and without project conditions. The proposed amphitheater is expected to house luau/entertainment events similar to existing uses with a maximum capacity less than existing conditions. As such, the proposed amphitheater is not anticipated to generate additional new trips in the project vicinity. In addition, synergy between the existing and proposed uses within the Ko Olina Resort is anticipated with a significant portion of trips associated with the proposed restaurant and retail uses expected to be made via non-motorized modes given the availability of improved pedestrian facilities in the vicinity of the project. Although traffic operations are generally expected to remain similar to without project conditions, the preparation of a parking and loading management plan is recommended to identify management strategies to address potential issues with parking and loading operations. In addition, since a high portion of trips to the project site is expected to be made via non-motorized modes, consideration should also be given to incorporating pedestrian and bicycle improvements to increase pedestrian visibility while traversing the project site. With the implementation of the aforementioned recommendations, the proposed project is not expected to have a significant impact on the surrounding roadway network.

APPENDIX A

BASELINE TRAFFIC COUNT DATA

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Site Code: Ali'inui Drive
Station ID: 30614

Start Time	05-Sep-18 Wed	Northbound Ali'inui Drive Morning	Afternoon	Hour Totals Morning	Afternoon
12:00		*	134		
12:15		*	136		
12:30		*	100		
12:45		*	122	0	492
01:00		*	134		
01:15		*	121		
01:30		*	125		
01:45		*	138	0	518
02:00		*	116		
02:15		*	145		
02:30		*	141		
02:45		*	165	0	567
03:00		*	164		
03:15		*	205		
03:30		*	144		
03:45		*	185	0	698
04:00		*	154		
04:15		*	196		
04:30		*	176		
04:45		*	204	0	730
05:00		*	139		
05:15		*	166		
05:30		*	156		
05:45		*	124	0	585
06:00		*	106		
06:15		*	132		
06:30		*	112		
06:45		*	117	0	467
07:00		*	136		
07:15		*	112		
07:30		*	94		
07:45		*	78	0	420
08:00		*	63		
08:15		*	96		
08:30		*	98		
08:45		*	124	0	381
09:00		*	87		
09:15		*	106		
09:30		*	78		
09:45		*	81	0	352
10:00		*	76		
10:15		148	94		
10:30		139	49		
10:45		111	52	398	271
11:00		114	31		
11:15		105	67		
11:30		93	47		
11:45		106	27	418	172
Total		816	5653		
Percent		12.6%	87.4%		

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Site Code: Ali'inui Drive
Station ID: 30614

Start Time	06-Sep-18 Thu	Northbound Ali'inui Drive Morning	Afternoon	Hour Totals Morning	Afternoon
12:00		15	112		
12:15		34	108		
12:30		18	106		
12:45		4	110	71	436
01:00		22	134		
01:15		3	123		
01:30		6	138		
01:45		3	151	34	546
02:00		0	142		
02:15		9	158		
02:30		4	156		
02:45		2	177	15	633
03:00		0	134		
03:15		2	150		
03:30		4	155		
03:45		11	153	17	592
04:00		9	130		
04:15		10	169		
04:30		22	184		
04:45		32	200	73	683
05:00		30	120		
05:15		40	156		
05:30		44	110		
05:45		50	128	164	514
06:00		73	92		
06:15		65	92		
06:30		66	*		
06:45		78	*	282	184
07:00		93	*		
07:15		101	*		
07:30		116	*		
07:45		111	*	421	0
08:00		113	*		
08:15		140	*		
08:30		116	*		
08:45		122	*	491	0
09:00		114	*		
09:15		110	*		
09:30		124	*		
09:45		126	*	474	0
10:00		110	*		
10:15		117	*		
10:30		116	*		
10:45		109	*	452	0
11:00		127	*		
11:15		126	*		
11:30		121	*		
11:45		146	*	520	0
Total		3014	3588		
Percent		45.7%	54.3%		
Grand Total			3830	9241	
Percent			29.3%	70.7%	
ADT			ADT 8,468		AADT 8,468

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Site Code: Ali'inui Drive
Station ID: 30616

Start Time	05-Sep-18 Wed	Southbound Ali'inui Drive Morning	Afternoon	Hour Totals Morning	Afternoon
12:00		*	128		
12:15		*	122		
12:30		*	122		
12:45		*	132	0	504
01:00		*	123		
01:15		*	136		
01:30		*	165		
01:45		*	158	0	582
02:00		*	138		
02:15		*	159		
02:30		*	181		
02:45		*	177	0	655
03:00		*	181		
03:15		*	120		
03:30		*	199		
03:45		*	152	0	652
04:00		*	170		
04:15		*	140		
04:30		*	124		
04:45		*	160	0	594
05:00		*	150		
05:15		*	149		
05:30		*	128		
05:45		*	146	0	573
06:00		*	108		
06:15		*	118		
06:30		*	87		
06:45		*	97	0	410
07:00		*	106		
07:15		*	68		
07:30		*	68		
07:45		*	77	0	319
08:00		*	65		
08:15		*	81		
08:30		*	73		
08:45		*	72	0	291
09:00		*	60		
09:15		*	51		
09:30		*	64		
09:45		*	57	0	232
10:00		105	66		
10:15		100	51		
10:30		120	41		
10:45		92	25	417	183
11:00		80	24		
11:15		102	24		
11:30		110	13		
11:45		124	8	416	69
Total		833	5064		
Percent		14.1%	85.9%		

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Site Code: Ali'inui Drive
Station ID: 30616

Start Time	06-Sep-18 Thu	Southbound Ali'inui Drive Morning	Afternoon	Hour Totals Morning	Afternoon
12:00		2	130		
12:15		8	122		
12:30		6	128		
12:45		5	133	21	513
01:00		5	118		
01:15		3	134		
01:30		2	148		
01:45		1	164	11	564
02:00		4	152		
02:15		1	166		
02:30		3	138		
02:45		4	96	12	552
03:00		5	128		
03:15		9	104		
03:30		11	95		
03:45		14	131	39	458
04:00		14	150		
04:15		22	192		
04:30		40	157		
04:45		39	184	115	683
05:00		29	196		
05:15		55	159		
05:30		62	152		
05:45		80	134	226	641
06:00		84	103		
06:15		90	10		
06:30		125	*		
06:45		124	*	423	113
07:00		110	*		
07:15		136	*		
07:30		168	*		
07:45		174	*	588	0
08:00		206	*		
08:15		139	*		
08:30		130	*		
08:45		146	*	621	0
09:00		136	*		
09:15		114	*		
09:30		132	*		
09:45		134	*	516	0
10:00		109	*		
10:15		118	*		
10:30		114	*		
10:45		106	*	447	0
11:00		94	*		
11:15		104	*		
11:30		102	*		
11:45		122	*	422	0
Total		3441	3524		
Percent		49.4%	50.6%		
Grand Total		4274	8588		
Percent		33.2%	66.8%		
ADT		ADT 8,356			AADT 8,356

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted by:SS
Counters:D4-5674
Weather:CLEAR

File Name : ALI KAM AM - 2
Site Code : 00000002
Start Date : 9/6/2018
Page No : 1

Groups Printed- Unshifted

	Ali'inui Dr Westbound			Kamoana Pl Northbound				Ali'inui Dr Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	Peds	App. Total	Thru	Right	App. Total	Int. Total
06:00 AM	1	49	50	6	0	5	11	63	5	68	129
06:15 AM	2	47	49	8	4	11	23	50	15	65	137
06:30 AM	3	49	52	4	4	4	12	92	11	103	167
06:45 AM	3	60	63	10	4	10	24	79	19	98	185
Total	9	205	214	28	12	30	70	284	50	334	618
07:00 AM	1	64	65	11	2	12	25	74	15	89	179
07:15 AM	3	84	87	11	3	19	33	95	17	112	232
07:30 AM	3	93	96	15	3	17	35	108	13	121	252
07:45 AM	0	62	62	23	2	11	36	117	30	147	245
Total	7	303	310	60	10	59	129	394	75	469	908
08:00 AM	4	100	104	18	1	14	33	125	17	142	279
08:15 AM	2	84	86	16	5	11	32	87	12	99	217
08:30 AM	1	89	90	15	1	17	33	95	17	112	235
08:45 AM	1	71	72	10	0	10	20	93	11	104	196
Total	8	344	352	59	7	52	118	400	57	457	927
Grand Total	24	852	876	147	29	141	317	1078	182	1260	2453
Apprch %	2.7	97.3		46.4	9.1	44.5		85.6	14.4		
Total %	1	34.7	35.7	6	1.2	5.7	12.9	43.9	7.4	51.4	

	Ali'inui Dr Westbound			Kamoana Pl Northbound			Ali'inui Dr Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	3	84	87	11	3	14	95	17	112	213
07:30 AM	3	93	96	15	3	18	108	13	121	235
07:45 AM	0	62	62	23	2	25	117	30	147	234
08:00 AM	4	100	104	18	1	19	125	17	142	265
Total Volume	10	339	349	67	9	76	445	77	522	947
% App. Total	2.9	97.1		88.2	11.8		85.2	14.8		
PHF	.625	.848	.839	.728	.750	.760	.890	.642	.888	.893

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted by:SS
Counters:D4-5674
Weather:CLEAR

File Name : ALI KAM PM - 2
Site Code : 00000002
Start Date : 9/6/2018
Page No : 1

Groups Printed- Unshifted

	Ali'inui Dr Westbound			Kamoana Pl Northbound				Ali'inui Dr Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	Peds	App. Total	Thru	Right	App. Total	Int. Total
03:00 PM	1	79	80	14	2	1	17	79	2	81	178
03:15 PM	4	86	90	8	6	6	20	59	3	62	172
03:30 PM	5	133	138	9	1	3	13	79	10	89	240
03:45 PM	2	82	84	5	4	7	16	74	10	84	184
Total	12	380	392	36	13	17	66	291	25	316	774
04:00 PM	2	91	93	9	4	14	27	103	12	115	235
04:15 PM	4	130	134	13	1	9	23	100	13	113	270
04:30 PM	3	134	137	17	0	10	27	84	16	100	264
04:45 PM	4	121	125	18	2	12	32	100	21	121	278
Total	13	476	489	57	7	45	109	387	62	449	1047
05:00 PM	6	100	106	25	2	12	39	112	12	124	269
05:15 PM	1	94	95	10	3	8	21	87	10	97	213
05:30 PM	2	92	94	6	2	23	31	107	9	116	241
05:45 PM	2	79	81	10	3	7	20	86	8	94	195
Total	11	365	376	51	10	50	111	392	39	431	918
Grand Total	36	1221	1257	144	30	112	286	1070	126	1196	2739
Apprch %	2.9	97.1		50.3	10.5	39.2		89.5	10.5		
Total %	1.3	44.6	45.9	5.3	1.1	4.1	10.4	39.1	4.6	43.7	

	Ali'inui Dr Westbound			Kamoana Pl Northbound			Ali'inui Dr Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	4	130	134	13	1	14	100	13	113	261
04:30 PM	3	134	137	17	0	17	84	16	100	254
04:45 PM	4	121	125	18	2	20	100	21	121	266
05:00 PM	6	100	106	25	2	27	112	12	124	257
Total Volume	17	485	502	73	5	78	396	62	458	1038
% App. Total	3.4	96.6		93.6	6.4		86.5	13.5		
PHF	.708	.905	.916	.730	.625	.722	.884	.738	.923	.976

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted by:JT, SH
Counters:D4-3890, D4-5675
Weather:CLEAR

File Name : ALI OLA AM
Site Code : 00000001
Start Date : 9/6/2018
Page No : 1

Groups Printed- Unshifted

	Ali'inui Dr Southbound					Olani St Westbound					Ali'inui Dr Northbound					Olani St Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	6	67	10	1	84	1	1	9	0	11	3	49	3	3	58	12	0	2	2	16	169
06:15 AM	17	64	19	7	107	3	0	15	0	18	1	49	8	6	64	7	0	1	0	8	197
06:30 AM	14	91	29	1	135	9	2	19	0	30	0	41	7	18	66	4	1	5	2	12	243
06:45 AM	6	83	21	1	111	12	3	18	0	33	3	59	8	12	82	2	0	2	1	5	231
Total	43	305	79	10	437	25	6	61	0	92	7	198	26	39	270	25	1	10	5	41	840
07:00 AM	11	79	13	2	105	4	1	10	0	15	8	62	7	30	107	9	2	4	9	24	251
07:15 AM	12	112	26	0	150	4	3	12	3	22	5	79	7	21	112	1	1	0	3	5	289
07:30 AM	10	112	34	3	159	10	3	19	2	34	6	83	9	46	144	5	1	2	4	12	349
07:45 AM	7	149	37	4	197	6	0	16	0	22	5	74	10	24	113	6	1	6	2	15	347
Total	40	452	110	9	611	24	7	57	5	93	24	298	33	121	476	21	5	12	18	56	1236
08:00 AM	25	126	19	3	173	4	3	16	3	26	9	91	11	58	169	21	1	6	4	32	400
08:15 AM	19	92	23	2	136	14	2	15	1	32	5	95	10	29	139	9	1	9	9	28	335
08:30 AM	20	83	12	2	117	17	1	13	0	31	8	82	10	47	147	14	1	6	10	31	326
08:45 AM	20	88	25	5	138	12	6	20	6	44	3	59	10	52	124	15	3	5	1	24	330
Total	84	389	79	12	564	47	12	64	10	133	25	327	41	186	579	59	6	26	24	115	1391
Grand Total	167	1146	268	31	1612	96	25	182	15	318	56	823	100	346	1325	105	12	48	47	212	3467
Apprch %	10.4	71.1	16.6	1.9		30.2	7.9	57.2	4.7		4.2	62.1	7.5	26.1		49.5	5.7	22.6	22.2		
Total %	4.8	33.1	7.7	0.9	46.5	2.8	0.7	5.2	0.4	9.2	1.6	23.7	2.9	10	38.2	3	0.3	1.4	1.4	6.1	

	Ali'inui Dr Southbound				Olani St Westbound				Ali'inui Dr Northbound				Olani St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	10	112	34	156	10	3	19	32	6	83	9	98	5	1	2	8	294
07:45 AM	7	149	37	193	6	0	16	22	5	74	10	89	6	1	6	13	317
08:00 AM	25	126	19	170	4	3	16	23	9	91	11	111	21	1	6	28	332
08:15 AM	19	92	23	134	14	2	15	31	5	95	10	110	9	1	9	19	294
Total Volume	61	479	113	653	34	8	66	108	25	343	40	408	41	4	23	68	1237
% App. Total	9.3	73.4	17.3		31.5	7.4	61.1		6.1	84.1	9.8		60.3	5.9	33.8		
PHF	.610	.804	.764	.846	.607	.667	.868	.844	.694	.903	.909	.919	.488	1.00	.639	.607	.931

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu HI, 96826

Counted by:JT, SH
Counters:D4-3890, D4-5675
Weather:CLEAR

File Name : ALI OLA PM
Site Code : 00000001
Start Date : 9/6/2018
Page No : 1

Groups Printed- Unshifted

	Ali'inui Dr Southbound					Olani St Westbound					Ali'inui Dr Northbound					Olani St Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	26	71	15	7	119	13	1	27	3	44	4	89	8	34	135	27	2	5	0	34	332
03:15 PM	18	57	12	2	89	7	0	11	2	20	3	79	10	29	121	27	1	4	0	32	262
03:30 PM	20	78	5	4	107	7	2	15	2	26	4	128	8	34	174	13	2	6	11	32	339
03:45 PM	24	87	12	10	133	10	2	21	3	36	2	82	7	35	126	19	2	4	13	38	333
Total	88	293	44	23	448	37	5	74	10	126	13	378	33	132	556	86	7	19	24	136	1266
04:00 PM	19	110	20	2	151	10	2	12	4	28	3	94	5	22	124	31	2	5	3	41	344
04:15 PM	30	116	19	6	171	7	1	19	6	33	5	124	13	62	204	26	5	8	7	46	454
04:30 PM	23	103	20	12	158	9	3	14	5	31	2	135	9	37	183	36	0	4	10	50	422
04:45 PM	36	131	17	7	191	12	2	19	1	34	7	124	14	43	188	22	0	4	2	28	441
Total	108	460	76	27	671	38	8	64	16	126	17	477	41	164	699	115	7	21	22	165	1661
05:00 PM	23	133	17	18	191	8	1	25	3	37	8	94	13	36	151	21	2	5	13	41	420
05:15 PM	33	100	11	11	155	11	3	13	3	30	6	89	12	25	132	18	2	2	3	25	342
05:30 PM	27	105	14	10	156	17	2	18	0	37	2	84	12	55	153	19	3	4	4	30	376
05:45 PM	12	90	2	11	115	13	0	9	0	22	4	78	2	49	133	15	0	2	8	25	295
Total	95	428	44	50	617	49	6	65	6	126	20	345	39	165	569	73	7	13	28	121	1433
Grand Total	291	1181	164	100	1736	124	19	203	32	378	50	1200	113	461	1824	274	21	53	74	422	4360
Apprch %	16.8	68	9.4	5.8		32.8	5	53.7	8.5		2.7	65.8	6.2	25.3		64.9	5	12.6	17.5		
Total %	6.7	27.1	3.8	2.3	39.8	2.8	0.4	4.7	0.7	8.7	1.1	27.5	2.6	10.6	41.8	6.3	0.5	1.2	1.7	9.7	

	Ali'inui Dr Southbound				Olani St Westbound				Ali'inui Dr Northbound				Olani St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	30	116	19	165	7	1	19	27	5	124	13	142	26	5	8	39	373
04:30 PM	23	103	20	146	9	3	14	26	2	135	9	146	36	0	4	40	358
04:45 PM	36	131	17	184	12	2	19	33	7	124	14	145	22	0	4	26	388
05:00 PM	23	133	17	173	8	1	25	34	8	94	13	115	21	2	5	28	350
Total Volume	112	483	73	668	36	7	77	120	22	477	49	548	105	7	21	133	1469
% App. Total	16.8	72.3	10.9		30	5.8	64.2		4	87	8.9		78.9	5.3	15.8		
PHF	.778	.908	.913	.908	.750	.583	.770	.882	.688	.883	.875	.938	.729	.350	.656	.831	.947

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR AUTOMOBILES AT SIGNALIZED INTERSECTIONS

LOS A describes operations with a control delay of 10s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C describes operations with control delay between 20 and 35s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most Cycles fail to clear the queue.

A lane group can incur a delay less than 80s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicated that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80s/veh represents failure from a delay perspective).

"Highway Capacity Manual," Transportation Research Board, 2016.

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE (LOS) CRITERIA FOR AUTOMOBILES AT A TWO-WAY STOP CONTROLLED (TWSC) INTERSECTIONS

LOS for a TWSC intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns by using criteria shown below. Major-street through vehicles are assumed to experience zero delay. LOS F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay.

The following lists the LOS criteria for a TWSC intersection:

LOS A describes operations with a control delay of 10s/veh or less and a volume-to-capacity ratio no greater than 1.0.

LOS B describes operations with a control delay between 10s/veh and 15s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS C describes operations with a control delay between 15s/veh and 25s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS D describes operations with a control delay between 25s/veh and 35s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS E describes operations with a control delay between 35s/veh and 50s/veh and a volume-to-capacity ratio no greater than 1.0.

LOS F describes operations with a control exceeding 50s/veh and a volume-to-capacity ratio no greater than 1.0 or when the volume-to-capacity ratio exceeds 1.0, regardless of the measurement of the control delay.

“Highway Capacity Manual,” Transportation Research Board, 2016.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
BASELINE PEAK PERIOD TRAFFIC ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	4	23	34	8	66	25	343	40	61	479	113
Future Volume (veh/h)	41	4	23	34	8	66	25	343	40	61	479	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.91		0.89	0.90		0.89	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	4	25	37	9	71	27	369	43	66	515	122
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	645	82	509	599	131	571	309	1102	128	402	979	231
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	1110	184	1150	1039	296	1289	787	3203	370	966	2843	670
Grp Volume(v), veh/h	44	0	29	46	0	71	27	204	208	66	321	316
Grp Sat Flow(s),veh/h/ln	1110	0	1334	1336	0	1289	787	1777	1796	966	1777	1736
Q Serve(g_s), s	1.1	0.0	0.6	0.3	0.0	1.5	1.3	4.0	4.0	2.6	6.8	6.9
Cycle Q Clear(g_c), s	2.6	0.0	0.6	0.8	0.0	1.5	8.2	4.0	4.0	6.6	6.8	6.9
Prop In Lane	1.00		0.86	0.80		1.00	1.00		0.21	1.00		0.39
Lane Grp Cap(c), veh/h	645	0	591	730	0	571	309	612	618	402	612	598
V/C Ratio(X)	0.07	0.00	0.05	0.06	0.00	0.12	0.09	0.33	0.34	0.16	0.52	0.53
Avail Cap(c_a), veh/h	980	0	964	1102	0	932	808	1738	1757	1015	1738	1699
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.5	0.0	7.5	7.5	0.0	7.7	15.6	11.4	11.4	13.9	12.3	12.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.2	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	0.2	0.0	0.3	0.2	1.4	1.4	0.5	2.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.5	0.0	7.5	7.5	0.0	7.8	15.8	11.7	11.8	14.1	13.0	13.1
LnGrp LOS	A	A	A	A	A	A	B	B	B	B	B	B
Approach Vol, veh/h		73			117			439			703	
Approach Delay, s/veh		8.1			7.7			12.0			13.2	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.2		25.8		21.2		25.8				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		46.0		34.0		46.0		34.0				
Max Q Clear Time (g_c+I1), s		8.9		3.5		10.2		4.6				
Green Ext Time (p_c), s		4.9		0.7		2.9		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			12.0									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	7	21	36	7	77	22	477	49	112	483	73
Future Volume (veh/h)	105	7	21	36	7	77	22	477	49	112	483	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.90		0.88	0.89		0.88	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	7	22	38	7	81	23	502	52	118	508	77
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	581	144	451	567	96	558	349	1327	137	363	1262	190
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1073	326	1025	1061	219	1267	823	3243	335	846	3085	465
Grp Volume(v), veh/h	111	0	29	45	0	81	23	274	280	118	292	293
Grp Sat Flow(s),veh/h/ln	1073	0	1351	1279	0	1267	823	1777	1801	846	1777	1773
Q Serve(g_s), s	4.1	0.0	0.8	0.8	0.0	2.5	1.4	7.2	7.2	7.5	7.7	7.8
Cycle Q Clear(g_c), s	6.7	0.0	0.8	1.6	0.0	2.5	9.1	7.2	7.2	14.8	7.7	7.8
Prop In Lane	1.00		0.76	0.84		1.00	1.00		0.19	1.00		0.26
Lane Grp Cap(c), veh/h	581	0	595	663	0	558	349	727	737	363	727	726
V/C Ratio(X)	0.19	0.00	0.05	0.07	0.00	0.15	0.07	0.38	0.38	0.33	0.40	0.40
Avail Cap(c_a), veh/h	629	0	650	716	0	610	606	1283	1300	627	1283	1280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.1	0.0	10.6	10.9	0.0	11.1	17.1	13.7	13.7	18.9	13.9	13.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.5	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.4	0.0	0.7	0.2	2.7	2.7	1.4	2.9	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	0.0	10.7	10.9	0.0	11.2	17.2	14.0	14.1	19.4	14.2	14.3
LnGrp LOS	B	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		140			126			577			703	
Approach Delay, s/veh		12.7			11.1			14.2			15.1	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		32.2		34.3		32.2		34.3				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		48.0		32.0		48.0		32.0				
Max Q Clear Time (g_c+I1), s		11.1		8.7		16.8		4.5				
Green Ext Time (p_c), s		3.9		0.8		4.8		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	11	9	339	437	72
Future Vol, veh/h	72	11	9	339	437	72
Conflicting Peds, #/hr	0	0	53	0	0	53
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	130	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	81	12	10	381	491	81

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	796	339	625	0	-	0
Stage 1	585	-	-	-	-	-
Stage 2	211	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.14	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	408	724	952	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	854	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	364	687	904	-	-	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	579	-	-	-	-	-
Stage 2	811	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	16.7		0.2		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	904	-	364	687	-	-
HCM Lane V/C Ratio	0.011	-	0.222	0.018	-	-
HCM Control Delay (s)	9	-	17.7	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.8	0.1	-	-

Intersection						
Int Delay, s/veh	1.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	5	17	485	396	62
Future Vol, veh/h	73	5	17	485	396	62
Conflicting Peds, #/hr	0	0	43	0	0	43
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	130	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	5	17	495	404	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	761	277	510	0	-	0
Stage 1	479	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.14	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	425	780	1051	-	-	-
Stage 1	676	-	-	-	-	-
Stage 2	803	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	384	748	1008	-	-	-
Mov Cap-2 Maneuver	384	-	-	-	-	-
Stage 1	637	-	-	-	-	-
Stage 2	770	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1008	-	384	748	-	-
HCM Lane V/C Ratio	0.017	-	0.194	0.007	-	-
HCM Control Delay (s)	8.6	-	16.6	9.8	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0	-	-

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS
YEAR 2027 PEAK PERIOD TRAFFIC
ANALYSIS WITHOUT PROJECT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	4	23	34	8	66	25	350	40	61	489	113
Future Volume (veh/h)	41	4	23	34	8	66	25	350	40	61	489	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.91		0.89	0.90		0.89	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	4	25	37	9	71	27	376	43	66	526	122
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	642	81	508	596	131	569	307	1114	126	401	991	229
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1109	184	1149	1039	296	1289	779	3210	365	960	2856	659
Grp Volume(v), veh/h	44	0	29	46	0	71	27	207	212	66	326	322
Grp Sat Flow(s),veh/h/ln	1109	0	1333	1335	0	1289	779	1777	1798	960	1777	1739
Q Serve(g_s), s	1.1	0.0	0.6	0.3	0.0	1.5	1.4	4.1	4.1	2.6	6.9	7.0
Cycle Q Clear(g_c), s	2.6	0.0	0.6	0.8	0.0	1.5	8.4	4.1	4.1	6.7	6.9	7.0
Prop In Lane	1.00		0.86	0.80		1.00	1.00		0.20	1.00		0.38
Lane Grp Cap(c), veh/h	642	0	589	727	0	569	307	617	624	401	617	603
V/C Ratio(X)	0.07	0.00	0.05	0.06	0.00	0.12	0.09	0.34	0.34	0.16	0.53	0.53
Avail Cap(c_a), veh/h	974	0	958	1095	0	926	794	1727	1748	1002	1727	1690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.6	0.0	7.5	7.6	0.0	7.8	15.7	11.4	11.4	13.9	12.4	12.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.2	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	0.2	0.0	0.4	0.2	1.4	1.4	0.5	2.4	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.6	0.0	7.6	7.6	0.0	7.9	15.9	11.7	11.8	14.1	13.1	13.1
LnGrp LOS	A	A	A	A	A	A	B	B	B	B	B	B
Approach Vol, veh/h		73			117			446			714	
Approach Delay, s/veh		8.2			7.8			12.0			13.2	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.4		25.9		21.4		25.9				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		46.0		34.0		46.0		34.0				
Max Q Clear Time (g_c+I1), s		9.0		3.5		10.4		4.6				
Green Ext Time (p_c), s		5.0		0.7		2.9		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		12.1
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	7	21	36	7	77	22	487	49	112	493	73
Future Volume (veh/h)	105	7	21	36	7	77	22	487	49	112	493	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.90		0.88	0.88		0.88	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	7	22	38	7	81	23	513	52	118	519	77
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	578	143	450	565	96	556	346	1336	135	360	1272	188
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1072	326	1024	1060	219	1267	815	3251	328	838	3095	457
Grp Volume(v), veh/h	111	0	29	45	0	81	23	280	285	118	297	299
Grp Sat Flow(s),veh/h/ln	1072	0	1350	1279	0	1267	815	1777	1802	838	1777	1775
Q Serve(g_s), s	4.2	0.0	0.8	0.8	0.0	2.6	1.4	7.3	7.4	7.7	7.9	8.0
Cycle Q Clear(g_c), s	6.7	0.0	0.8	1.6	0.0	2.6	9.3	7.3	7.4	15.0	7.9	8.0
Prop In Lane	1.00		0.76	0.84		1.00	1.00		0.18	1.00		0.26
Lane Grp Cap(c), veh/h	578	0	593	661	0	556	346	731	741	360	731	730
V/C Ratio(X)	0.19	0.00	0.05	0.07	0.00	0.15	0.07	0.38	0.39	0.33	0.41	0.41
Avail Cap(c_a), veh/h	626	0	648	713	0	608	597	1278	1296	618	1278	1277
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	10.7	11.0	0.0	11.2	17.2	13.7	13.7	19.0	13.9	13.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.5	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.4	0.0	0.7	0.2	2.7	2.8	1.4	2.9	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.4	0.0	10.8	11.0	0.0	11.3	17.3	14.1	14.1	19.5	14.3	14.3
LnGrp LOS	B	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		140			126			588			714	
Approach Delay, s/veh		12.8			11.2			14.2			15.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	32.4	34.3	32.4	34.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	48.0	32.0	48.0	32.0
Max Q Clear Time (g_c+I1), s	11.3	8.7	17.0	4.6
Green Ext Time (p_c), s	4.0	0.8	4.9	0.8

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	11	9	346	446	72
Future Vol, veh/h	72	11	9	346	446	72
Conflicting Peds, #/hr	0	0	53	0	0	53
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	130	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	81	12	10	389	501	81

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	810	344	635	0	-	0
Stage 1	595	-	-	-	-	-
Stage 2	215	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.14	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	402	720	944	-	-	-
Stage 1	610	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	359	684	896	-	-	-
Mov Cap-2 Maneuver	359	-	-	-	-	-
Stage 1	573	-	-	-	-	-
Stage 2	808	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	896	-	359	684	-	-
HCM Lane V/C Ratio	0.011	-	0.225	0.018	-	-
HCM Control Delay (s)	9.1	-	17.9	10.4	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.9	0.1	-	-

Intersection						
Int Delay, s/veh	1.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	5	17	495	404	62
Future Vol, veh/h	73	5	17	495	404	62
Conflicting Peds, #/hr	0	0	43	0	0	43
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	130	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	5	17	505	412	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	774	281	518	0	-	0
Stage 1	487	-	-	-	-	-
Stage 2	287	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.14	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	419	777	1044	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	379	745	1001	-	-	-
Mov Cap-2 Maneuver	379	-	-	-	-	-
Stage 1	634	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.4	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1001	-	379	745	-	-
HCM Lane V/C Ratio	0.017	-	0.197	0.007	-	-
HCM Control Delay (s)	8.7	-	16.8	9.9	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0	-	-

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
YEAR 2027 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	4	23	34	8	66	25	377	40	61	507	113
Future Volume (veh/h)	41	4	23	34	8	66	25	377	40	61	507	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.89		0.87	0.88		0.87	0.96		0.89	0.94		0.89
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	44	4	25	37	9	71	27	405	43	66	545	122
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	506	67	419	477	106	469	367	1511	159	463	1329	295
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	1058	180	1127	1010	284	1260	739	3199	336	889	2814	626
Grp Volume(v), veh/h	44	0	29	46	0	71	27	223	225	66	343	324
Grp Sat Flow(s),veh/h/ln	1058	0	1307	1294	0	1260	739	1777	1759	889	1777	1663
Q Serve(g_s), s	1.7	0.0	0.9	0.8	0.0	2.4	1.6	4.9	5.0	3.1	8.1	8.2
Cycle Q Clear(g_c), s	4.1	0.0	0.9	1.7	0.0	2.4	9.8	4.9	5.0	8.1	8.1	8.2
Prop In Lane	1.00		0.86	0.80		1.00	1.00		0.19	1.00		0.38
Lane Grp Cap(c), veh/h	506	0	487	583	0	469	367	839	831	463	839	785
V/C Ratio(X)	0.09	0.00	0.06	0.08	0.00	0.15	0.07	0.27	0.27	0.14	0.41	0.41
Avail Cap(c_a), veh/h	690	0	690	786	0	666	546	1270	1257	679	1270	1189
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.8	0.0	13.0	13.2	0.0	13.4	14.4	10.2	10.3	12.7	11.1	11.1
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.1	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.3	0.4	0.0	0.6	0.3	1.7	1.7	0.6	2.9	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.9	0.0	13.0	13.2	0.0	13.6	14.4	10.4	10.4	12.9	11.4	11.5
LnGrp LOS	B	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		73			117			475			733	
Approach Delay, s/veh		14.1			13.4			10.7			11.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		35.4		29.0		35.4		29.0
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0
Max Green Setting (Gmax), s		46.0		34.0		46.0		34.0
Max Q Clear Time (g_c+I1), s		10.2		4.4		11.8		6.1
Green Ext Time (p_c), s		5.3		0.7		3.2		0.4

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	7	21	36	7	77	22	542	49	112	535	73
Future Volume (veh/h)	105	7	21	36	7	77	22	542	49	112	535	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.89		0.87	0.87		0.87	0.93		0.82	0.93		0.82
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	7	22	38	7	81	23	571	52	118	563	77
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	517	130	407	510	87	502	348	1490	135	356	1409	191
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	1043	323	1014	1043	216	1251	737	3225	292	747	3048	414
Grp Volume(v), veh/h	111	0	29	45	0	81	23	313	310	118	327	313
Grp Sat Flow(s),veh/h/ln	1043	0	1336	1259	0	1251	737	1777	1740	747	1777	1685
Q Serve(g_s), s	5.0	0.0	1.0	1.1	0.0	3.0	1.6	8.5	8.6	9.0	8.9	9.0
Cycle Q Clear(g_c), s	8.0	0.0	1.0	2.1	0.0	3.0	10.6	8.5	8.6	17.6	8.9	9.0
Prop In Lane	1.00		0.76	0.84		1.00	1.00		0.17	1.00		0.25
Lane Grp Cap(c), veh/h	517	0	537	596	0	502	348	821	804	356	821	779
V/C Ratio(X)	0.21	0.00	0.05	0.08	0.00	0.16	0.07	0.38	0.39	0.33	0.40	0.40
Avail Cap(c_a), veh/h	540	0	564	622	0	527	499	1185	1160	509	1185	1124
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	13.4	13.8	0.0	14.1	16.6	12.9	12.9	18.7	13.0	13.1
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.3	0.3	0.5	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.3	0.4	0.0	0.8	0.3	3.1	3.1	1.5	3.3	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.8	0.0	13.5	13.9	0.0	14.2	16.6	13.2	13.2	19.2	13.3	13.4
LnGrp LOS	B	A	B	B	A	B	B	B	B	B	B	B
Approach Vol, veh/h		140			126			646			758	
Approach Delay, s/veh		16.1			14.1			13.3			14.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.0		34.5		39.0		34.5				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		49.0		31.0		49.0		31.0				
Max Q Clear Time (g_c+I1), s		12.6		10.0		19.6		5.0				
Green Ext Time (p_c), s		4.6		0.8		5.5		0.8				

Intersection Summary			
HCM 6th Ctrl Delay			14.1
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	11	9	373	464	72
Future Vol, veh/h	72	11	9	373	464	72
Conflicting Peds, #/hr	0	0	53	0	0	53
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	130	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	81	12	10	419	521	81

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	845	354	655	0	-	0
Stage 1	615	-	-	-	-	-
Stage 2	230	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.14	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	385	711	928	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	840	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	344	675	881	-	-	-
Mov Cap-2 Maneuver	344	-	-	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	798	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.6	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	881	-	344	675	-	-
HCM Lane V/C Ratio	0.011	-	0.235	0.018	-	-
HCM Control Delay (s)	9.1	-	18.7	10.4	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0	-	0.9	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	73	5	17	550	446	62
Future Vol, veh/h	73	5	17	550	446	62
Conflicting Peds, #/hr	0	0	43	0	0	43
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	130	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	5	17	561	455	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	845	302	561	0	-	0
Stage 1	530	-	-	-	-	-
Stage 2	315	-	-	-	-	-
Critical Hdwy	5.8	5.9	4.14	-	-	-
Critical Hdwy Stg 1	4.8	-	-	-	-	-
Critical Hdwy Stg 2	4.8	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	385	757	1006	-	-	-
Stage 1	646	-	-	-	-	-
Stage 2	781	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	348	726	965	-	-	-
Mov Cap-2 Maneuver	348	-	-	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	749	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.6	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	965	-	348	726	-	-
HCM Lane V/C Ratio	0.018	-	0.214	0.007	-	-
HCM Control Delay (s)	8.8	-	18.1	10	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	0	-	-

APPENDIX F

TRANSIT LOS CALCULATIONS

Multimodal Transit LOS Calculation

		Farrington Hwy
	From	2000' West of Aliinui Dr
	To	Aliinui Dr
Inputs		**1**
	TRANSIT OPERATIONS INFORMATION	
	Number of local buses on street segment per hour (bus/h)	2
	Number of express buses stopping in segment per hour (bus/h)	2
t_{ex}	Average excess wait time (min)	7.2
L_f	Average passenger load factor (p/seat)	0.5
S	Average transit travel speed (mi/h)	51.0
l_{pt}	Average passenger trip length (mi)	12.7
	Is the segment in the CBD of a metro area of 5 million or more?	No
	TRANSIT AMENITY DATA	
p_{sh}	Percent stops in segment with a shelter	0%
p_{be}	Percent stops in segment with a bench	0%
	PEDESTRIAN ENVIRONMENT DATA	
W_A	Sidewalk width (ft) (Enter 0 if no sidewalk)	0.0
W_{buf}	Buffer width from sidewalk to street (ft)	0.0
	Does a continuous barrier exist between the street and sidewalk?	No
	Is the street divided?	Yes
	Are parking spaces striped?	No
p_{pk}	Proportion of on-street parking occupied	0%
W_{bl}	Bicycle lane width (ft)	0.0
W_{os}	Shoulder/parking lane width (ft)	0.0
W_{ol}	Outside travel lane (closest to sidewalk) width (ft)	12.0
v_m	Outside lane demand flow rate at midsegment (veh/h)	1350
S_R	Average vehicle running speed, including intersection delay (mi/h)	45.0

Calculations		
f	Transit frequency (bus/h)	4
f_h	Headway factor	2.80
f_{pl}	Passenger load weighting factor	1.00
T_{at}	Perceived amenity time rate (min/mi)	0.0
T_{ex}	Excess wait time rate due to late arrivals (min/mi)	0.6
T_{ptt}	Perceived travel time rate (min/mi)	2.3
T_{btt}	Base travel time rate (min/mi)	4.0
f_{tt}	Perceived travel time factor	1.24
s_{w-r}	Transit wait-ride score	3.47
f_s	Motorized vehicle speed adjustment factor	0.81
f_v	Motorized vehicle volume adjustment factor	3.07
W_{aA}	Adjusted available sidewalk width (ft)	0.0
f_{sw}	Sidewalk width coefficient	6.00
f_b	Buffer area coefficient	1.00
W_t	Total width of outside lane, bike lane, and parking lane/shoulder (ft)	12.0
W_v	Effective total width as a function of traffic volume (ft)	12.0
W_1	Effective width of combined bike lane and shoulder (ft)	0.0
f_w	Cross-section adjustment factor	-3.05
I_p	Pedestrian environment score	6.88
	Pedestrian LOS	F
I_t	Transit LOS score	1.83

Output		
	Transit LOS	***A***

Appendix E

Parking Management Plan

FEHR PEERS

MEMORANDUM

Date: March 8, 2024

To: Matt Caires, James Campbell Company
Tracy Camuso, G70

From: Spencer Reed and Sohrab Rashid

Subject: Parking Management Plan for the Proposed Cove at Ko Olina Project

SD23-0490

This memorandum presents the parking management plan for the proposed Cove at Ko Olina project located in the community of Ko Olina on the Leeward side of the island of Oahu. The proposed project includes redevelopment of the existing Paradise Cove Luau site to include a mix of restaurant and retail uses. This parking management plan was prepared based on discussions with the project team, the current site plan, industry parking standards, and adjustments reflecting the local site context.

Study Background

The project site proposed for redevelopment includes TMK 1-9-1-057-027 located at 92-1089 Aliinui Drive in the Ko Olina community on the Leeward side of Oahu. This TMK currently includes the Paradise Cove Luau and the Paradise Cove Crystal Chapel that periodically hosts small events. A portion of TMK 1-9-1-057-029 that is currently used for parking will continue to be used for parking for the proposed project site uses. The remaining portion of TMK 1-9-1-057-029 is operated by the Lanikuhonua Cultural Institute (LCI), but it does include a 15-space parking lot that provides free parking for beachgoers at any time of day. Access to the site is provided by two driveways on Aliinui Drive located south of the Ko Olina security gate. Aliinui Drive includes bicycle lanes in both directions and a continuous sidewalk on the makai or west side of the street.

The luau is a daily occurrence and operates between 5:00 PM and 9:00 PM in the evening and the facility includes capacity for 1,000 seated attendees. Current attendance averages approximately 800 to 900 persons per night with roughly 25% of attendees arriving by bus and the rest traveling to and from the site via private vehicle (roughly 65%) or walking in from the adjacent properties located south of the site (roughly 10%). Parking is provided in lots located on the north and east sides of the parcel, as well as in the adjacent parking lot located south of the site along Aliinui Drive. The north lot is designated for employee parking only.

We understand James Campbell Company plans to redevelop the site for a new luau venue with a reduced seating capacity, as well as a mixture of restaurants and retail stores extending the length of the site. The detailed project description is included in the next section.

Because the Project is increasing the amount of development on the site and is expected to generate a commensurate increase in parking demand, it was necessary to review the parking characteristics of the existing site and develop future parking demand estimates to determine what, if any, parking management strategies would be necessary for operation of the site.

Existing Parking Characteristics

Figure 1 - Existing Parking Areas

The parking demand at the existing Paradise Cove Luau facility was measured in June 2023 to: 1) determine the current demand of this use, and 2) provide data for adjusting this demand based on the planned reduction in luau seating capacity with the proposed Project.

Parking occupancy counts were conducted on Friday June 23, 2023 and Saturday June 24, 2023 to identify the peak parking demand by lot on the Project site and on the adjacent LCI property (see **Figure 1** at right). The dates were selected in consultation with James Campbell Company as they represent days with the potential for highest visitors to the luau. The Project site is served by Lots 1 through 3, and Lot 4 is the beach parking lot. Lots 5 and 6 are gated and for use by LCI event attendees only. Counts were conducted between 3:00 PM or (two hours before the luau event begins) and 11:00 PM (or two hours after the luau show finishes).

In addition to the total number of parked vehicles, we also made observations of traffic flows into and out of the lots, as well as counts of buses, and average occupancy counts (i.e., the number of people in each vehicle).

Existing Parking Supply

Land use entitlements for the Cove Property dating back to the early 1990s document 354 standard parking stalls and 30 bus stalls. Due to typical resurfacing and restriping maintenance, the existing number of parking stalls in use has changed over time. **Table 1** below illustrates the parking supply for the Project site including the areas under the control of LCI (i.e., Lot 5) and the designated free beach parking spaces (Lot 4). As shown below, the total available parking supply for the luau is 281 spaces in Lots 1, 2, and 3 exclusive of the 10 designated chapel parking spaces in Lot 1 and the 19 bus stalls in Lot 2. The entire site includes a total of 505 spaces for private passenger vehicles and trucks, although the 214 spaces in Lots 4 and 5 are not included in the proposed project demand analysis presented later in this report since they are controlled separately.

Table 1: Existing Cove Property Parking

Parking Lot Area	Standard Spaces	ADA Spaces	Reserved Spaces	Total Private Vehicle Spaces	Bus Spaces
Lot 1	60	6	0	66	0
Chapel	*10*	*0*	*0*	*10*	*0*
Lot 2	0	2	18	20	19
Lot 3	193	2	0	193	0
Existing Paradise Cove	**253**[1]	**10**	**18**	**279**[1]	**19**
Lot 4	13	2	0	15	0
Lot 5	199	0	0	199	0
Lot 4 – 5 Total[2]	**212**	**2**	**0**	**214**	**0**
Total	**465**	**12**	**18**	**493**	**19**

Source: Fehr & Peers.
Notes:
Existing property parking supply was counted in June 2023 and reflects the available number of parking spaces in use.
[1] Excludes 10 chapel spaces.
[2] Lot 4 and 5 do not serve the existing property site.

Existing Parking Demand

The results of the parking counts showed that the total demand for vehicle parking in Lots 1 through 3 on Friday ranged from 34% at 3:00 PM to a maximum of 97% at 6:00 PM and then reduced to 10% at 10:00 PM. The results for Lots 1 through 3 on Saturday were similar, albeit with slightly lower values of 22% at 3:00 PM to a maximum of 94% at 6:00 PM and then reduced to 4% at 10:00 PM. The vehicles remaining in the lot at 10:00 PM are assumed to be employees in Lots 1 and 2. Existing parking demand is illustrated graphically in **Figure 2** and **Figure 3** for Friday and Saturday, respectively.

Figure 2 - Friday Luau Parking Demand

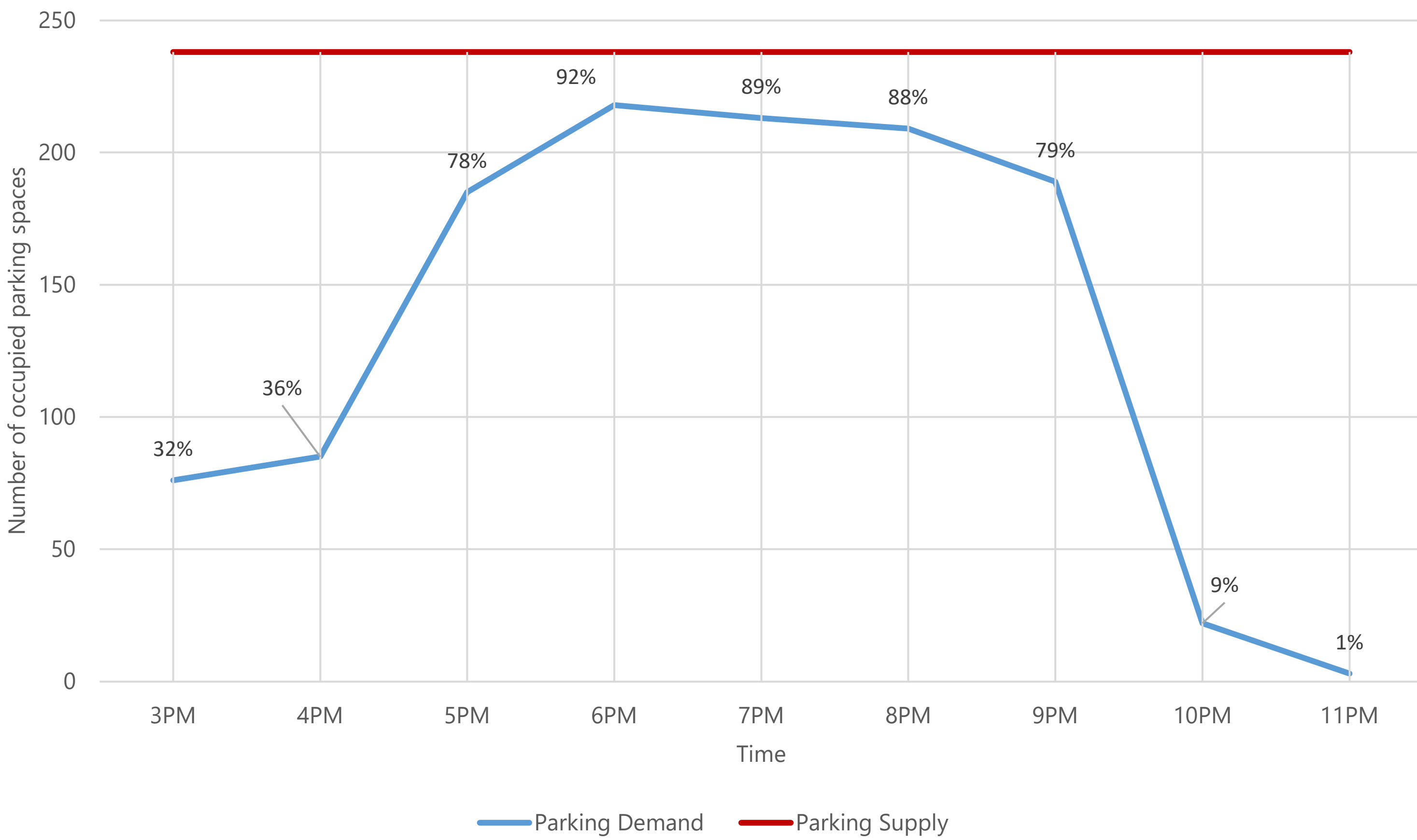
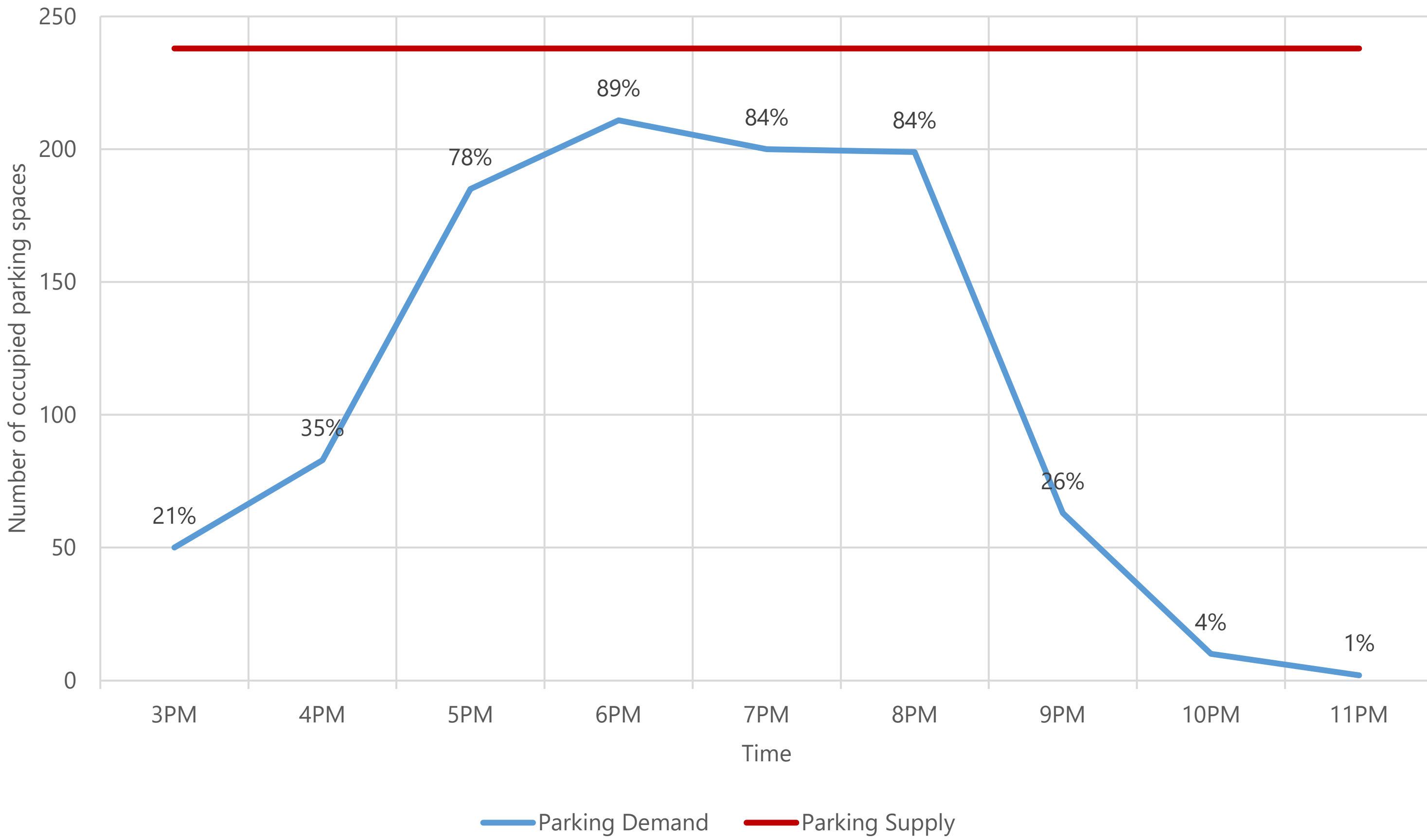


Figure 3 - Saturday Luau Parking Demand



It should be noted that Lot 1 includes 10 spaces designated for the Crystal Chapel, and the demand and supply for these spaces are excluded from this calculation. The demand in these spaces was up to three (3) vehicles on Friday and up to seven (7) vehicles on Sunday.

Peak bus parking demand within Lot 2 was five (5) and six (6) coaches on Friday and Saturday, respectively, within the 19 bus spaces are provided in this lot. Some private cars and pick-up trucks parked in bus spaces during each afternoon/evening, but these volumes varied between one (1) and five (5) vehicles during the peak bus parking demand period of 5:00 PM to 9:00 PM.

No event was held at LCI on Friday night, but vehicles parked in Lot 5 on Saturday night and ranged from 21% occupancy at 11:00 PM to a peak demand of 46% at 6:00 PM. Access to 57 parking spaces in Lot 3 was blocked by chains across the drive aisles on both days.

Beach parking in Lot 4 was full from 3:00 PM through 5:00 PM or 6:00 PM on both days, but dropped to less than 50% occupancy by 8:00 PM. The lot was empty by 10:00 PM on Friday and Saturday.

Other Existing Travel Characteristics

During field observations, the average vehicle occupancy (AVO) of private vehicles parking on site was estimated based on a sample count during Friday and Saturday evenings, and it was determined to be approximately 3.2. The AVO of buses was determined to be 45.5.

Given that on-site parking for the luau is free and cars are not required to stop as they enter the site, traffic congestion was very limited. Most vehicles experienced little or no delay as they entered the site, and the dispersed arrival pattern also contributed to the minimal congestion.

Project Description

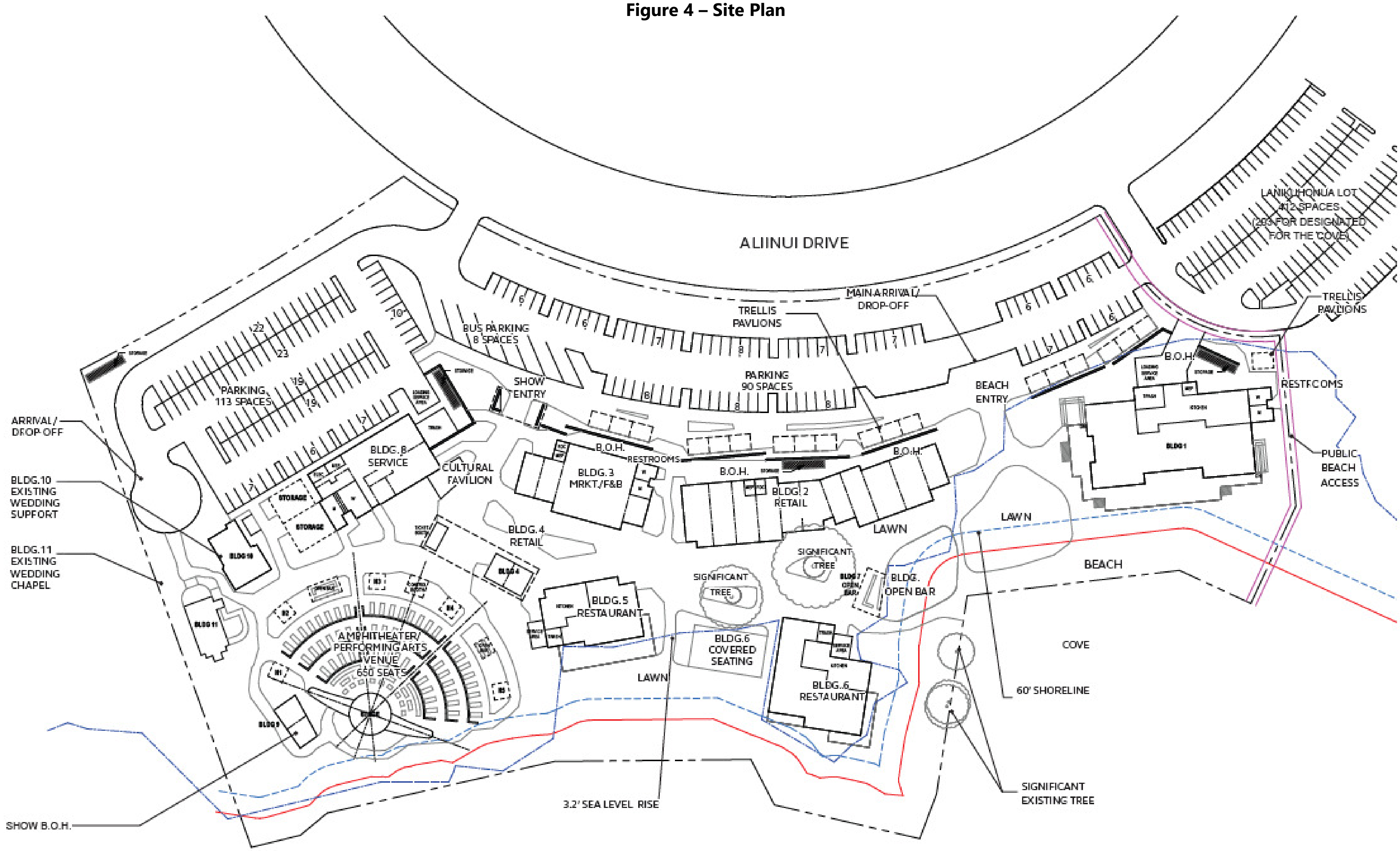
The Cove at Ko Olina (i.e., the "Project") will consist of a luau facility with supporting uses, retail spaces, restaurants, and a small administration building for a total of approximately 57,500 square feet (sf) of development. The Project will specifically include the following:

- 650-seat luau facility including 9,120 sf of support buildings
- 26,220 sf of retail shops
- 6,240 sf of fast casual/fast food restaurant
- 9,000 sf of family restaurant
- 15,000 sf of fine/casual dining
- 2,880 sf of back of house/management space

Figure 4 shows the preliminary site plan for the proposed Project including land uses and the adjacent parking areas. Some areas are proposed to be re-striped to maximize the available parking supply and better serve the anticipated increase in site demand. On-site parking for the Project will consist of 406 spaces located in the following areas:

- 113 spaces located in the north lot with parking for standard sized vehicles (Lot 1)
- 90 parking spaces in parking lot east of the building area, where this lot will be re-striped to include more standard sized vehicle spaces plus eight (8) dedicated spaces for full-size buses/coaches (Lot 2)
- 203 spaces located in the parking lot located just south of the southern driveway serving the site (Lot 3).

Figure 4 – Site Plan



Project Shared Parking Analysis Methodology

A shared parking analysis was conducted using methodologies and assumptions provided in *Shared Parking, 3rd Edition* (Urban Land Institute [ULI], 2020) and existing data obtained at the site. The ULI sponsored a national study in 1984 that established a basic methodology for analyzing parking demand in mixed-use developments and developed averages for parking rates by land use. The analysis presented in this memorandum utilizes the data from the updated *Shared Parking, 3rd Edition* report published in 2020.

The shared parking methodology establishes the base parking rate, parking demand reductions, and hourly/monthly demand patterns for each land use. The overall parking demand is calculated by considering the parking demand patterns and parking demand reductions (potential for non-auto modes and internal capture) for each component of the project being analyzed. Information regarding the parking rates, parking demand reductions, and parking demand patterns for the Project is provided below. The analysis of the luau and the effect of the reduced attendee capacity was analyzed separately using existing count data since this unique use is not included in the *Shared Parking* document.

Parking Rates

The shared parking analysis for the Project used base parking rates for visitors and employees as determined by ULI. **Table 2** presents the parking rates for both visitors/customers and employees and demonstrates the typical parking needs of the Project by land use.

Table 2: Parking Demand Rates by Land Use

		Weekday		Weekend	
ULI Land Use	Unit	Visitor	Employee	Visitor	Employee
Retail	ksf	2.90	0.70	3.20	0.80
Fine/Casual Dining	ksf	13.25	2.25	13.25	2.25
Family Restaurant	ksf	15.25	2.15	15.25	2.15
Fast Casual/Fast Food	ksf	12.40	2.00	12.40	2.00

Source: Shared Parking (Urban Land Institute, 3rd Edition) and Fehr & Peers (Luau only).
Notes:
Luau parking rates were not developed as the proportional reduction in luau seating capacity was applied to existing luau parking demand to determine future luau parking demand.

Separate rates were used for weekday and weekend and for each user. The derived rates use the daily/hourly/seasonal patterns for calculating the parking demand based on the unique travel characteristics of the project being analyzed. The back of house/management space was considered ancillary to the other land uses and would not generate a separate parking demand but rather support the other uses on the Project site.

As noted previously, the parking demand the luau was derived from the existing data, and the proportional reduction in seating capacity was applied to the existing parking demand to estimate future parking demand with redevelopment of the Project site.

Adjustments were made for two travel factors in accordance with the ULI shared parking methodology: the potential for non-auto modes, and estimated internal capture of parking between the land uses in the area.

Parking Demand Reductions

The shared parking analysis allows for adjustment in the base parking rate due to factors such as mode split/walk-in and non-captive ratio. These factors are based on the mix of uses in the project, size of the uses, and location of the project. Additional information regarding these factors is provided below.

- Mode Adjustment – One factor that affects the overall parking demand at a particular development is the number of visitors and employees that arrive by automobile. The alternatives considered in the analysis account for the effects of pedestrian, bicycle, drop-off, and transit access to the site.
- Noncaptive Ratio – Also known as trip internalization. Based on data from empirical studies through sources such as ULI, it is known that a certain percentage of trips in mixed-use developments (depending on the mix of land uses in the project) are trips moving between the land uses on site, i.e., they were internally captured on the site. Adjustments were made to the analysis to account for trip internalization.

Table 3 documents the adjustment percentages applied to each of the land uses for visitors and employees for different periods of the day. The non-captive ratio was applied based on the mix and size of the uses in the Project. It is assumed that some patrons will only park a vehicle once, but they will visit multiple components of the Project.

Table 3: Shared Parking Model Reductions

ULI Land Use	Mode Adjustment Daytime	Mode Adjustment Evening	Noncaptive Ratio Daytime	Noncaptive Ratio Evening
Retail				
- Visitor	0.6	0.6	0.94	0.89
- Employee	1.0	1.0	1.0	1.0
Fine/Casual Dining				
- Visitor	0.6	0.6	1.0	1.0
- Employee	1.0	1.0	1.0	1.0
Family Restaurant				
- Visitor	0.6	0.6	1.0	1.0
- Employee	1.0	1.0	1.0	1.0
Fast Casual/Fast Food				
- Visitor	0.6	0.6	0.76	0.74
- Employee	1.0	1.0	1.0	1.0

Source: Shared Parking (Urban Land Institute, 3rd Edition) and Fehr & Peers (Luau only).
Luau parking did not have a mode adjustment or noncaptive ratio reduction applied as the proportional reduction in luau seating capacity was applied to existing luau parking demand to determine future luau parking demand and the parking demand was based on locally collected empirical data and already reflective of the characteristics surrounding the project site.

The mode split adjustment was applied based on the location of the Project and the ability of nearby residents, resort visitors and employees to travel to the Project by a mode other than automobile which they would have to park (i.e., walking or biking). The area mauka of Aliinui Drive across from the Project site along Olani Street includes a commercial development and a residential development, The Coconut Planation. While a limited interaction with the commercial uses is anticipated, most of the residential units are within a ½-mile walking distance.

In addition, four resort properties are located within a similar ½-mile walking distance: the Four Seasons and Aulani resorts. These two resorts include a total of 1,166 rooms or units with a population of nearly 2,500 persons assuming 85% occupancy and 2.5 persons per unit. Given the lack of current dining options in this area, it is not unreasonable to assume that a large number of restaurant seats and retail customers will originate from these resort properties. In addition, two other resorts (the Beach Villas at Ko Olina and Marriott's Ko Olina Beach Club) are expected to generate some visitor trips to the project site, although most of these will likely be bicycle or TNC trips.

Overall, a mode adjustment of 40% was applied to the commercial components parking demand calculation to account for the proximity of a substantive visitor and resident population of potential patrons to the site in an area where there are very limited food options. Note that if

40% of the restaurant seats were occupied solely by resort visitors, this would equate to 20% of the resort population within a ½-mile walk including the Four Seasons and Aulani resorts only. This is considered a reasonable assumption and doesn't include any of the nearby residents in The Coconut Plantation development.

Parking Demand Patterns

The shared parking analysis uses monthly adjustment factors and time-of-day adjustment factors to account for the variation in parking demand for different land uses. Based on the anticipated land uses and parking demand reductions applied, monthly adjustment factors are applied based on the month that will result in the greatest parking demand (peak month). The time-of-day factors are applied to the peak month demand to determine the estimated parking demand throughout the day. **Table A-1** in the appendix documents the project commercial components weekday and weekend peak month adjustment and time-of-day adjustment for visitors and employees and documents the estimated total parking demand. The parking demand for the luau was not incorporated in the shared parking calculations as the empirical data already considered the local parking characteristic for the luau.

Other Potential Parking Reductions or Supply Increases

After calculating the initial parking demand estimates, reductions in demand or increases in parking supply were considered to determine the final parking supply that would be needed to adequately serve the proposed Project. These adjustments include the following:

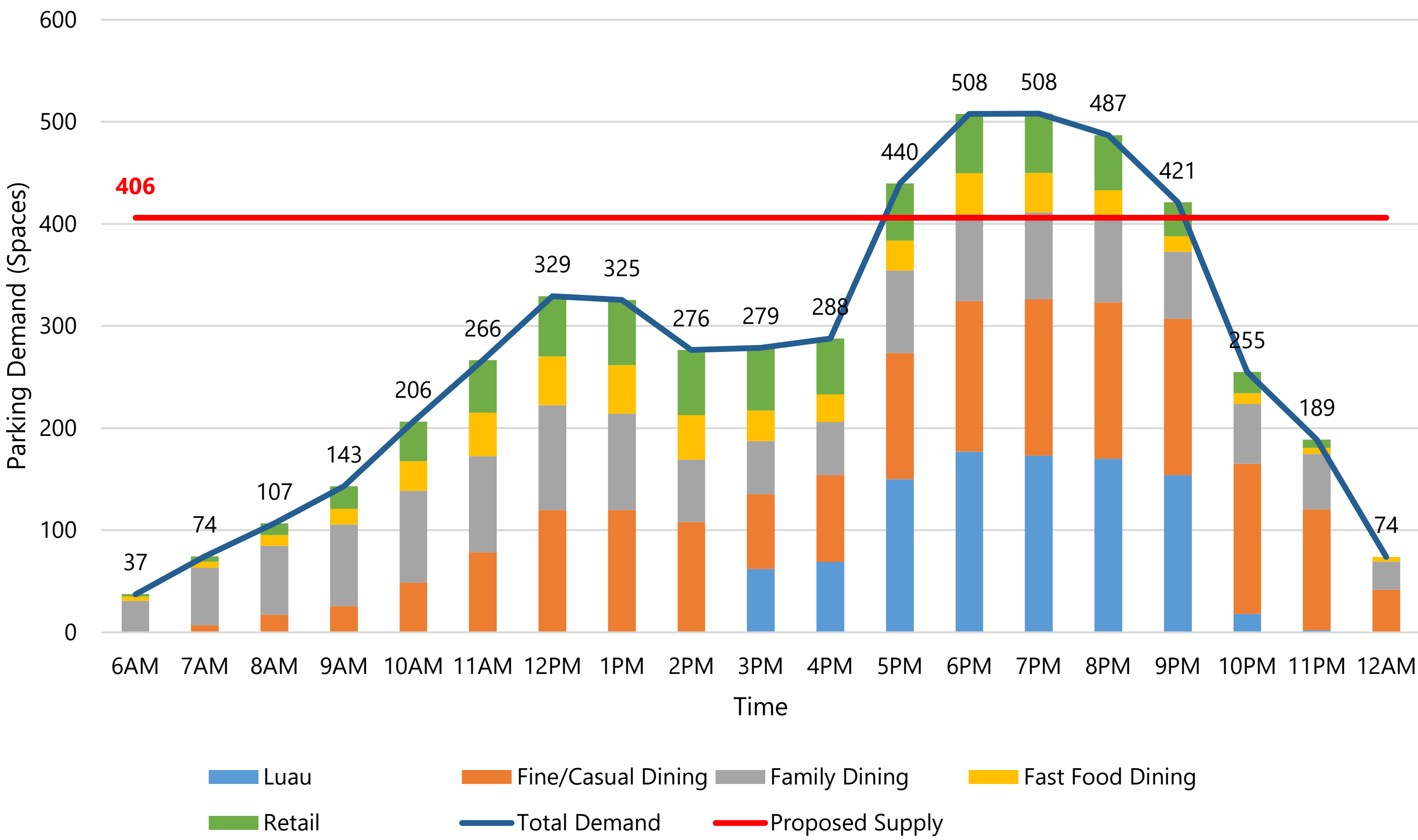
- Implementation of parking management strategies including but not limited to:
    - Increasing the parking supply by requiring valet parking during peak times or potentially all day
    - Incentivizing the use transportation network companies (TMCs) such as Uber and Lyft
    - Charging for parking or implementing maximum time limits

Project Shared Parking Demand

Figure 5 illustrates the gross parking demand for the proposed Project by land use by time of day for Friday evening. This demand was calculated using the shared parking analysis methodology and assumptions described in the previous section, and it presents the demand before applying any reductions for parking management strategies.

Although retail is but a small component of the overall project, the peak month of demand was calculated as December, which is consistent with the uptick in visitor travel that occurs on Oahu during the winter holidays. It should be noted that total Saturday parking demand with the Project is estimated to be slightly lower than Friday, and accordingly the results for Friday are the focus of this analysis.

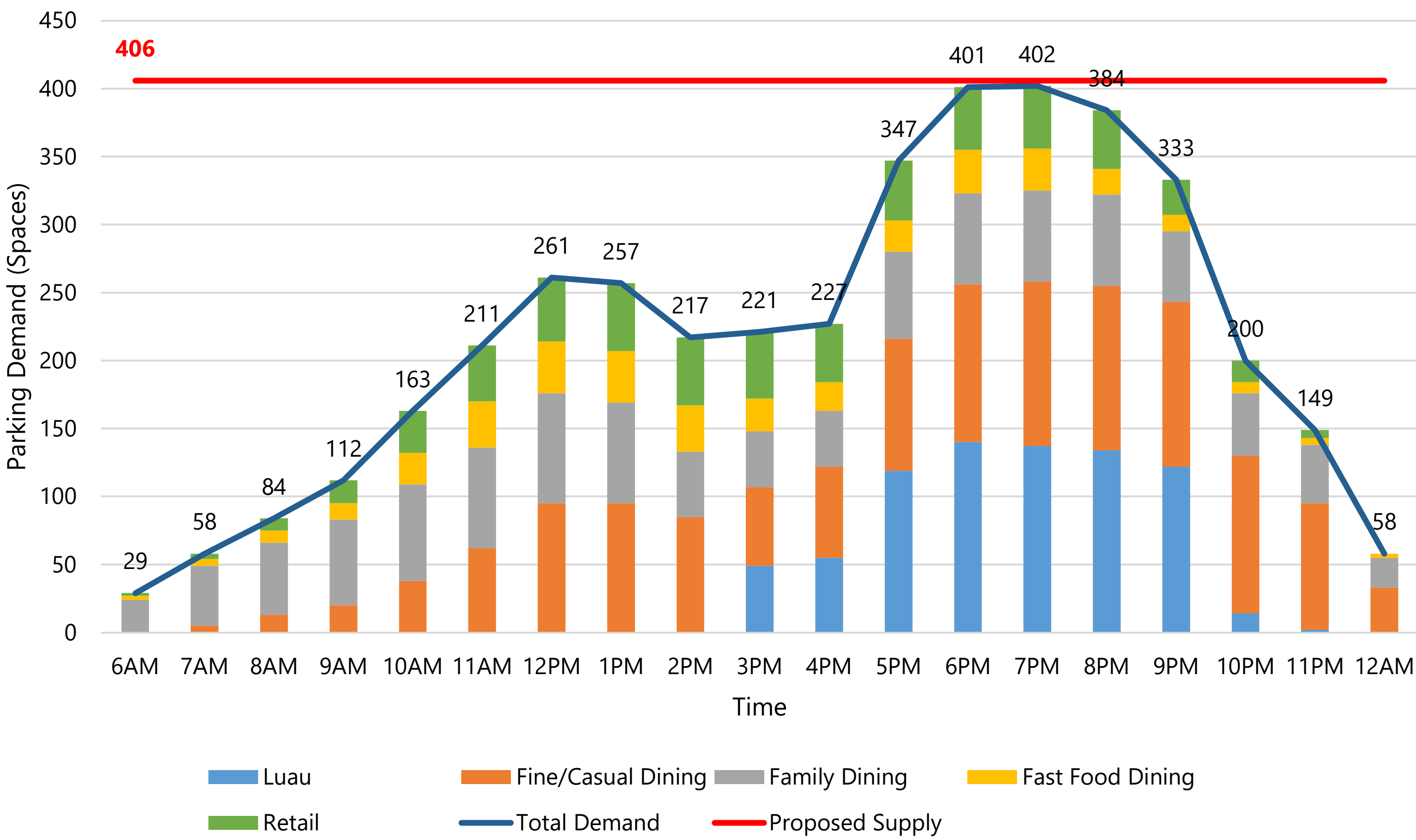
Figure 5 - Projected Friday Parking Demand (w/o Management Strategies)



As shown on **Figure 5**, parking demand at 12:00 PM and 1:00 PM during the lunchtime period is estimated to meet or be very close to the available number of spaces without accounting for any demand management strategies. Without these strategies, the estimated peak parking demand of 440 spaces is projected to occur on a Friday at 6:00 PM and 7:00 PM, and the demand is not expected to drop below the capacity of 406 spaces until sometime between 9:00 PM and 10:00 PM.

For the Project to accommodate parking demand within the available land area on the project site, a combination of strategies will be needed to increase the parking supply and reduce the demand. This reduction will need to equate to 13% of 440 such that the demand at the peak time of 7:00 PM on a Friday will not exceed the proposed 406 vehicle supply. **Figure 6** illustrates the commensurate reduction in demand by hour that will be required to accommodate the demand on site within the available supply. The strategies to accomplish this reduction are described in the section entitled Parking Management Recommendations.

Figure 6 - Projected Friday Parking Demand (w/ Management Strategies)



Project Parking Supply Required Per Ordinance

According to the City & County Revised Ordinances of Honolulu (ROH) Chapter 21 Article 6 Section 20: “No off-street parking is required in the Primary Urban Center Development Plan area and Ewa Development Plan area, except for those areas thereof located in the residential, agricultural, and preservation zoning districts." Because the Project site is in the Ewa Development Plan area and the current zoning is B-1 (Neighborhood Business), no minimum parking supply for the proposed redeveloped land uses is required.

However, it is helpful to understand the parking supply that would typically be required for a project of this type to compare to the demand estimates presented above. If we were to apply the minimum required parking supplies listed in *Table 21-6.1 Minimum Off-Street Parking Ratios* in the ROH, the Project would only be required to provide a total of 191 spaces as illustrated in Table 1 below.

Table 4: Required Minimum Parking Supply Based on ROH Requirements[1]

Use	Size[2]	Parking Ratio[3]	Number of Spaces
Luau	480 seats (17,000 sf)	1:5 seats or 1:125 sf (the lesser of these)	96
Retail Shops	14,600 sf	1:500 sf	29
Restaurants	25,500 sf	1:500 sf	51
Restaurant/Marketplace	5,000 sf	1:500 sf	10
Administrative Office	2,400	1:500 sf	5
		Total	**191**

Source: Fehr & Peers, James Campbell Company and City & County Revised Ordinances of Honolulu, 2023.

Notes:

1 Per The Revised Ordinances of Honolulu (ROH) Chapter 21-6.20 regarding Off-Street Parking Requirements, the ratios in this table do not apply to land uses in the Ewa Development Plan area. Data in this table is provided for informational purposes only.

2 Land uses and sizes from Cove at Lo Olina Redevelopment: Program Review v7 (June 6, 2022) provided by James Campbell Company.

3 Ratios from ROH Table 21-6.1 from Chapter 21-6.20 regarding Off-Street Parking Requirements.

As noted in the sections presented above, the anticipated peak parking demand of the Project without any parking management strategies in place is expected to be 440 spaces and would well exceed the required ROH supply between 6:00 PM and 8:00 PM by roughly 200%. Strategies to manage the demand and increase the on-site parking supply within the planned parking areas is presented in the next section.

Recommended Parking Management Strategies

To reasonably accommodate Project peak parking demand and achieve a reduction of 27% over the anticipated gross demand, we recommend implementation of the following strategies upon Project opening:

Mandatory Valet Parking

Operating valet parking will require visitors to drop off their vehicle with an attendant and allow for more efficient parking within Lots 1 through 3. Visitors will be given a ticket associated with their vehicle that the attendant will use to identify the appropriate vehicle when the visitor is ready to depart the site. Valet parking can effectively increase the on-site supply between a range of 15% to 25% depending on the configuration of the parking area and the proportion available for valet service.

Due to the unique nature of the Projects location, operations, and parking layout, the ability to increase parking supply can be a significant parking manage strategy. To that end, we recommend that valet parking be implemented for the entire site during all hours of operation. Valet operations can efficiently utilize the unique shape of the existing parking lots which will result in improvements to site circulation, improvements to passenger loading and unloading, and a higher quality experience for visitors. While the operations of the valet program and its potential increase in parking supply will be at the discretion of the valet operator, and park vehicles in a manner employee parking be limited to Lot 1 at the north end of the site because: 1) employees make fewer trips and are parking for longer periods, and 2) employees entering this lot would not conflict with other traffic in Lots 2 and 3. Because valet parking would then be limited to Lots 2 and 3, we estimate that valet parking could likely increase the supply by no more than 20%.

While it may be possible to only implement valet parking at select times of day (e.g., before noon), the challenge is for valet attendants to not block vehicles in a space after drivers have self-parked. For this reason, we recommend that all parking be operated with a valet service if other parking management strategies are unable to effectively manage parking demand.

Charging for Parking

A critical strategy to manage parking demand is to charge users an hourly fee. This strategy is currently in use at the shopping area on Olani Street east of the project site that includes the

Monkeypod restaurant and Island Market store and can be integrated with potential valet parking (described below). The current fee at that shopping area is $2.50 per hour. The amount of the hourly fee can be adjusted to manage demand, such that an initial fee of $2.50, for example, can be increased to $3.50 or $5.00 per hour if demand exceeds available capacity. Charging for parking allows for cost recovery of the valet service described above, and it can also serve as an additional revenue source for the project.

In addition, the rate per hour can be also adjusted to ensure that vehicles are not parked for an excessive amount of time. For example, the cost for each of the first two hours to park may be fixed at $2.50 per hour, but the price for the third hour could be increased to $7.50 or a level that will incentivize visitors to leave the site within a two-hour period. This benefits the site by increasing space availability for other visitors, and it helps to manage the number of people that may park at the site and solely visit the beach area nearby.

Incentivizing Transportation Network Company (TNC) Use

Some visitors from nearby resorts and other origins including Kapolei and Makakilo are expected to use Transportation Network Companies (TNCs) such as Uber and Lyft to access and depart the site. While this activity does increase the amount of vehicle traffic, it also has the benefit of reducing parking demand at the site. If other strategies are not effective in managing the demand, we recommend creating a financial incentive to encourage the use TNCs by visitors. This could take the form of a visitor showing a digital receipt for a TNC ride and receiving a coupon for use at one of the restaurants or retail establishments. In addition, we recommend a dedicated curb space for TNC loading and unloading to avoid conflicting with valet parking activities.

Promoting Other Modes of Transportation

Incentivizing the use of other modes of transportation such as transit/shuttle vehicles, bicycles, and walking would reduce parking demand. While the parking demand calculations already consider some parking demand reductions due to non-automobile modes of transportation, encouragement of these types of transportation options through providing secure bicycle parking, sidewalk enhancements, and convenient shuttle stops could result in visitors choosing not to drive and park a vehicle. Accommodating a shuttle provided by the adjacent resorts is highly recommended and may involve dedication of a specific curb space and waiting area for passenger loading and unloading. Currently, no shuttle service is provided within the Ko Olina

Resort, but implementation could be accomplished through coordination between the resort owners.

Beach Parking Management

It is expected that free beach parking will remain with development of the project. Management of the beach parking will need to be considered with the more parking activity occurring at the site. Leaving the beach parking as is with no restrictions on time limits or cost could see misuse of those parking spaces to visit the commercial components of the project.

To mitigate the concern of beach parking misuse, time limits could be considered for beach parking to limit the amount of time vehicles can be parked. The limiting of parking time could dissuade beach visitors from visiting the project commercial components before or after their beach visits. In addition, the beach parking supply could be incorporated within the total parking supply of the project and managed through a ticketing system managed by the valet program. Beach visitors would be required to see the valet attendant to get a beach parking permit to utilize one of the existing 15 parking spaces. When beach visitors leave then those parking spaces become available for another visitor who has contacted the project valet.

These strategies can be utilized with the strategies above to ensure that beach parking is not misused for project parking.

Parking Management Effectiveness

The anticipated parking demand was estimated using industry best practices and available information. It is important to note that parking demand at the project site will depend on the popularity of the establishments and visitor experiences. As such, demand could be theoretically lower or higher depending on a variety of factors. The benefit of applying the recommended strategies is that they provide a series of levers that can manage demand through parking charge modifications and supply management. Increasing hourly rates, dynamically adjusting hourly rates based on demand, and valet parking employees in addition to visitors are some of the ways that strategies can be adjusted to manage demand. We anticipate that the project sponsor will need to adjust the parking program to strike a balance between demand and visitor satisfaction. Fortunately, because of the parking restrictions within the Ko Olina resort, spillover into adjacent neighborhoods is not feasible given the security of gated communities and resort properties. With the implementation of the parking management strategies, project parking demand is expected to be accommodated within the proposed project parking supply.

Appendix:

Shared Parking Calculations

Table A-1: Paradise Cove at Ko Olina Commerical Shared Parking Analysis

Shared Parking Demand Summary																		
Peak Month: DECEMBER -- Peak Period: 7 PM, WEEKDAY																		
Land Use	Project Data		Weekday					Weekend					Weekday			Weekend		
	Quantity	Unit	Base Ratio	Driving Adj	Non-Captive Ratio	Project Ratio	Unit For Ratio	Base Ratio	Driving Adj	Non-Captive Ratio	Project Ratio	Unit For Ratio	Peak Hr Adj 7 PM	Peak Mo Adj December	Estimated Parking Demand	Peak Hr Adj 7 PM	Peak Mo Adj December	Estimated Parking Demand
Retail																		
Retail (<400 ksf)	26,220	sf GLA	2.90	60%	94%	1.64	ksf GLA	3.20	60%	94%	1.80	ksf GLA	90%	100%	39	60%	100%	28
Employee			0.70	100%	100%	0.70		0.80	100%	100%	0.80		100%	100%	19	80%	100%	17
Food and Beverage																		
Fine/Casual Dining	15,000	sf GLA	13.25	60%	100%	7.93	ksf GLA	15.25	60%	100%	9.13	ksf GLA	100%	100%	119	95%	100%	130
Employee			2.25	100%	100%	2.25		2.50	100%	100%	2.50		100%	100%	34	100%	100%	38
Family Restaurant	9,000	sf GLA	15.25	60%	100%	9.13	ksf GLA	15.00	60%	100%	8.98	ksf GLA	80%	100%	66	70%	100%	57
Employee			2.15	100%	100%	2.15		2.10	100%	100%	2.10		95%	100%	19	95%	100%	18
Fast Casual/Fast Food	6,240	sf GLA	12.40	60%	75%	5.58	ksf GLA	12.70	60%	76%	5.76	ksf GLA	80%	96%	27	80%	96%	28
Employee			2.00	100%	100%	2.00		2.00	100%	100%	2.00		90%	100%	12	90%	100%	12
Entertainment and Institutions																		
Hotel and Residential																		
Office																		
Additional Land Uses																		
													Customer/Visitor		251	Customer		243
													Employee/Resident		84	Employee/Resident		85
													Reserved		-	Reserved		-
													Total		335	Total		328

Appendix F

Preliminary Engineering Report

The Cove at Ko ‘Olina Redevelopment

91-1089 Ali‘inui Drive, Kapolei, O‘ahu
Tax Map Key: (1) 9-1-057:027

Preliminary Engineering Report

Prepared for:
Campbell Hawai‘i Investor LLC
1001 Kamokila Blvd, Ste. 250
Kapolei, Hawai‘i 96707

Prepared by:
Group 70 International, Inc.
dba G70
111 S King Street, Suite 170
Honolulu, Hawai‘i 96813

March 2024

1 Introduction

1.1 Project Background and Description

Paradise Cove, owned by Campbell Hawaii Investor LLC, offers tourist-oriented cultural experiences and a nightly lū‘au on a 10.85-acre Commercial-zoned property located at 92-1089 Ali‘inui Drive in Kapolei, O‘ahu. **See Figures 1, Vicinity Map, Figure 2, Location Map**, and **Figure 3, Existing Conditions.**

The proposed redevelopment (“Project”) will demolish and remove twenty-two existing structures and replace them with new structures of similar uses. Concept level proposed new structures are depicted in **Figure 4, Concept Site & Utility Plan.**

1.2 Purpose

The purpose of this Preliminary Engineering Report is to evaluate the existing and proposed civil infrastructure including roads, water, sewer and drainage conditions at the Project.

1.3 Site Location and Surroundings

The Project is located along the shoreline at parcel tax map key (TMK) (1) 9-1-057:027) in the Honouliuli ahupua‘a of the ‘Ewa District on the island of O‘ahu. It is bounded by Ali‘inui Drive to the east (mauka), the ocean on the west, to the north by 5.5-acre Preservation-zoned and an undeveloped parcel owned by Ko ‘Olina Development LLC, and on the south by a 10.81-acre parcel containing the Lanikūhonua Cultural Institute. The project is zoned Neighborhood Business District (B-1) and is within the State’s Urban Use District. The parcel is within the Special Management Area (SMA), and an SMA Use Permit will be required for the Project.

2 Roads and Access

2.1 Existing Conditions

2.1.1 Vehicular Access

There are two main vehicle access points to the Project provided via Ali‘inui Drive, a private roadway along the mauka edge of the property. Ali‘inui Drive has a 90-foot right-of-way and a posted speed limit of 25 miles per hour. Ali‘inui Drive is owned and maintained by Ko ‘Olina Development Company and consists of two paved vehicular travel lanes in each direction separated by a vegetated median strip, concrete curbs, gutters and sidewalks.

2.1.2 Pedestrian Access

Concrete sidewalks are provided on both sides of Ali‘inui Drive fronting the property although most patrons arrive by bus or private vehicles.

2.1.3 Parking

There are two onsite parking lots that are accessible from Ali‘inui Drive. A total of 69 parking stalls, 6 accessible stalls and 31 bus stalls are available for attendees within the Paradise Cove Site.

Street parking is not allowed along Ali‘inui Drive. Paradise Cove is also allowed to use an additional 203 parking stalls in the Lanikūhonua parking lot under a Conditional Use Permit for shared access.

2.2 Proposed Roads, Access and Parking

Vehicular access to onsite parking will continue to be provided along Ali‘inui Drive via the two existing access points.

Onsite parking will meet Land Use Ordinance requirements and consist of a mix of vehicle stalls, accessible stalls and bus stalls generally located along the mauka edge of the property. The proposed site plan maintains the existing parking lots. The parking lot along Ali‘inui drive will consist of eight bus stalls, 89 vehicle stalls, and five accessible stalls. The parking lot at the northern end of the site will provide ninety-three parking spaces and four handicap stalls. The agreement regarding use of the Lanikūhonua parking lot will remain in effect.

3 Water Infrastructure

3.1 Existing Conditions

3.1.1 Water System

Potable water service is provided from a 12-inch diameter Board of Water Supply (BWS) main in Ali‘inui Drive. A 2-inch diameter lateral services the north portion of site and a second, 2-1/2-inch diameter lateral conveys water to the south end of the site.

According to BWS, there are five water meters that currently serve the existing site (**Table 1 - Existing Meter Information**):

Table 1 - Existing Meter Information

Meter Number	Meter Size; Type	P/ID number	Average Daily Flow
98060120	1.5”; Domestic	3330060983	4,500 gpd
94070086	2”; Domestic	7204026459	9,000 gpd
02600954	1.5”; Irrigation	1626490277	--
13060163	1.5”; Irrigation	3793213808	--
3746624	8”; Fire	7627677333	--

Fire protection for the existing site is provided by three offsite fire hydrants along Ali‘inui Drive (L4578, L4579, L4580) and an 8-inch diameter pipe near the north end of the site, which feeds building sprinkler systems and four onsite fire hydrants.

3.1.2 Existing Water Demand

According to BWS records, the existing average daily water demand is 13,500 gallons per day (gpd).

3.1.3 Pressure and Flow Data

Although BWS has suspended fire flow tests on fire hydrants as a water conservation measure, BWS reports that hydrant L4578 has a static pressure of 84 psi and that their hydraulic model indicates the hydrant can flow 1,000 gallons per minute (gpm) with a residual pressure of 71 psi.

3.2 Proposed Water System

3.2.1 Water Availability

BWS verified water availability in a letter dated July 28, 2021, confirming their system could accommodate the anticipated project water needs. The letter is attached for reference in **Appendix A**. Campbell’s position is the Cove is outside of the Ko ‘Olina Resort and Marina master plan. Therefore, the project should not be subject to review and approval of the Ko ‘Olina Community Association (KOCA) or be subject to the required improvements needed by KOCA before water resources are granted for the project. Therefore, the project should be able to seek review and approval directly from BWS.

Recent correspondence with BWS in 2023 regarding the availability of non-potable water indicates that plans for a new non-potable well source (by others) for the Ko Olina area has advanced. Given this commitment and progress, BWS may review and approve building permits for projects requiring non-potable water use for the Ko Olina area, including the planned non-potable uses needed for the Project. A letter from BWS confirming this condition has been requested by G70 in December 2023 and is currently pending.

3.2.2 Water Demand

The projected water demand for the proposed Paradise Cove project have been separated in the table below (**Table 2 - Proposed Water Demand**):

Table 2 - Proposed Water Demand

Use Description	Demand Rate		Area, sf	Qty	Units	Potable Demand, gpd
	Qty	Units				
PERFORMING ARTS VENUE & ASSOCIATED ACTIVITIES						
Makai Amphitheater	3,000	gpd/acre	17,000	0.39	acre	1,171
Pre-show area	3,000	gpd/acre	30,000	0.69	acre	2,066
Pre-show bars	3,000	gpd/acre	600	0.01	acre	41
Event Kitchen/Back of House	3,000	gpd/acre	9,120	0.21	acre	628
RETAIL & ASSOCIATED ACTIVITIES						
Building 2-4, 7	3,000	gpd/acre	26,220	0.60	acre	1,806
RESTAURANTS						

Table 2 - Proposed Water Demand						
Use Description	**Demand Rate**		**Area, sf**	**Qty**	**Units**	**Potable Demand, gpd**
	Qty	**Units**				
Building 5	60	gpd/seat	6,240	213	seat	12,780
Building 6	60	gpd/seat	9,000	363	seat	21,780
Building 1	60	gpd/seat	15,000	610	seat	36,600
COMMON AREAS						
Building 8 – Management Office Support	3,000	gpd/acre	2,880	0.07	acre	198
Entry Portal	3,000	gpd/acre	1,400	0.03	acre	96
Public Restrooms at Lagoon	6	gpd/capita	300	400	capita	2,400
Total water flow, gallons per day (gpd) =						**79,567**
Max Daily Flow, Gallons per Day (gpd) =						**119,350**

The water demand for restaurant and food and beverage (F&B) retail was estimated based on the State of Hawaii Administrative Rules (HAR) 11-62 Wastewater Systems, Appendix D, Table I, 50 gpd/seat plus 20% = 60 gpd/seat. Dry retail water consumption is based on BWS standards of 3,000 gpd/acre = 69 gpd/1000 sf. The total domestic water demand is 79,567 gpd with the maximum daily flow being 119,350 gpd. This is an increase of 66,067 gpd. Non-potable or irrigation water demand is not anticipated to increase significantly from existing use.

The existing 1-1/2-inch and 2-inch meters have rated maximum flows of 100 and 160 gpm, respectively. Meter adequately needs to be verified during design however a new upsized meter will most likely be needed for the proposed project.

3.2.3 Fire Protection

The Water System Standards requires a fire flow of 2,000 gpm for two (2) hours for commercial developments, with hydrants spaced not less than 250 feet apart.

Due to the general similarity between the character of the existing and proposed development it is anticipated that offsite and onsite fire protection is adequate to accommodate the project, and onsite fire protection improvements are not needed. The locations of the existing onsite hydrants will be verified and reviewed for coverage adequacy during the design stage. All new buildings are anticipated to be sited with adequate emergency vehicle access.

4 Wastewater

4.1 Existing Wastewater Infrastructure

4.1.1 Existing Wastewater System

The project site is served by two, 8-inch diameter sewer laterals connected to an 8-inch diameter municipal wastewater collection system main in Aliʻinui Drive. An additional 8-inch diameter sewer main exits the site through the southeast boundary, into the Lanikūhonua site.

All sewer mains convey wastewater to the West Beach Resort #1 Pump Station. This pump station is within the Ko ʻOlina resort and is owned by the City and County of Honolulu (CCH). This pump station conveys wastewater to the CCH Honouliuli Wastewater Treatment Plant.

According to the 2003 Kapolei Interceptor Sewer report done by Community Planning, parcels within the Ko ʻOlina area were assigned wastewater flow capacities based on each parcel's size and land use. Flows already established from existing project sewer master plans at the time were also considered and tabulated in this report. Per the Kapolei Interceptor Sewer report, the Paradise Cove parcel was assigned 25,000 gallons per day based on 1,000 total capita at 25 gallons per day flow rate. Discussions with the City indicate that wastewater generated from the proposed project would need to be within this flow allocation established in 2003. A City Sewer Connection Application will not be approved for proposed flow rates that exceed 25,000 gallons per day.

The Department of Health (DOH) has stated there are no cesspools or Individual Wastewater Systems within the Project TMK.

4.1.2 Existing Wastewater Flow

The estimated existing wastewater flow has been estimated based on the total water demand reported by BWS. It is assumed that the wastewater flow is 80% of the water demand, see **Table 3 - Existing Wastewater Flow**.

Table 3 - Existing Wastewater Flow

Description	Unit	Unit of Measurement	Average Water (gpd)	Average Wastewater (gpd)
EXISTING USE				
Meter 98060120 (1-1/2" domestic)	1.00	LS	4,500	3,600
Meter 94070086 (2" domestic)	1.00	LS	9,000	7,200
Total Wastewater flow, gallons per day (gpd) = 10,800				

4.2 Proposed Wastewater Infrastructure

4.2.1 Design Parameters

Wastewater from the Project will continue to be disposed via the two existing sewer laterals.

Onsite wastewater infrastructure will be designed to meet the standards of Chapters 1 and 2 of the City and County of Honolulu, Department of Environmental Services, “Wastewater Design Standards” and the relevant sections of Chapter 14, Revised Ordinances of Honolulu.

4.2.2 Wastewater Flow Projection

Anticipated building uses, floor areas, seat count, number of employees and patron counts may be used to estimate wastewater flow, with load factors from Table I of HAR 11-62, Appendix D. The following flow rates were used to calculate the total wastewater flow, which is shown in **Table 4 - Proposed Wastewater Flow**:

- 20 gpd/employee,
- 50 gpd /seat in restaurants (a single seating is assumed),
- 5 gpd /person for retail customers,
- 5 gpd /person for theater space,
- 1 employee per 400 square feet (slightly higher than the minimum numbers listed for the Building Code occupancy) and
- 30 sf/seat restaurant seat density, equal to the customer load.

Table 4 - Proposed Wastewater Flow

Building Name	Area, sf	# Empl.	# Cust.	Wastewater Generation Rate		Wastewater Flow	
				Per Empl.	Per Cust.	Empl.	Cust.
PERFORMING ARTS VENUE/RETAIL/ASSOCIATED ACTIVITIES							
Makai Amphitheater	17,000	43	650	20	5	860	3,250
Pre-show area	30,000	75	0	20	10	1,500	0
Pre-show bars	600	2	0	20	10	40	0
Event Kitchen/Back of House	9,120	23	0	20	10	460	0
PERFORMING ARTS VENUE/RETAIL/ASSOCIATED ACTIVITIES							
Buildings 2-4, 7	26,220	66	213	20	5	1,320	1,065
RESTAURANTS							
Building 5	6,240	16	208	20	50	320	10,400
Building 6	9,000	23	300	20	50	460	15,000

Table 4 - Proposed Wastewater Flow							
Building Name	**Area, sf**	**# Empl.**	**# Cust.**	**Wastewater Generation Rate**		**Wastewater Flow**	
				Per Empl.	**Per Cust.**	**Empl.**	**Cust.**
Building 1	15,000	38	610	20	50	760	25,000
COMMON AREAS							
Building 8 – Management Office Support	2,880	7	6	20	10	140	60
Entry Portal	1,400	4	0	20	10	80	0
Public Restrooms at Lagoon	300	0	400	20	10	0	4,000
						Total wastewater flow (gpd) =	**64,715**

Based on the tabulated values above, the future wastewater flow is estimated at 64,715 gpd. This is an increase of approximately 53,915 gpd from existing flow rates, and exceeds the 25,000 gpd wastewater flow cap established in the 2003 Kapolei Interceptor Sewer Report. Due to the limited information available at concept-level design, inflated wastewater generation rates can be expected and flow discrepancies can be resolved in the design process with more refined programming.

In addition, the applicant is working with the County to update the sewer allocation of wastewater flow capacity within the master planned tributary area, as allowed under the Kapolei Interceptor Sewer Assessment Agreement, to meet the anticipated wastewater demand for the project. The project can also consider several design considerations to reduce the projected wastewater demand flows such as:

- Implement black water and gray water systems (gray water system could account for up to 50% of the total wastewater generation)
- Consider restaurant occupancy rate factor (current assumption is 100% restaurant occupancy rate)
- Establish restaurant dining times (breakfast, lunch, & dinner versus lunch & dinner only)
- Reduce restaurant seat density factor (increase square footage per seat)
- Reduce restaurant size
- Consider low flow fixtures to reduce wastewater generation rates

4.2.3 Grease Interceptors

The Uniform Plumbing Code (UPC) and the City require grease interceptors at establishments where grease may be introduced into the drainage or sewage system.

The introduction of Fats, Oils and Greases (FOG) into a sewer system can lead to detrimental effects arising from higher Biochemical Oxygen Demand (BOD) levels in wastewater effluent, increased odor complaints due to decomposition of accumulated grease, and sewage spills caused by clogged pipes, pumps or disposal fields. These potential problems can be mitigated by installing grease interceptors that utilize settling chambers and baffled pipe connections to separate FOG from wastewater before it enters the sewer system.

Grease interceptors will be operated and maintained where FOG is anticipated to be generated, such as where kitchens are planned.

5 Drainage Infrastructure

5.1 Existing Conditions

5.1.1 Project Area Soils

Based on the United States Department of Agriculture (USDA) Web Soil Survey, several soil types are present onsite, **see Figure 5: Soils Map.**

The soil type occurring over the largest portion of the site is type KmA, Keaau clay, 0 to 2 percent slopes, described in the Web Soil Survey as derived from alluvium and composed mostly of clay, underlain by cemented material and sand. This soil is poorly drained and experiences occasional ponding and flooding. KmA soils are classified in Hydrologic Soil Group C.

CR, Coral Outcrop, occurs along the shoreline and beach. This soil type is described as coral rock at the ground surface, having very low available water capacity, excessively drained, with slopes ranging from 0 to 25 percent. The frequency of flooding is rare.

Soil type KmbA, Keaau clay, saline, 0 to 2 percent slopes, also occurs in the mauka center area of the site. It is described as clay overlying cemented material and sand. It is poorly drained but has only occasional to no ponding or flooding. This type is classified as Hydrologic Soil Group C.

A small area of soil type JaC, Jaucas Sand, may occur over the south corner of the site. This soil type arises from sand sized coral, shells, and sandy marine deposits derived from sedimentary rock. It is excessively drained, and the occurrence of flooding is rare; ponding does not occur. Jaucas Sand is a member of Hydrologic Soil Group A.

Soil type LPE, Lualualei extremely cobbly clay, 3 to 35 percent slopes, may occur in a small area near the north end of the site. This soil occurs in alluvial fans and a typical profile is described as “extremely cobbly clay” to the full depth. Up to 35% of the surface is covered with cobbles, stones and boulders. Flooding and ponding frequency are indicated to be “none.” LPE is a member of Hydrologic Soil Group C.

A geotechnical study including percolation tests will be conducted during the design phase to assess soil percolation rates for onsite storm runoff disposal via infiltration and/or percolation.

5.1.2 Topography and Drainage

A topographic survey indicates elevations at the site range from approximately 16 feet at the mauka boundary along Ali‘inui Drive, to Mean Sea Level at the shoreline. The average overall slope is about 4%.

Generally, stormwater runoff from the parking lot along the north boundary of the site (Basin 1) and the lot parallel to Ali‘inui Drive (Basin 2) is collected by catch basins and routed to the Ali‘inui Drive storm drainage system. Stormwater runoff from the remainder of the site (Basin 3) generally flows overland to the ocean.

Existing runoff flows were calculated using the Rational Method as described in the City's "Storm Drainage Standards" August 2017 and are tabulated in **Table 5 - Existing Hydrology Conditions**.

Table 5 - Existing Hydrology Conditions

Tributary Area	Discharge Point	C Value	1_{10} (in/hr)	Area (acres)	Flow, Q (cfs)
1	Catch Basin	0.80	5.35	1.82	7.75
2	Drain Inlet	0.60	4.90	1.82	5.36
3	Catch Basin	0.81	5.14	1.58	6.59
4	Ocean	0.60	4.25	4.36	11.12
5	Adjacent property	0.60	4.83	0.90	2.61
				Total Existing Condition Runoff =	**33.43**

5.1.3 Flood Hazards

The project site is located within Flood Zone VE, described on the Flood Hazard Assessment Report downloaded from the State of Hawaii, Department of Land and Natural Resources (DLNR) website www.hawaiinfip.org as coastal flood zone with velocity hazard (wave action). The base flood elevation (BFE) is 12 feet. Inland of Zone VE, the property lies in Zone D "Unstudied areas where flood hazards are undetermined, but flooding is possible." See **Figure 6: Flood Hazard Assessment Report**.

The flood hazard designations are also shown in **Figure 7 "National Flood Hazard Layer FIRMette"** although the flood depth over the south portion of the site is reduced from 12 to 8 feet.

5.1.4 Sea Level Rise

A portion of the site along the shoreline is within the year 2100 sea level rise predicted by the Hawaii Climate Change Mitigation and Adaptation Commission, 2021, as shown in **Figure 8: Year 2100 Sea Level Rise**. Proposed buildings near the shoreline will need to be constructed as post-and-beam, to accommodate possible high wave wash.

5.2 Proposed Grading and Drainage Conditions

5.2.1 Grading and Erosion Control

The existing topography will be altered for construction of the proposed improvements and a grading permit and bond will be required by the CCH, Department of Planning and Permitting (DPP). **Figure 9: Concept Grading & Drainage Plan** illustrates the proposed grading of the site.

Erosion control best management practices (BMP) will comply with the State, County and Federal regulations during all phases of construction. A National Pollutant Discharge Elimination System (NPDES) general permit coverage authorizing discharges of storm water associated with construction activities will be required for the project from the DOH, Environmental Management Division, Clean Water Branch.

5.2.2 Drainage

Concept level redevelopment site grading defines three approximately equally sized drainage areas. Runoff from two impervious parking lots will continue to be collected at catch basins and discharge to the storm drainage system in Ali‘inui Drive. Runoff from the third basin will sheet flow to the ocean. Future runoff flows calculated using the Rational Method as described in the City’s “Storm Drainage Standards” August 2017 are tabulated in **Table 6 - Proposed Hydrology Conditions**.

Table 6 - Proposed Hydrology Conditions

Tributary Area	Discharge Point	C Value	1_{10} (in/hr)	Area (acres)	Flow, Q (cfs)
1	Catch Basin	0.76	5.19	1.15	5.09
2	Catch Basin	0.59	5.14	1.58	7.32
3	Ocean	0.70	4.06	7.76	20.34
				Total Future Condition Runoff =	**32.75**

It is seen that the total runoff decreases in the developed condition.

5.2.3 Low Impact Development

The total disturbed area will be greater than one acre and the project will be required to comply with the City’s drainage and storm water quality standards which include BMPs and Low Impact Development (LID) measures located throughout the site where practical and feasible to improve storm water runoff quality and minimize the effects on receiving waters.

The project will maximize pervious and landscaped areas within the site. LID measures such as bioswales, rain gardens, planter boxes, sand filters, and permeable pavement will be considered and sited where appropriate to reduce direct outflow from the site and mitigate peak flows. Based on preliminary information, infiltration may be suitable for the site if a permeable coral layer is reached.

5.2.4 Sea Level Rise

Site strategies to account for sea level rise include:

- Raise site elevations around proposed buildings to 1-foot higher than the 3.2-foot sea level rise exposure area (includes passive flooding, annual high wave flooding, and coastal erosion).
- Grade the site to include green stormwater infrastructure to promote infiltration of surface runoff and lengthen the time of concentration of surface and coastal water runoff.
- Buildings will be set back 60-feet from the coastline. Areas along the coastline will be vegetated to function as a vegetated buffer.
- The site will be graded to allow runoff and coastal flooding to flow through the site.

6 Electrical and Telecommunications

6.1 Existing Services

Existing power and telephone service is provided from Ali‘inui Drive. Within the site, there are two Hawaiian Electric Company (HECo) transformers for the north and south end of the site. Electrical services are provided throughout the site.

Onsite telecommunication services are provided from the vault located at the southern end of the site. The mauka buildings near the parking lot currently have service while the other structures throughout the site may not have service. Further research can be done to determine the extent of the current telecom service.

6.2 Proposed Services

The electrical and telecommunication systems shall be designed and coordinated with HECo for electrical services and Spectrum or Hawaiian Telcom for telecommunication services.

Based on the existing service, all electrical service will be provided from Ali‘inui Drive and may utilize the existing onsite electrical system. The capacity of the existing transformers is unknown and necessary upgrades will be determined during design.

It is anticipated that nearly all proposed structures will need to have telecommunication services. Upgrades to the existing telecommunication service may be required to meet the proposed level of demand and will be determined during design.

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

July 28, 2021

Ms. Tracy Camuso, AICP
Group 70 International, Inc.
111 South King Street, Suite 170
Honolulu, Hawaii 96813

Dear Ms. Camuso:

Subject: Your Letter Dated June 23, 2021 Requesting Comments on the Environmental Impact Statement Preparation Notice for The Cove at Ko Olina Redevelopment Project in Kapolei - Tax Map Key: 9-1-057: 027

Thank you for your letter regarding the proposed redevelopment project at The Cove at Ko Olina.

The parcel has an existing nonpotable water meter. However, as of the submittal of this Environmental Impact Statement Preparation Notice, the Barbers Point Nonpotable Wells pumping exceeds State Permitted Use and could be in violation of the State Water Use Permit. We understand that Ko Olina Resort is planning an additional nonpotable well to accommodate future irrigation demands, however, the exploratory well has not been constructed to date. A commitment and schedule for the construction and connection of the nonpotable well is required before the Board of Water Supply (BWS) will approve building permits for the Ko Olina Resort. BWS Rules & Regulations require the use of nonpotable water for irrigation of large landscaped areas, if available. The developer of this project is required to coordinate with Ko Olina Resort for the development of the new nonpotable source. A source development plan should be submitted for BWS review. Confirmation on the adequacy of the wells yield and chloride content are also required before building permits will be approved.

The existing potable water system is adequate to provide off-site fire protection and accommodate the domestic demands of the proposed development. However, please be advised that this information is based upon current data, and therefore, the BWS reserves the right to change any position or information stated herein up until the final approval of the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

The developer will need to obtain a potable water allocation from the Ko Olina Resort and Marina. A copy of the letter should be submitted to the BWS for documentation.

When water is made available, the applicant will be required to pay our Water System Facilities Charges for transmission.

Water conservation measures are required for all proposed developments. These measures include the selection of Water Sense labeled ultra-low-flow plumbing fixtures and toilets, utilization of nonpotable water for irrigation using rain catchment and chiller/air handler condensate, cooling tower conductivity meters and water softening recycling systems, drought and salt tolerant plants, and xeriscaping principles in all landscaping. We recommend installing efficient irrigation systems, such as drip irrigation, and incorporating moisture sensors to avoid operating the irrigation system in the rain and/or if the ground has adequate moisture.

The proposed project is subject to BWS Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of Honolulu Fire Department.

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

cc: Ko Olina Resort

THE COVE AT KO 'OLINA REDEVELOPMENT

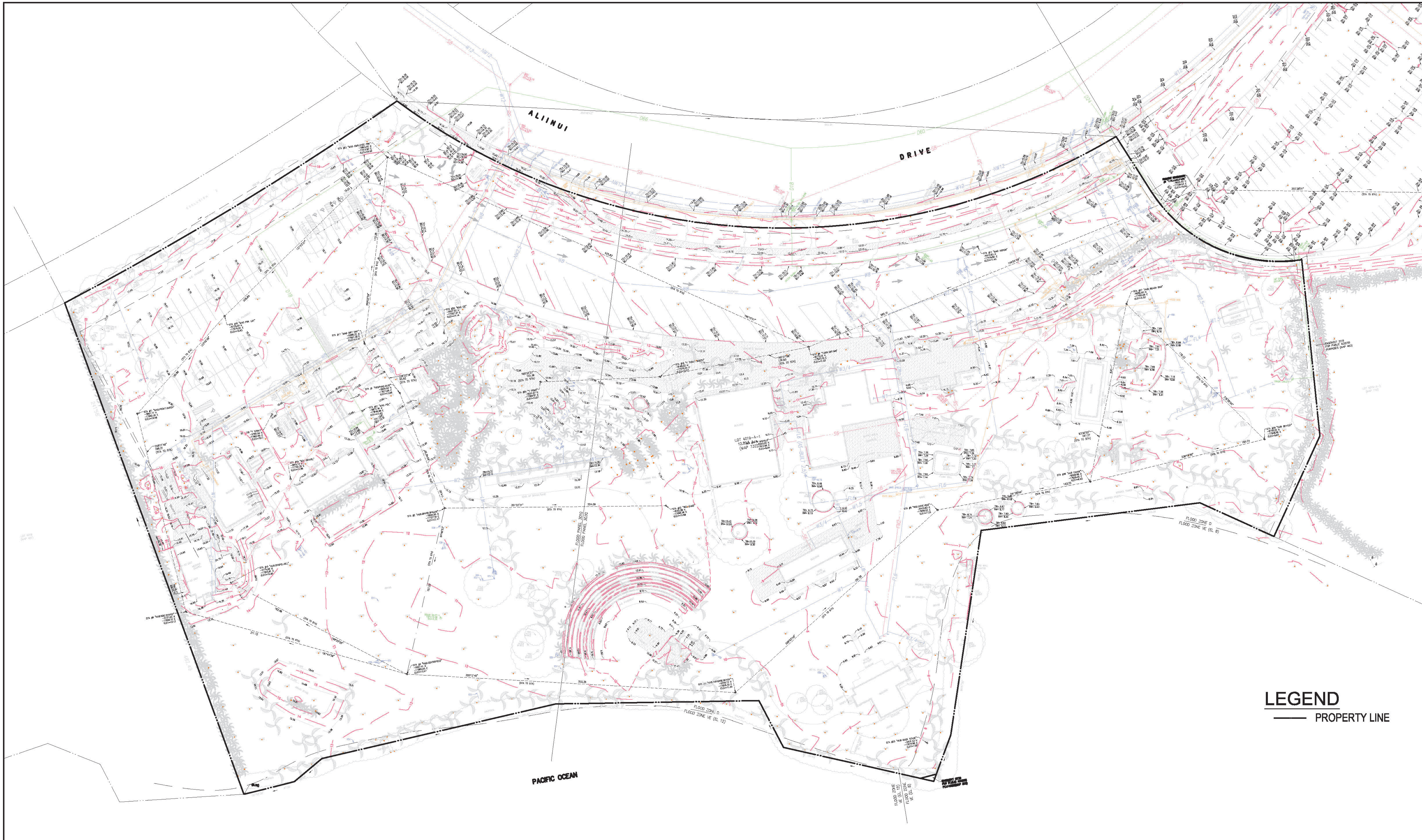
FIGURE 1 - VICINITY MAP

G70

THE COVE AT KO 'OLINA REDEVELOPMENT

FIGURE 2 - LOCATION MAP

G70

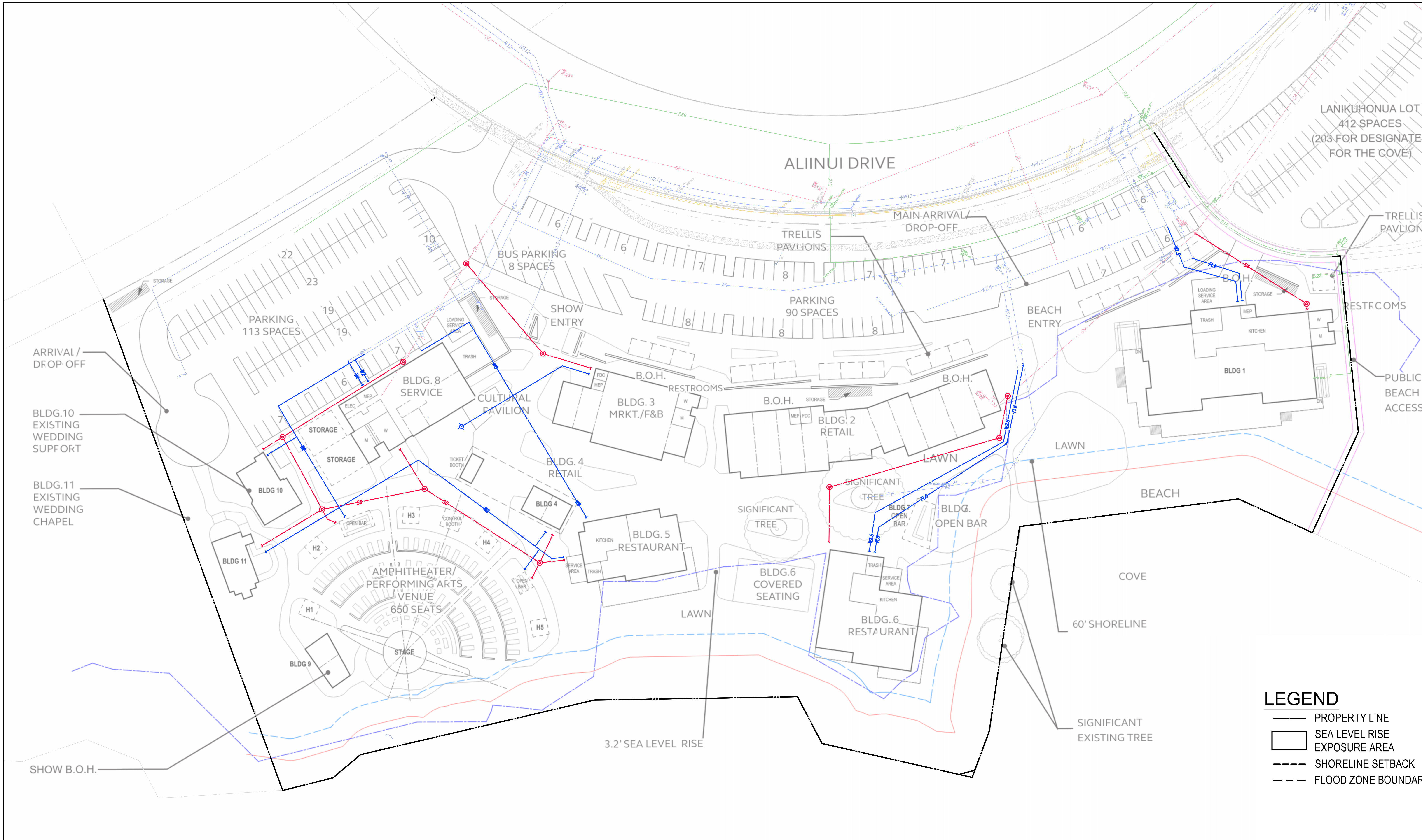


THE COVE AT KO OLINA
REDEVELOPMENT

EXISTING CONDITIONS PLAN

SCALE: 1" = 40'

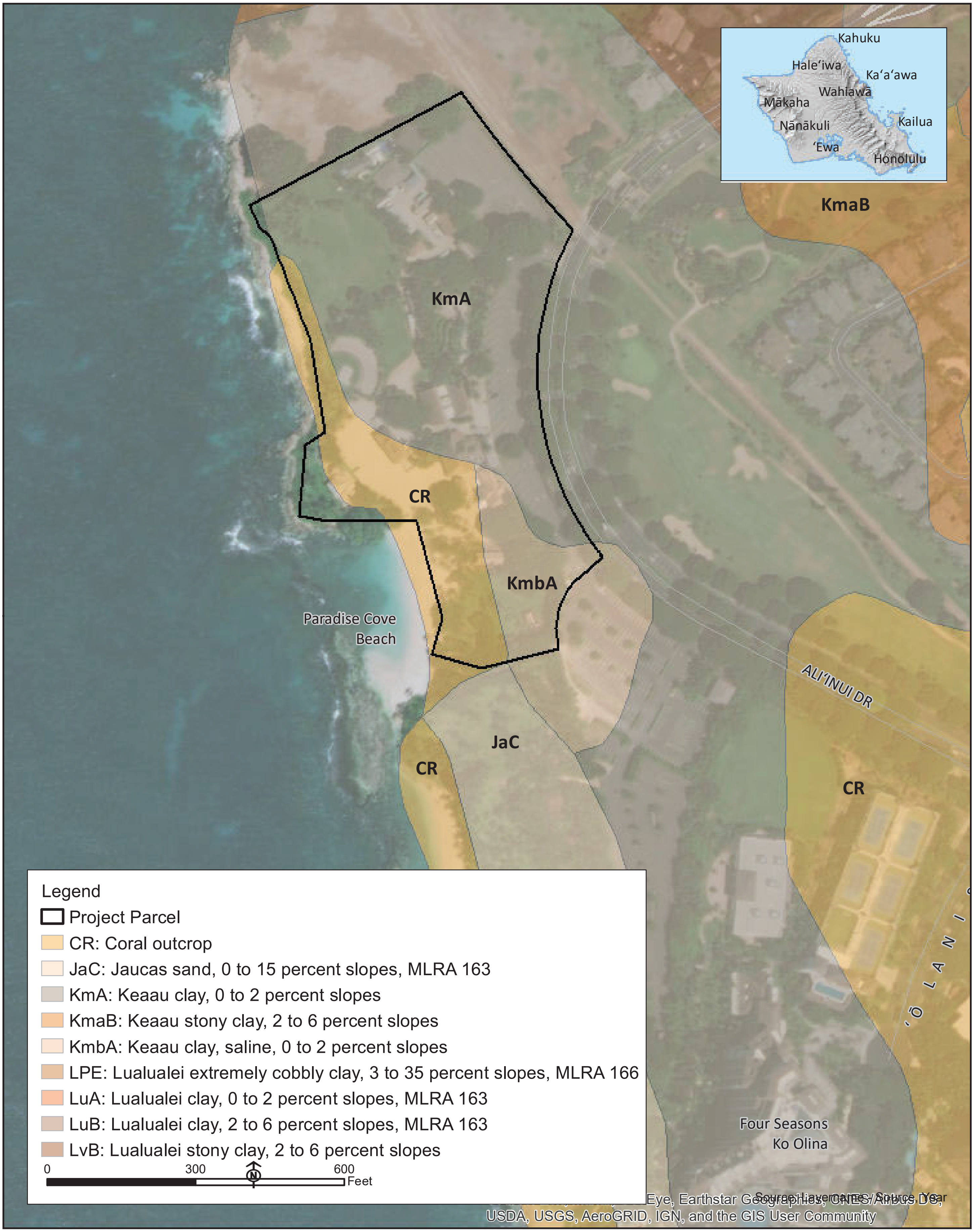
FIGURE
3



THE COVE AT KO OLINA REDEVELOPMENT

SITE & UTILITY PLAN

FIGURE 4



THE COVE AT KO 'OLINA REDEVELOPMENT

FIGURE 5 - SOILS MAP

G70

Flood Hazard Assessment Report

www.hawaiinfip.org

Paradise Cove Redevelopmt

FIGURE 6

Property Information

COUNTY:	HONOLULU
TMK NO:	(1) 9-1-057:027
WATERSHED:	MAKAIWA
PARCEL ADDRESS:	91-1089 ALIINUI DRIVE KAPOLEI, HI 96707

Notes:

Flood Hazard Information

FIRM INDEX DATE:	NOVEMBER 05, 2014
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL - EFFECTIVE DATE:	15003C0301G - JANUARY 19, 2011 15003C0303G - JANUARY 19, 2011

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

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

0 400 800 ft

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

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

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

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

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

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

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

OTHER FLOOD AREAS

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

National Flood Hazard Layer FIRMette FIGURE 7

FEMA

158°7'55"W 21°21'3"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

158°7'18"W 21°20'29"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/1/2021 at 9:37 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

THE COVE AT KO ʻOLINA REDEVELOPMENT

FIGURE 8 - YEAR 2100 SEA LEVEL RISE MAP

THE COVE AT KO OLINA
REDEVELOPMENT

GRADING AND DRAINAGE PLAN

FIGURE
9

POST CONSTRUCTION BMP
OPPURTUNITY PLAN

SCALE: 1" = 40'

40 20 0 40 80

POST CONSTRUCTION BMP PLAN

CONCEPT

PARADISE COVE REDEVELOPMENT

10

07.20.21

BIM 360://220069-01 Paradise Cove Redevelopment/pcr-ParadiseCove-A20_Central.rvt

6/6/2022 10:55:29 AM

Appendix G

Acoustic Study

ACOUSTIC STUDY FOR THE PARADISE COVE REDEVELOPMENT KO OLINA RESORT OAHU, HAWAII

Prepared for:

G70

Prepared by:

Y. EBISU & ASSOCIATES
1126 12th Avenue, Room 305
Honolulu, Hawaii 96816

AUGUST 2022

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

LIST OF FIGURES (CONTINUED)

LIST OF TABLES

CHAPTER I. SUMMARY

The existing and future traffic noise levels in the vicinity of the Paradise Cove Redevelopment were evaluated for their potential impact along roadways which service the facility. The changes in future traffic noise levels associated with the project traffic following implementation of the Paradise Cove Redevelopment Plan (see Figure I-1) are anticipated to be very low and range from 0 to 0.4 DNL (Day-Night Sound Level). Due to the very small increases in traffic noise anticipated to result from the project, risks of adverse noise impacts from project traffic noise are considered to be low, and the proposed project should not cause adverse noise impacts along the roadways servicing the project. For these reasons, special traffic noise mitigation measures are not considered necessary.

Risks of adverse noise impacts from entertainment events at the proposed Makai Amphitheater / Performing Arts Venue (MA/PAV) at Paradise Cove may increase due to the reduced buffer distance to Kai Lani At Ko Olina residents, but the available buffer distance of approximately 721 feet should be adequate to allow the facility to remain within regulatory sound level limits while maintaining current sound system amplification levels. Because of the reduced house speaker throw distances to the farthest guest table at the proposed MA/PAV facility, it should also be possible to maintain current sound levels in the seated areas with reduced house speaker volume settings and spillover levels beyond the Paradise Cover property lines to compensate for the reduced buffer distance. Anticipated sound levels during entertainment events at the proposed MA/PAV facility are predicted to be lower than existing levels at residents of The Coconut Plantation-Ko Olina and at receptors at the Lanikuhonua Cultural Institute due to increased buffer distances between the MA/PAV and those locations.

Unavoidable, but temporary, noise impacts may occur during construction of the proposed project, particularly during the site preparation and earth work activities on the project site. Because construction activities are predicted to be audible at neighboring and properties and beyond, the quality of the acoustic environment may be degraded to levels exceeding 60 dBA (A-Weighted decibels) during periods of construction. Mitigation measures to reduce construction noise to inaudible levels will not be practical in all cases, but the use of quiet equipment and compliance with the State Department of Health (DOH) construction noise permit requirements are recommended for use as mitigation measures.

PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE I-1

CHAPTER II. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies to assess environmental noise is the Day-Night Average Sound Level (DNL or Ldn). This descriptor incorporates a 24-hour average of instantaneous A-Weighted sound levels as read on a standard Sound Level Meter. The maximum A-Weighted sound level occurring while a noise source such as a heavy truck or aircraft is moving past a listener (i.e., the maximum sound level from a "single event") is referred to as the "Lmax value". The mathematical product (or integral) of the instantaneous sound level times the duration of the event is known as the "Sound Exposure Level", or Lse, which is analogous to the energy of the time-varying sound levels associated with a single event.

By definition, the minimum averaging period for the DNL descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. Because of the averaging used, DNL values in urbanized areas typically range between 50 and 75 DNL. In comparison, the typical range of intermittent noise events may have maximum Sound Level Meter readings between 75 and 105 dBA. A more complete list of noise descriptors is provided in Appendix B to this report. In Appendix B, the Ldn descriptor symbol is used in place of the DNL descriptor symbol.

Table II-1, extracted from Reference 1, categorizes the various DNL levels of outdoor noise exposure with severity classifications. Table II-2, also extracted from Reference 1, presents the general effects of noise on people in residential use situations. Figure II-1 presents suggested land use compatibility guidelines for residential and nonresidential land uses. A general consensus among federal agencies has developed whereby residential housing development is considered acceptable in areas where exterior noise does not exceed 65 DNL. This value of 65 DNL is used as a federal regulatory threshold for determining the necessity for special noise abatement measures when applications for federal funding assistance are made.

As a general rule, noise levels of 55 DNL or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, DNL levels generally range from 55 to 65 DNL, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 DNL, and as high as 75 DNL when the roadway is a high speed freeway, such as H-1 Freeway. Due to noise shielding effects from intervening structures, interior lots are usually exposed to 3 to 10 DNL lower noise levels than the front lots which are not shielded from the traffic noise.

For the purposes of determining noise acceptability for funding assistance from federal agencies, an exterior noise level of 65 DNL or lower is considered acceptable. These federal agencies include the Federal Aviation Administration (FAA), Department

TABLE II-1

EXTERIOR NOISE EXPOSURE CLASSIFICATION (RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY–NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL (1) STANDARD
Minimal Exposure	Not Exceeding 55 DNL	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL But Not Above 65 DNL	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 DNL But Not Above 75 DNL	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 DNL	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.

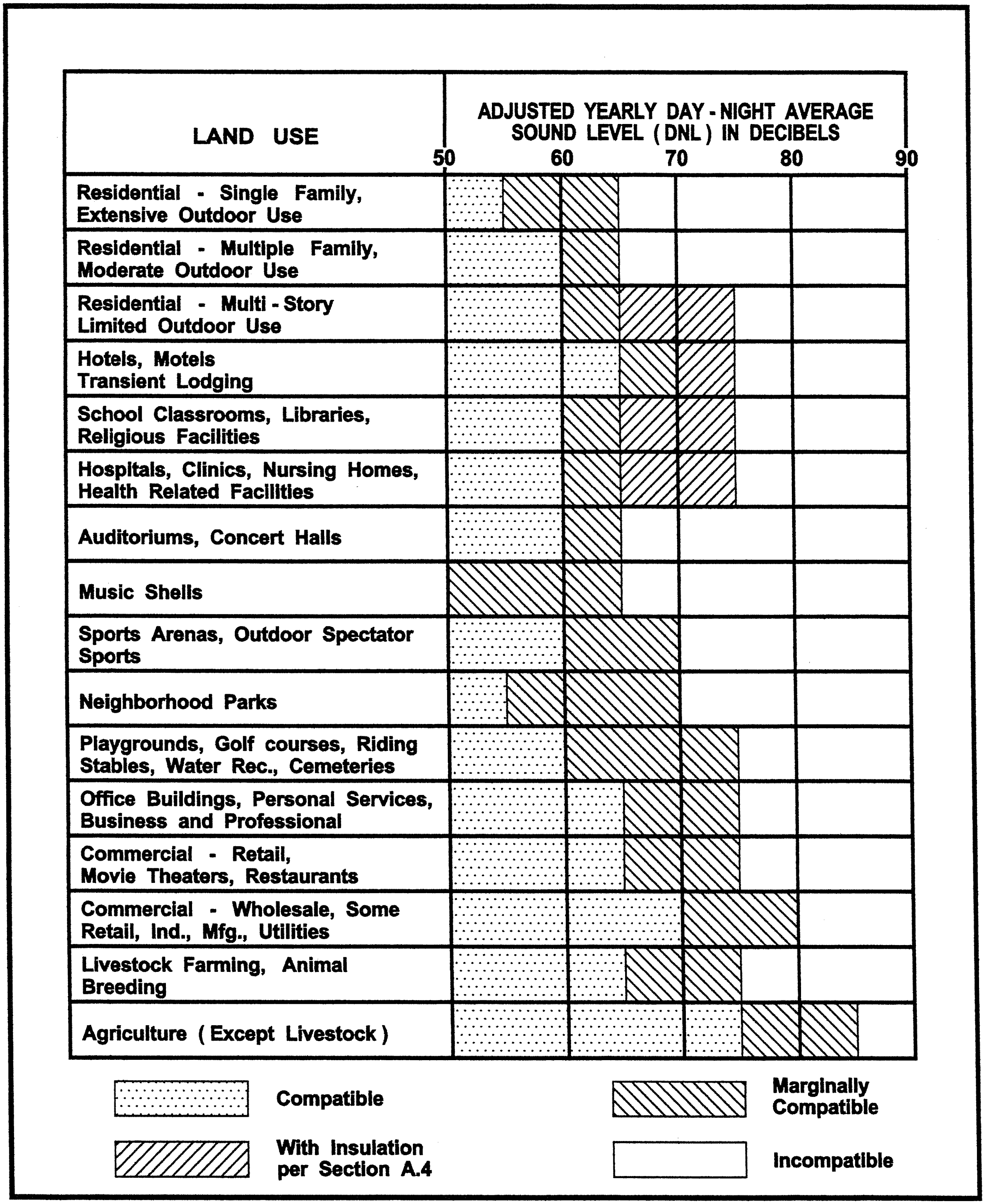
TABLE II-2

EFFECTS OF NOISE ON PEOPLE
(Residential Land Uses Only)

EFFECTS[1] / DAY-NIGHT AVERAGE SOUND LEVEL IN DECIBELS	Hearing Loss	Speech Interference		Annoyance[2]	Average Community Reaction[4]	General Community Attitude Towards Area
		Indoor	Outdoor			
	Qualitative Description	%Sentence Intelligibility	Distance In Meters for 95% Sentence Intelligibility	% of Population Highly Annoyed[3]		
75 and above	May Begin to Occur	98%	0.5	37%	Very Severe	Noise is likely to be the most important of all adverse aspects of the community environment.
70	Will Not Likely Occur	99%	0.9	25%	Severe	Noise is one of the most important adverse aspects of the community environment.
65	Will Not Occur	100%	1.5	15%	Significant	Noise is one of the important adverse aspects of the community environment.
60	Will Not Occur	100%	2.0	9%	Moderate to Slight	Noise may be considered an adverse aspect of the community environment.
55 and below	Will Not Occur	100%	3.5	4%		Noise considered no more important than various other environmental factors.

1. "Speech Interference" data are drawn from the following tables in EPA's "Levels Document": Table 3, Fig. D-1, Fig. D-2, Fig. D-3. All other data from National Academy of Science 1977 report "Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Evaluation of Environmental Impact of Noise."
2. Depends on attitudes and other factors.
3. The percentages of people reporting annoyance to lesser extents are higher in each case. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in intergrating annoyance over a very long time.
4. Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

NOTE: Research implicates noise as a facor producing stress-related health effects such as heart disease, high-blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been quantified.



LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY - NIGHT SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED.
(Source: American National Standards Institute S12.9 - 1988/Part 5)

FIGURE II-1

of Defense (DOD); Federal Housing Administration, Housing and Urban Development (FHA/HUD), and Veterans Administration (VA). This standard is applied nationally (see Reference 2), including Hawaii.

Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 DNL does not eliminate all risks of noise impacts. Because of these factors, a lower level of 55 DNL is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise (see Reference 3). For typical, naturally ventilated structures in Hawaii, an exterior noise level of 55 DNL results in an interior level of approximately 45 DNL, which is considered to be the "Unconditionally Acceptable" (or "Near-Zero Risk") level of interior noise. However, after considering the cost and feasibility of applying the lower level of 55 DNL, government agencies such as FHA/HUD and VA have selected 65 DNL as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 DNL are generally considered acceptable. Exceptions to this occur when naturally ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 DNL.

In the State of Hawaii, the State Department of Health (DOH) regulates noise from on-site activities. State DOH noise regulations are expressed in maximum allowable property line noise limits rather than DNL (see Reference 4). The noise limits apply on all islands of the State, including Hawaii. Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for preservation/residential, apartment/commercial, and agricultural/industrial lands equate to approximately 55, 60, and 76 DNL, respectively. However, the DOH noise regulations apply primarily to fixed machinery sources and not to crowd noise or public address systems.

The sound levels associated with entertainment events at establishments which require liquor licenses, such as may be required for luau dinner shows, are currently regulated by the Honolulu Liquor Commission (see Reference 5). The applicable noise limits are identical to those of the State DOH, and are 60 dBA during the daytime period of 7:00 AM to 10:00 PM, and 50 dBA during the nighttime period of 10:00 PM to 7:00 AM. The Honolulu Liquor Commission noise regulations are not limited to fixed machinery, and may be applied to crowd noise or public address systems.

CHAPTER III. GENERAL STUDY METHODOLOGY

The purposes of this noise study include predicting and evaluating the traffic noise increases associated with motor vehicle traffic to and from the Paradise Cove facility following the improvements proposed in the redevelopment of Paradise Cove. Additionally, potential noise impacts from the entertainment events at the facility were also evaluated. The scope of the noise study included evaluations of potential noise impacts on existing noise sensitive receptors within the project environs. The Paradise Cove Redevelopment Plan replaces the current Luau Stage Show / Dining Area and Imu Amphitheater with a Makai Amphitheater / Performing Arts Venue / Pre-show Area. Sound level measurements of the existing entertainment programs at Paradise Cove were obtained to describe existing sound levels in the surrounding community, with predictions of potential sound levels from future entertainment programs following redevelopment of the facility.

Existing traffic noise levels were measured at two locations in the project environs to provide a basis for developing the project's traffic noise contributions along Farrington Highway and Aliinui Drive, as well as for describing the existing noise environment at noise sensitive locations which are removed from roadway traffic. The locations of the two traffic noise measurement sites, "LOC A" and "LOC B", are shown in Figure I-1. Traffic noise measurements were performed during the AM and PM peak traffic hours in June 2021 on Farrington Highway and in August 2022 along Aliinui Drive. The results of the traffic noise measurements were also compared to calculations of existing traffic noise levels to validate the traffic noise computer model used. These traffic noise measurement results, and their comparisons with computer model predictions are summarized in Table III-1.

Traffic noise calculations for the existing conditions as well as noise predictions for the Year 2026 were performed using the Federal Highway Administration (FHWA) Noise Prediction Model (Reference 6). Traffic data entered into the noise prediction model were: hourly traffic volumes; average vehicle speeds; and estimates of traffic mix. The traffic study for the project (Reference 7), and Hawaii State DOT traffic counts at Ko Olina Interchange along Farrington Highway (Reference 8), were the primary sources of data inputs to the model. For existing and future traffic along Farrington Highway, it was assumed that the PM peak hour Leq(h) was 2.4 dB less than the 24-hour DNL. This assumption was based on computations of the hourly Leq and 24-hour DNL of traffic noise along Farrington Highway at Ko Olina Interchange (see Figure III-1). Along Aliinui Drive, where Paradise Cove and other resort area traffic tends to dominate the PM peak hour traffic volume, it was assumed that the PM peak hour Leq(h) was 1.5 dB less than the 24-hour DNL because of the lower distribution of AM commuter traffic during the nighttime DNL penalty hours prior to 7:00 am.

The predicted increases in traffic noise levels attributable to project related traffic were calculated, and noise impact risks evaluated. The relative contributions of non-project and project related traffic to the total noise levels were also calculated, and

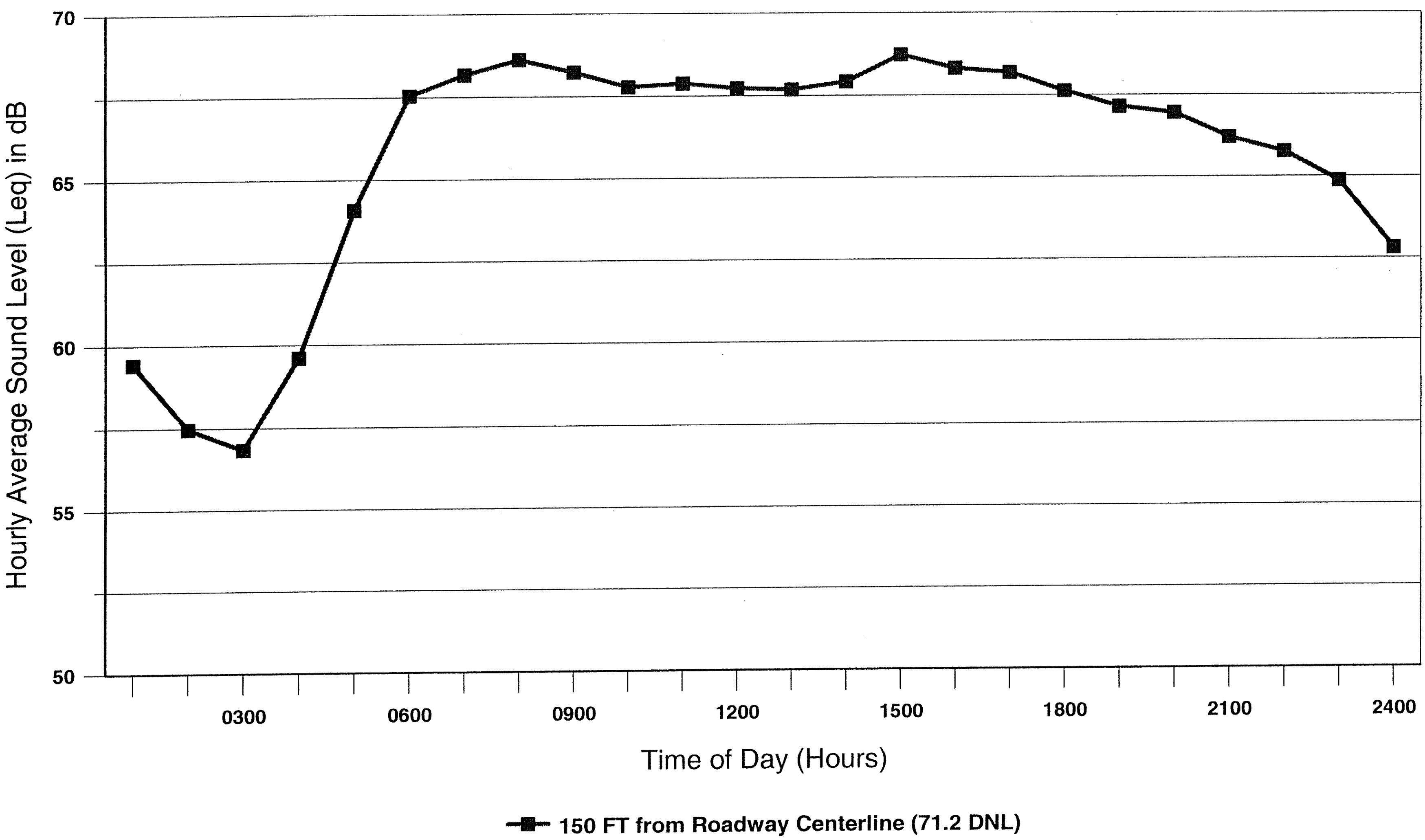
TABLE III-1
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	------ Hourly Traffic Volume ------ AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A. 150 FT from the centerline of Farrington Highway (6/2/21)	1531 TO 1631	55	4,192	33	32	67.5	68.0
A. 150 FT from the centerline of Farrington Highway (6/3/21)	0634 TO 0734	55	3,227	64	74	69.1	68.7
B. 77 FT from the centerline of Aliinui Drive (8/18 /22)	0720 TO 0829	32	970	29	3	63.4 (1)	60.6
B. 77 FT from the centerline of Aliinui Drive (8/18 /22)	1614 TO 1715	32	1,235	12	1	60.1	60.2

Notes:

(1) Includes leaf blower noise from parking lot estimated to be 59.7 dBA (Leq).

FIGURE III-1
HOURLY TRAFFIC NOISE LEVELS VS. TIME OF DAY
STA. B7200000H1-1; MAINLINE FARRINGTON HWY AT KO OLINA I.C. APRIL 18, 2019



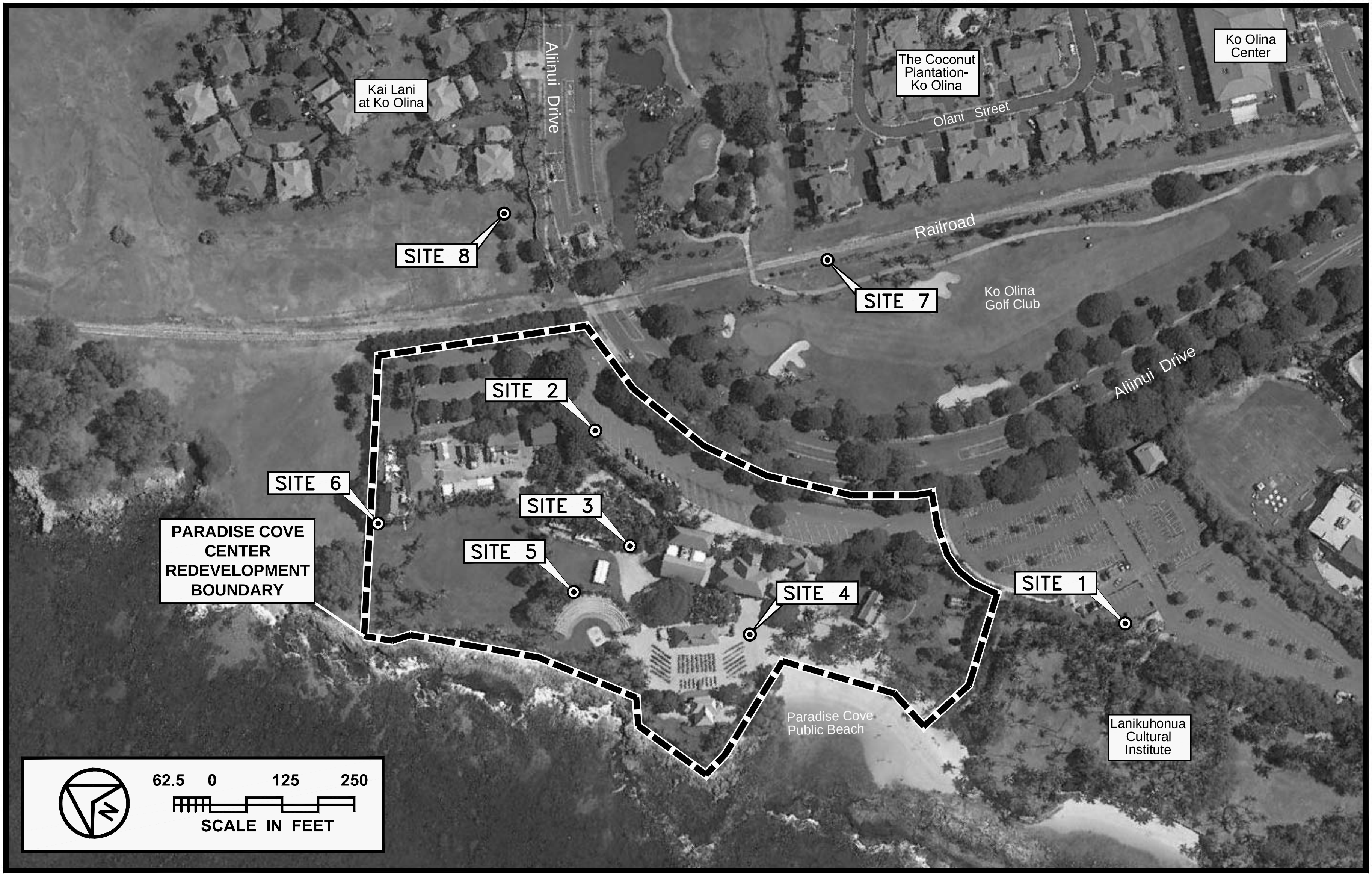
an evaluation of possible traffic noise impacts was made.

The possibility of adverse noise impacts from on-site entertainment events at the proposed Makai Amphitheater / Performing Arts Venue (MA/PAV) were evaluated by comparing predicted sound levels from that facility with existing background ambient noise levels in the project environs. The proposed Redevelopment Plan is shown in Figure III-2. Sound level measurements were obtained at Sites 1 through 8 where shown in Figure III-3, in order to quantify Base Year sound levels associated with entertainment events at the Imu Amphitheater and Luau Dinner Show Theater. These sound level measurements were obtained between 4:00 PM and 9:00 PM on June 29, 2022 and July 6, 2022. The measurement Sites 7 and 8 were also used to quantify existing background noise levels at the closest residences to Paradise Cove, and measurement Site 1 was used to simulate future sound levels from the proposed MA/PAV programs at approximately the same distance from the Luau Dinner Show Theater as would occur between the proposed MA/PAV and the closest residence at Kai Lani At Ko Olina. Using the sound measurements obtained at the locations shown in Figure III-3, predictions were made of anticipated future sound levels associated with possible similar entertainment events at the proposed MA/PAV following the completion of the Paradise Cove redevelopment. The risks of adverse noise impacts at the closest existing residents mauka of Paradise Cove were evaluated using these sound level predictions, the measured levels of existing background ambient noise levels, and existing State Department of Health and Honolulu Liquor Commission property line noise limits.

Calculations of average exterior and interior noise levels from construction activities were performed for typical naturally ventilated and air conditioned dwellings. Predicted noise levels were compared with existing background ambient noise levels, the potential for noise impacts was assessed, and mitigation measures recommended.

PROPOSED PARADISE COVE REDEVELOPMENT PLAN

FIGURE III-2



PROJECT SITE AND BACKGROUND NOISE MEASUREMENT LOCATIONS

FIGURE III-3

CHAPTER IV. BASE YEAR NOISE ENVIRONMENT

The existing background ambient noise levels in the project environs are controlled by traffic on Farrington Highway, local traffic on Aliinui Drive, Ko Olina Golf Course waterfalls, wind, and surf. The sounds of automobiles, heavy trucks, and buses, as well as the sounds of music and amplified voice announcements from the various activities at Paradise Cove control the background ambient noise levels on the project site between 4:30 PM and 9:45 PM. At locations in the immediate vicinity of the project site and which are removed from Farrington Highway, existing average background ambient noise levels range from 50 to 55 Leq, which are in the "Minimal Exposure, Unconditionally Acceptable" noise exposure category. On the grounds of Paradise Cove, average background noise levels rise to levels between 75 to 85 Leq in the immediate vicinity of the various entertainment events which occur in a programmed sequence during a typical day. The higher sound levels are audible at developed lands near the north, east, and south property boundaries of the complex.

Existing traffic noise levels were measured at Locations A and B where shown in Figure I-1 to determine the Base Year traffic noise levels along Farrington Highway and Aliinui Drive. Along Farrington Highway, at approximately 150 FT setback distance from the roadway's centerline, existing traffic noise levels are approximately 72 DNL, and are in the "Significant Exposure, Normally Unacceptable" noise exposure category. Along the section of Aliinui Drive northeast of Paradise Cove, existing traffic noise levels associated with traffic on Farrington Highway tend to mask the noise from local traffic on Aliinui Drive. Along the section of Aliinui Drive south of Paradise Cove, existing traffic noise levels are relatively low and less than 65 DNL, and are in the "Moderate Exposure, Acceptable" noise exposure category.

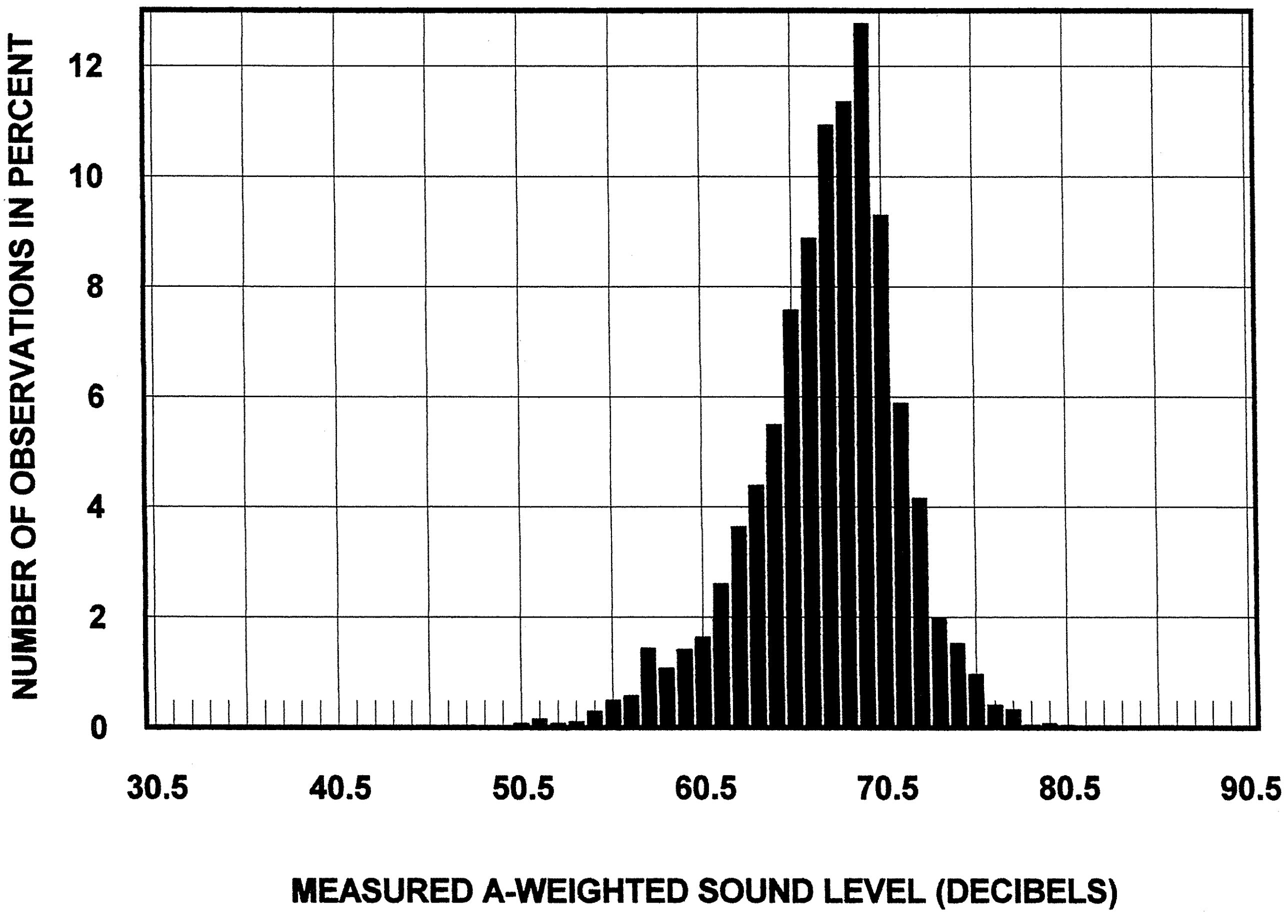
The existing traffic noise levels along Farrington Highway are high and are controlled by non-project traffic. Figures IV-1 through IV-4 are hourly histograms of measured traffic noise levels obtained at Location A in June 2021. At approximately 150 FT setback distance from the highway's centerline, maximum noise levels (Lmax) associated with the louder motorcycle and heavy truck traffic on the highway are in the order of 80 to 93 dB at this setback distance. Tour bus traffic along the highway are somewhat quieter and range from 73 to 80 dB at this setback distance. Base Year traffic volumes along Farrington Highway were not available for this project, so the traffic noise measurement data obtained in June 2021 were used to describe Base Year traffic noise levels along Farrington Highway in the project environs.

Base Year (CY 2022) traffic noise measurements at Location B were obtained in August 2022 during the AM and PM peak hours. The results of these measurements are shown in Table III-1 and Figures IV-5 and IV-6. These noise measurement results were used to validate the FHWA Traffic Noise Model as shown in Table III-1.

Results of calculations of Base Year traffic noise levels along Aliinui Drive, Olani Street, and Kamoana Place during the PM peak hour period are shown in Table IV-1.

FIGURE IV-1
HISTOGRAM OF MEASURED SOUND LEVELS AT LOC A; 150 FT FROM CENTERLINE OF FARRINGTON HIGHWAY

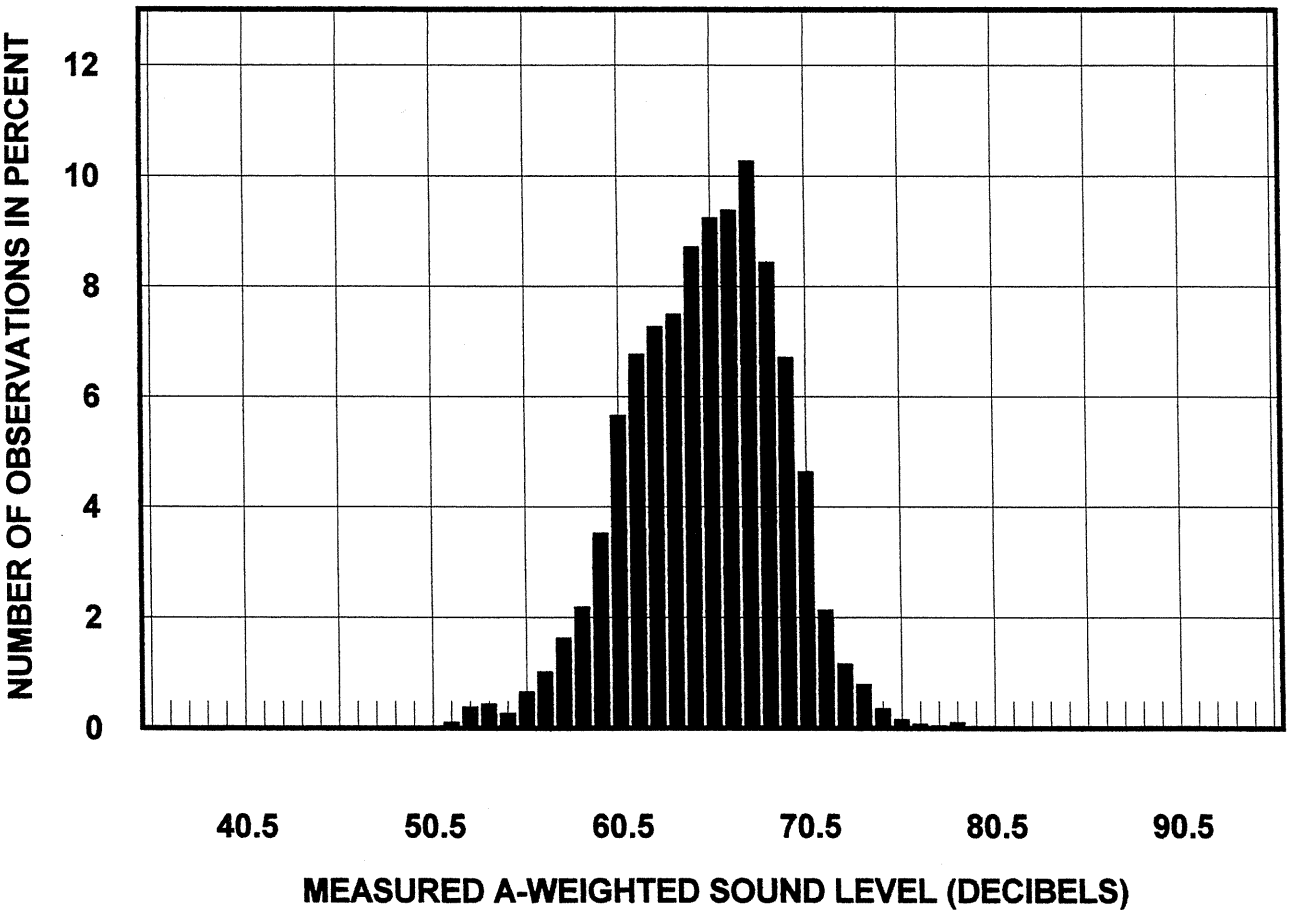
DATE: JUNE 3, 2021
TIME: 0634 - 0734 HOURS
METER RESPONSE: LAEQ



Lmax:	84.2 dBA
L10:	71.9 dBA
L50:	67.9 dBA
Leq:	69.1 dBA
Lmin:	50.4 dBA

FIGURE IV-2
HISTOGRAM OF MEASURED SOUND LEVELS AT LOC A; 150 FT FROM CENTERLINE OF FARRINGTON HIGHWAY

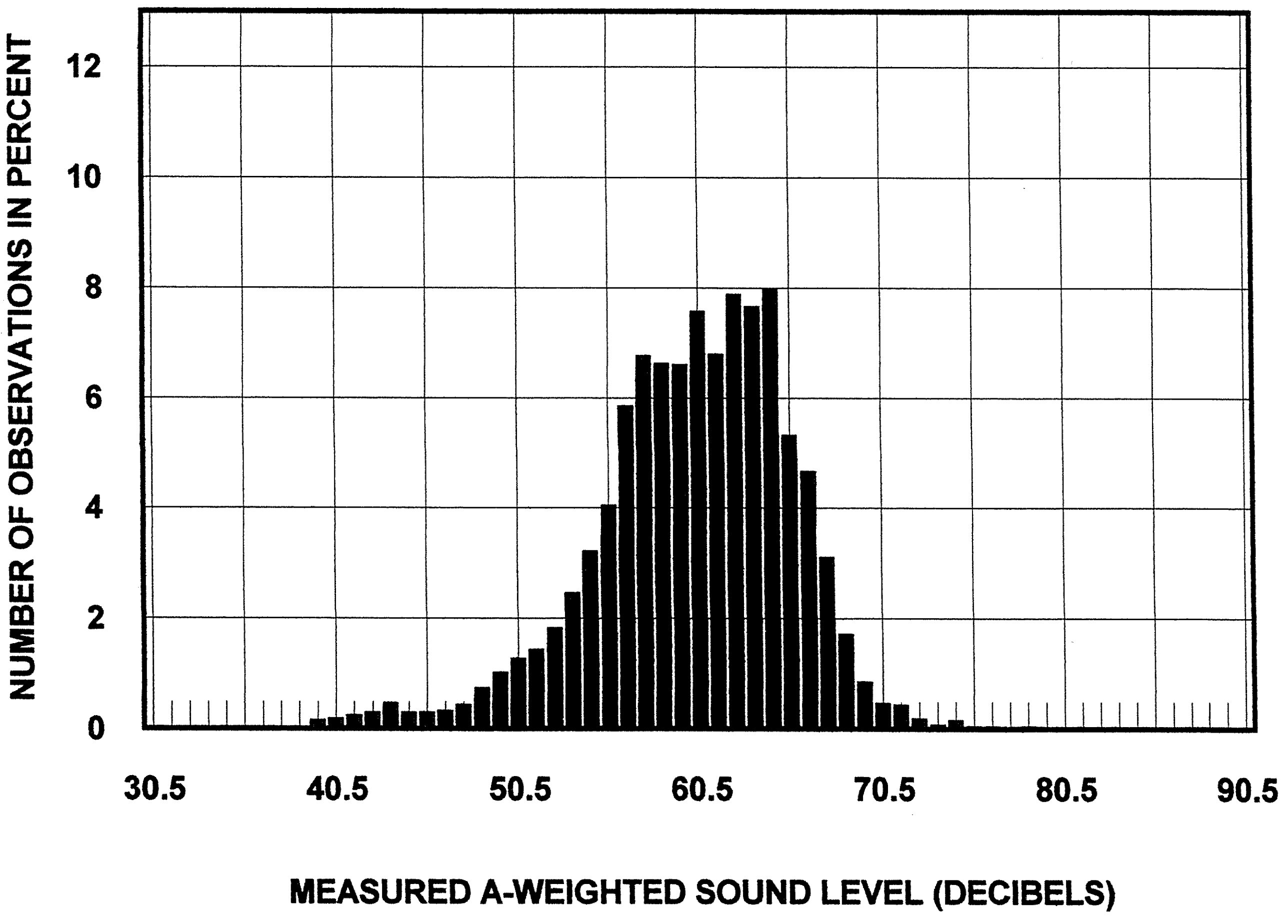
DATE: JUNE 2, 2021
TIME: 1531 - 1631 HOURS
METER RESPONSE: LAEQ



Lmax:	93.1	dBA
L10:	70.0	dBA
L50:	65.4	dBA
Leq:	67.5	dBA
Lmin:	51.1	dBA

FIGURE IV-3
HISTOGRAM OF MEASURED SOUND LEVELS AT LOC A; 150 FT FROM CENTERLINE OF FARRINGTON HIGHWAY

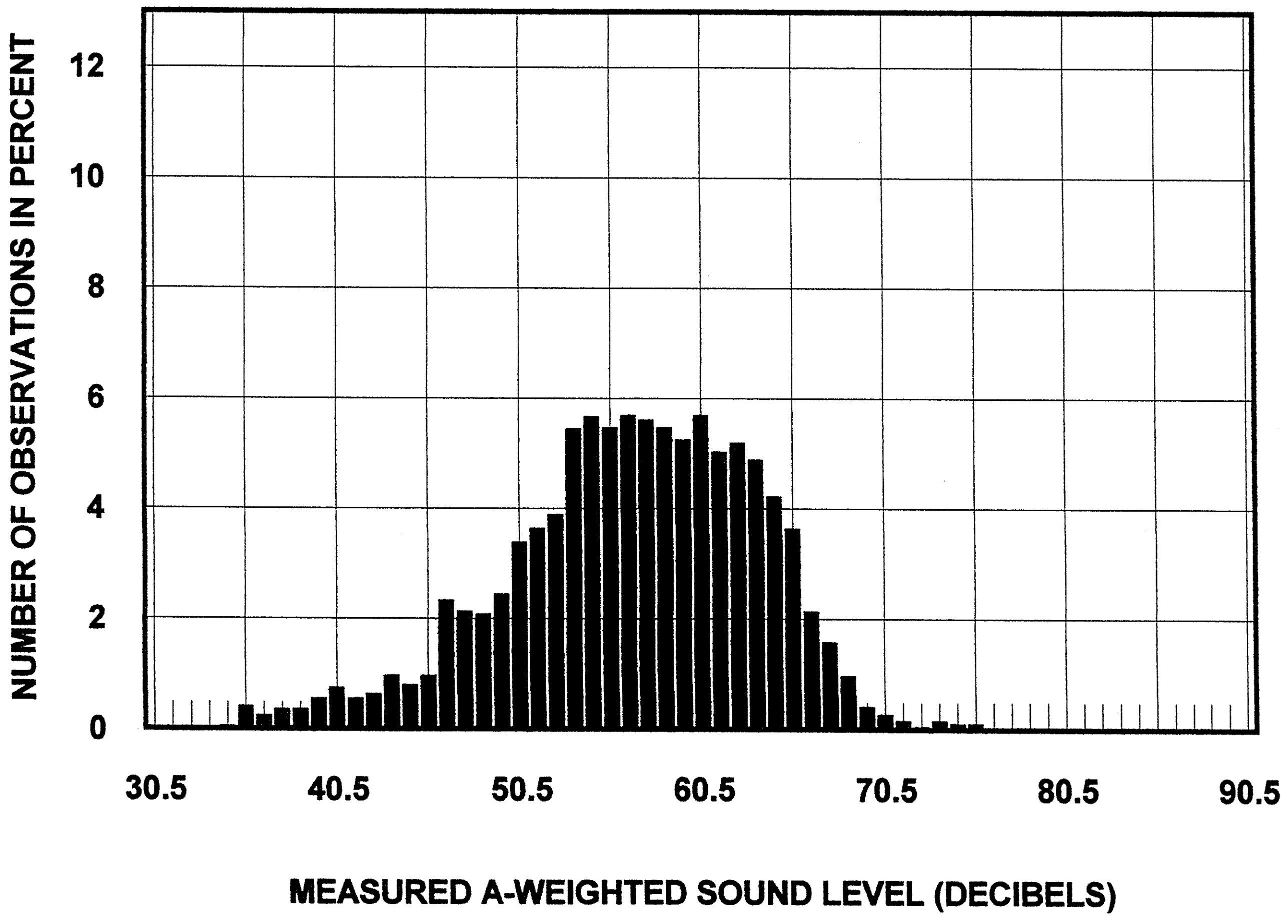
DATE: JUNE 2, 2021
TIME: 2149 - 2249 HOURS
METER RESPONSE: LAEQ



Lmax:	79.4 dBA
L10:	62.6 dBA
L50:	57.8 dBA
Leq:	63.0 dBA
Lmin:	38.7 dBA

FIGURE IV-4
HISTOGRAM OF MEASURED SOUND LEVELS AT LOC A; 150 FT FROM CENTERLINE OF FARRINGTON HIGHWAY

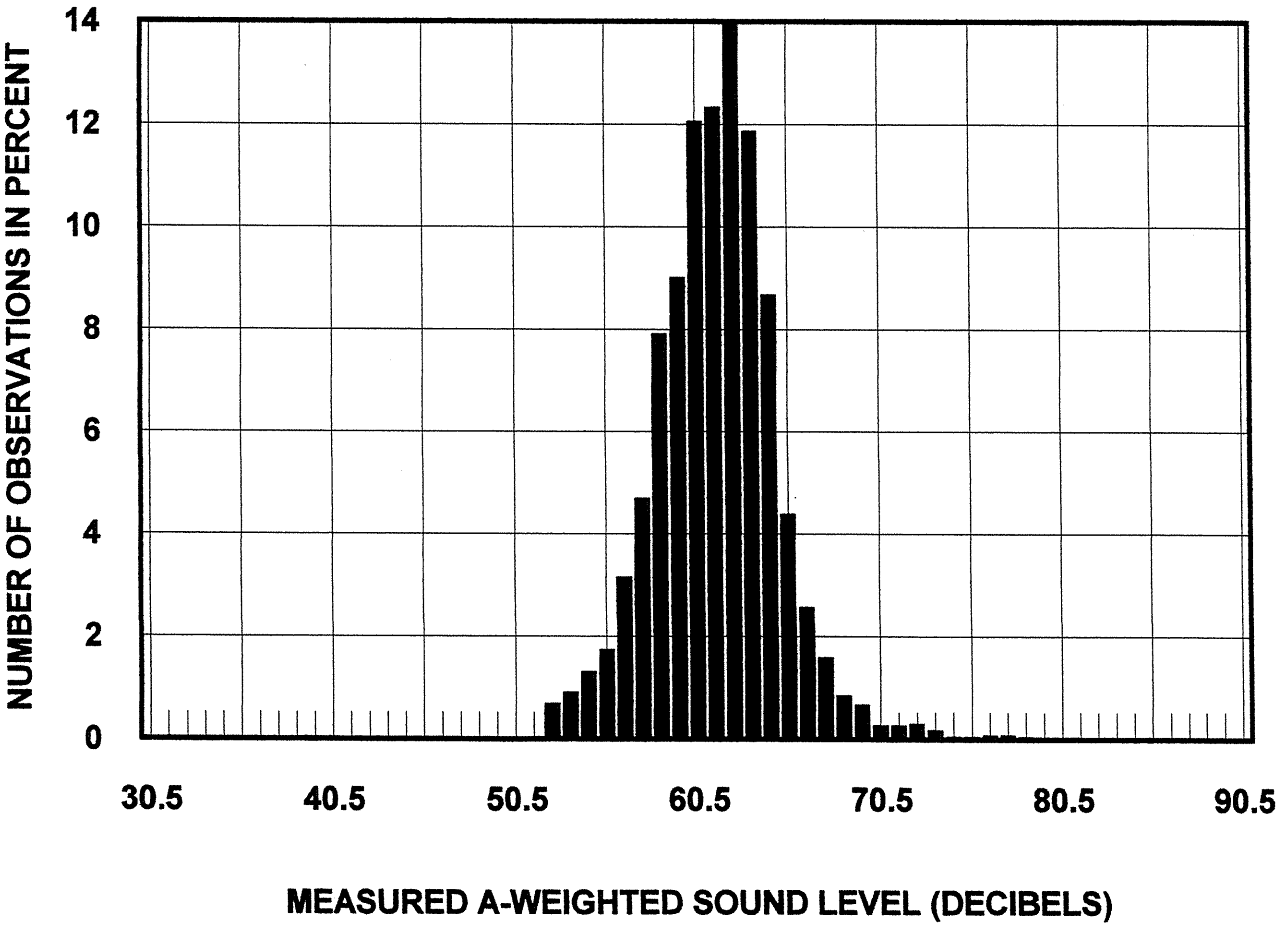
DATE: JUNE 2, 2021
TIME: 2250 - 2350 HOURS
METER RESPONSE: LAEQ



Lmax:	78.0 dBA
L10:	64.9 dBA
L50:	57.2 dBA
Leq:	61.1 dBA
Lmin:	34.9 dBA

FIGURE IV-5
HISTOGRAM OF MEASURED SOUND LEVELS AT
LOC B; 77 FT FROM CENTERLINE OF ALIINUI DRIVE

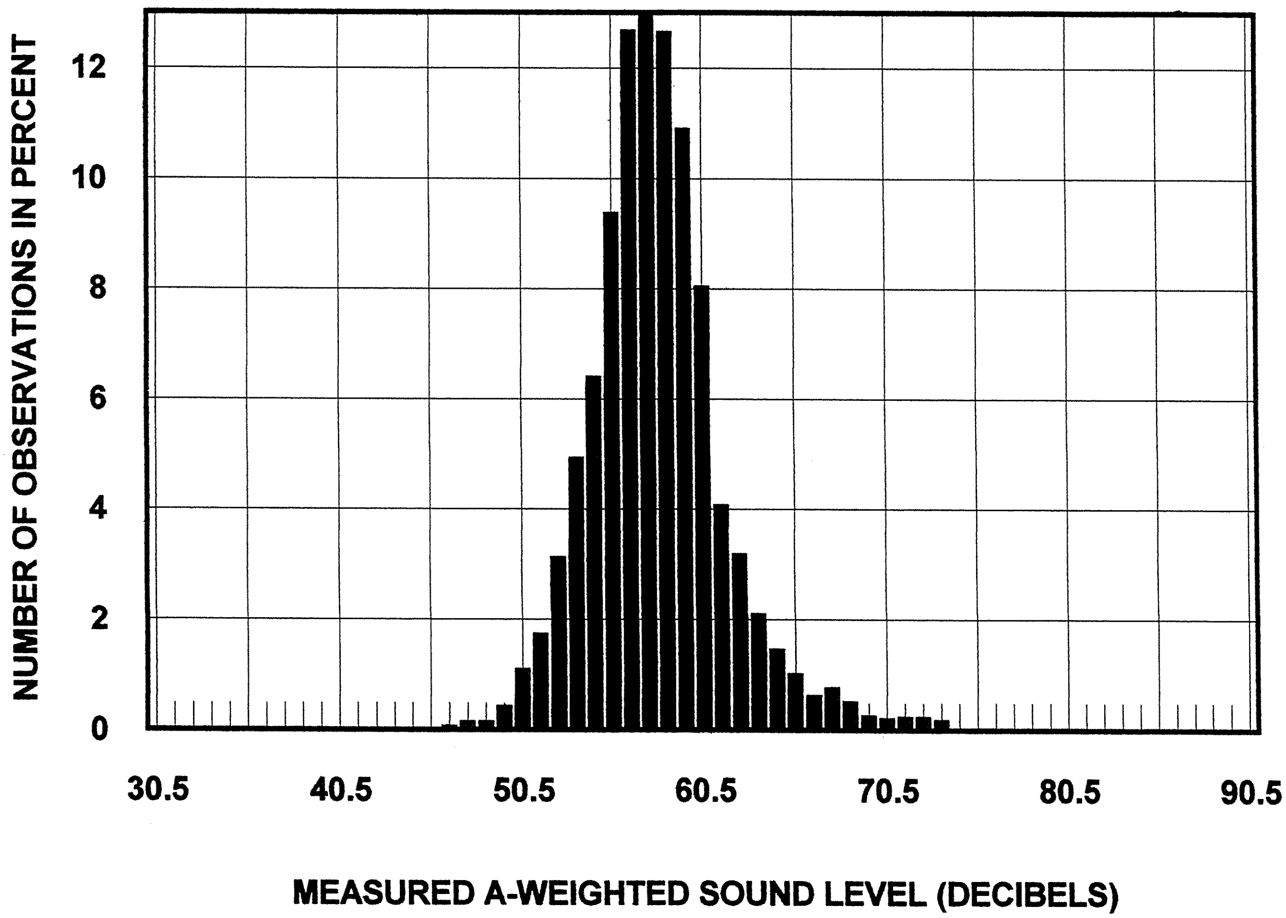
DATE: AUGUST 18, 2022
TIME: 0720 - 0827 HOURS
METER RESPONSE: LAEQ



Lmax:	**79.3 dBA**
L10:	**65.3 dBA**
L50:	**61.7 dBA**
Leq:	**63.2 dBA**
Lmin:	**52.2 dBA**

FIGURE IV-6
HISTOGRAM OF MEASURED SOUND LEVELS AT LOC B; 77 FT FROM CENTERLINE OF ALIINUI DRIVE

DATE: AUGUST 18, 2022
TIME: 1615 - 1715 HOURS
METER RESPONSE: LAEQ



Lmax:	76.0	dBA
L10:	62.3	dBA
L50:	57.8	dBA
Leq:	60.1	dBA
Lmin:	46.7	dBA

TABLE IV-1

BASE YEAR (CY 2022) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS SECTIONS OF ROADWAYS IN THE PROJECT AREA (PM PEAK HOUR)

	SPEED	TOTAL	********* VOLUMES (VPH) ***********					
LOCATION	(MPH)	VPH	AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
Aliinui Drive W. of Olani Street	32	1,327	1,304	20	3	64.7	58.7	54.7
Aliinui Drive Between Olani Street and Kamoana Pl.	32	1,052	1,034	16	2	63.7	57.6	53.7
Aliinui Drive E. of Kamoana Pl.	32	903	887	14	2	63.1	57.0	53.0
Olani Street N. of Aliinui Dr.	25	288	262	26	0	57.2	51.2	48.3
Olani Street S. of Aliinui Dr.	25	235	223	12	0	55.1	49.2	46.2
Kamoana Place S. of Aliinui Dr.	25	157	149	8	0	53.4	47.4	44.5

The traffic volumes used for the peak hour periods were obtained from Reference 7, and are shown in Appendix C. Table IV-2 presents the calculated setback distances between the roadway centerlines and the iso-noise contours associated with the 65, 70, and 75 DNL levels of traffic noise during the Base Year. The traffic noise levels shown in the tables only apply when unobstructed line-of-sight conditions exist to the roadways. These conditions would generally occur along the Right-of-Way, within any open space fronting the roadway, or at the upper levels of any man-made structure or natural terrain feature. Based on the results shown in Tables IV-1 and IV-2, it was concluded that Base Year traffic noise levels from Aliinui Drive could exceed the 65 DNL FHA/HUD noise standard at Kai Lani At Ko Olina, but that Base Year traffic noise levels from Aliinui Drive at other developed locations shown in Figure I-1 do not exceed 65 DNL.

During the period from late afternoon until 8:30 to 9:00 PM, Paradise Cove hosts commercial entertainment events, which includes a luau dinner show. Sound levels during the louder venues are audible within the Paradise Cove property as well as beyond the property boundaries. Sound level measurements were obtained in the project area where shown in Figure III-3 at Sites 1 through 8, during entertainment events with live music at Paradise Cove on June 29, 2022 and July 6, 2022. Figures IV-7 through IV-14 present typical histograms of the measured sound levels (without adjustments for background noise levels) at Sites 1 through 8 during the indicated entertainment events at Paradise Cove on June 29, 2022 and July 6, 2022. Also included with each histogram are the measured maximum (Lmax), minimum (Lmin), and average (Leq) sound levels recorded during the measurement period. The median (L50, or level exceeded 50 percent of the time) and L10 (or level exceeded 10 percent of the time) are also included with each histogram. An L10 value of 60 dBA corresponds to the State Department of Health's and Honolulu Liquor Commission's daytime noise limit beyond the property line for lands zoned for business or apartment use, which applies to Paradise Cove (at receptors beyond its boundaries) due to its B-1 zoning designation. Sound level measurements at Site 2 were performed continuously from approximately 4:00 PM to 8:45 PM on both days, with simultaneous audio recording also performed for identifying and confirming the periods of the audible entertainment programs. Continuous sound level measurements were obtained during the entire Luau Dinner Show on July 6, 2022 at Site 1. The results obtained at Site 1 were used to simulate the anticipated future sound levels at Kai Lani At Ko Olina during a similar Luau Dinner Show performed at the planned location of the MA/PAV, at a common distance of approximately 720 feet from the main house speakers. Measured sound levels at Site 1 during the louder later portion of the dinner show were also examined in respect to exceedances of the 60 dBA threshold for 2 minutes in any 20-minute interval, which is the L10 noise metric used in the DOH rules (Reference 4).

Based on the measurements obtained at Sites 1, 2, and 5, it was concluded that existing sound levels associated with the current entertainment events at Paradise Cove do not exceed the 60 dBA Liquor Commission limit at the closest residences at The Coconut Plantation-Ko Olina or Kai Lani At Ko Olina during both the Imu

TABLE IV-2

YEAR 2022 AND 2026 DISTANCES TO 65, 70, AND 75 DNL CONTOURS

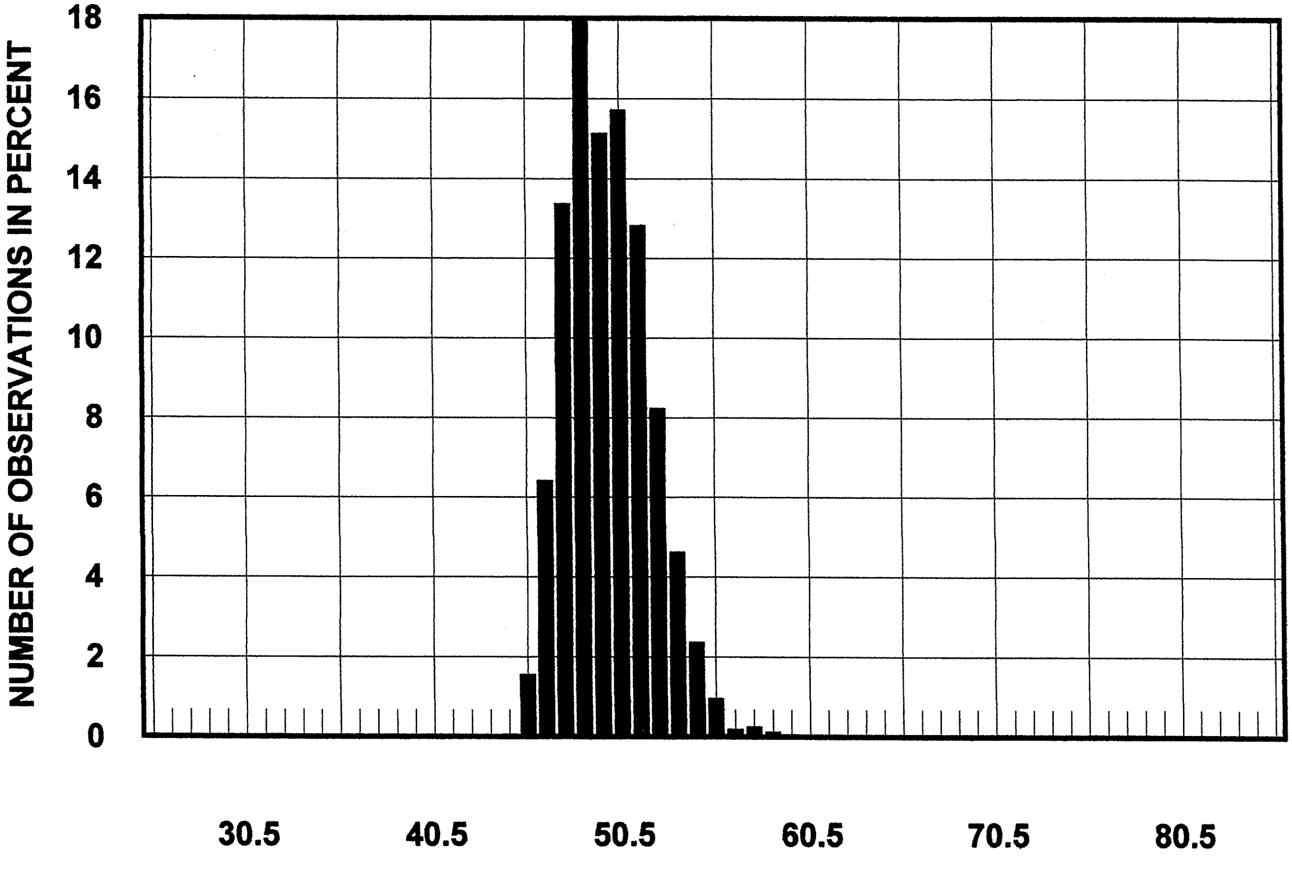
STREET SECTION	65 DNL SETBACK (FT)		70 DNL SETBACK (FT)		75 DNL SETBACK (FT)	
	EXISTING	CY 2026	EXISTING	CY 2026	EXISTING	CY 2026
Aliinui Drive W. of Olani Street	57	59	32	33	18	19
Aliinui Drive Between Olani Street and Kamoana P	51	54	29	30	16	17
Aliinui Drive E. of Kamoana Pl.	48	50	27	28	15	16
Olani Street N. of Aliinui Dr.	24	24	14	14	<12	<12
Olani Street S. of Aliinui Dr.	19	19	<12	<12	<12	<12
Kamoana Place S. of Aliinui Dr.	16	16	<12	<12	<12	<12

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See Tables IV-1 and V-1 for traffic volume, speed, and mix assumptions.
(3) Setback distances are for unobstructed line-of-sight conditions.
(4) Loose Soil conditions assumed along all roadways.

FIGURE IV-7
HISTOGRAM OF MEASURED SOUND LEVELS DURING LUAU DINNER SHOW; SITE 1

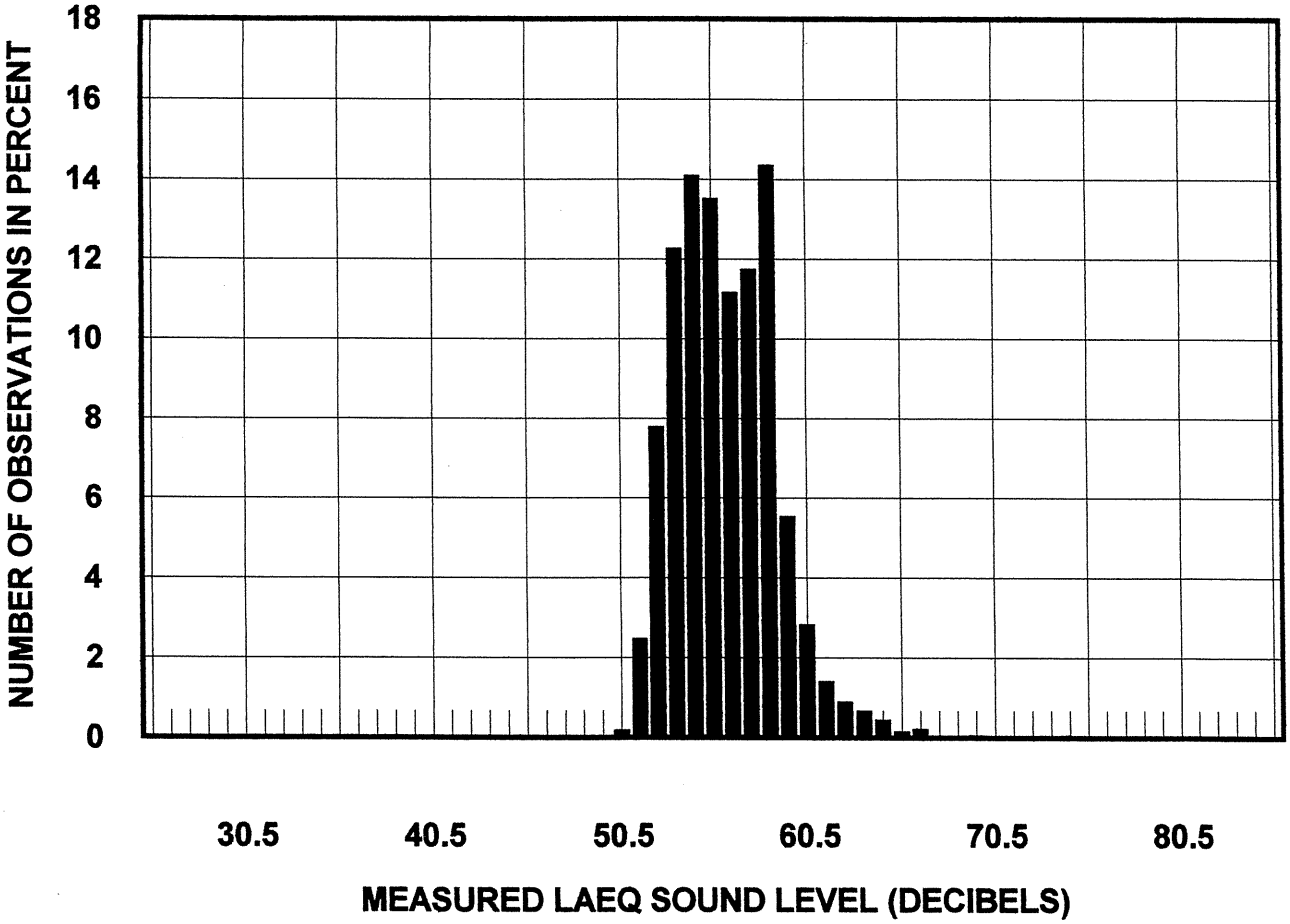
DATE: JULY 6, 2022
TIME: 1940 - 2032 HOURS
METER RESPONSE: SLOW



Lmax:	62.4 dBA
L10:	52.8 dBA
L50:	49.7 dBA
Leq:	50.5 dBA
Lmin:	44.9 dBA

FIGURE IV-8
HISTOGRAM OF MEASURED SOUND LEVELS DURING LUAU DINNER SHOW; SITE 2

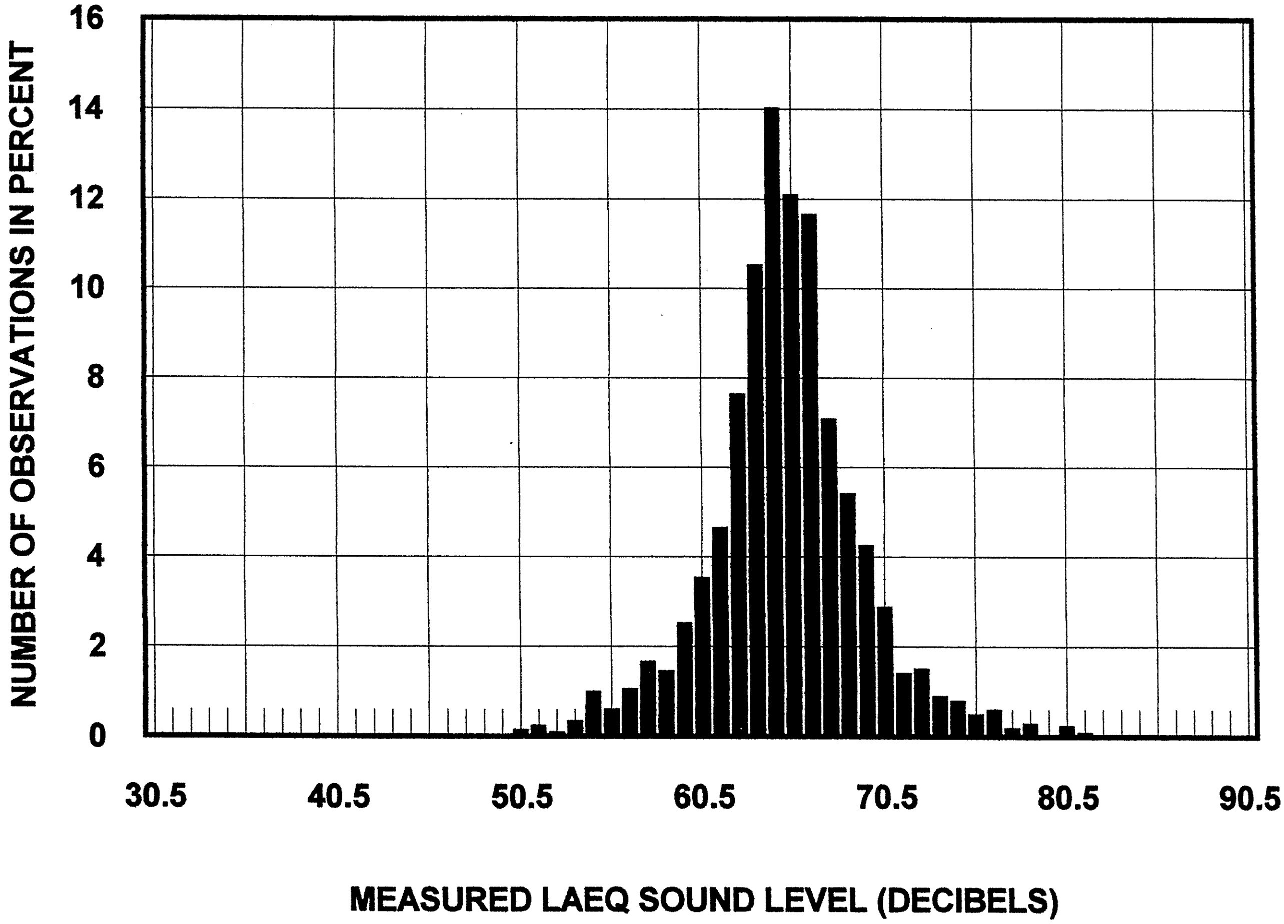
DATE: JULY 6, 2022
TIME: 1940 - 2032 HOURS
METER RESPONSE: SLOW



Lmax:	69.9 dBA
L10:	59.3 dBA
L50:	55.9 dBA
Leq:	57.1 dBA
Lmin:	50.7 dBA

FIGURE IV-9
HISTOGRAM OF MEASURED SOUND LEVELS DURING LUAU DINNER SHOW; SITE 3

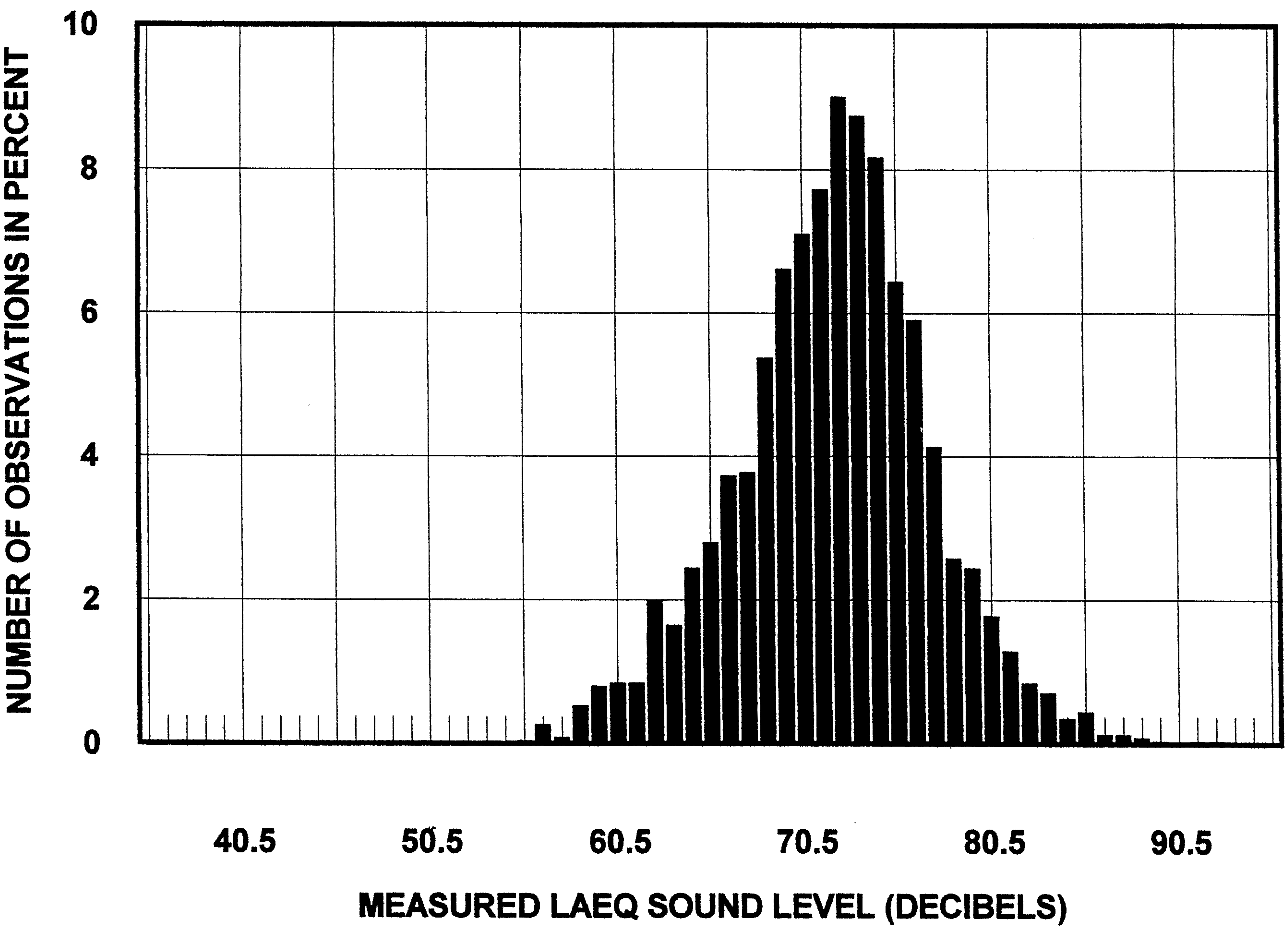
DATE: JUNE 29, 2022
TIME: 1908 - 1931 AND 2021 - 2037 HOURS
METER RESPONSE: SLOW



Lmax: 86.7 dBA
L10: 69.8 dBA
L50: 65.0 dBA
Leq: 67.7 dBA
Lmin: 49.9 dBA

FIGURE IV-10
HISTOGRAM OF MEASURED SOUND LEVELS DURING LUAU DINNER SHOW; SITE 4

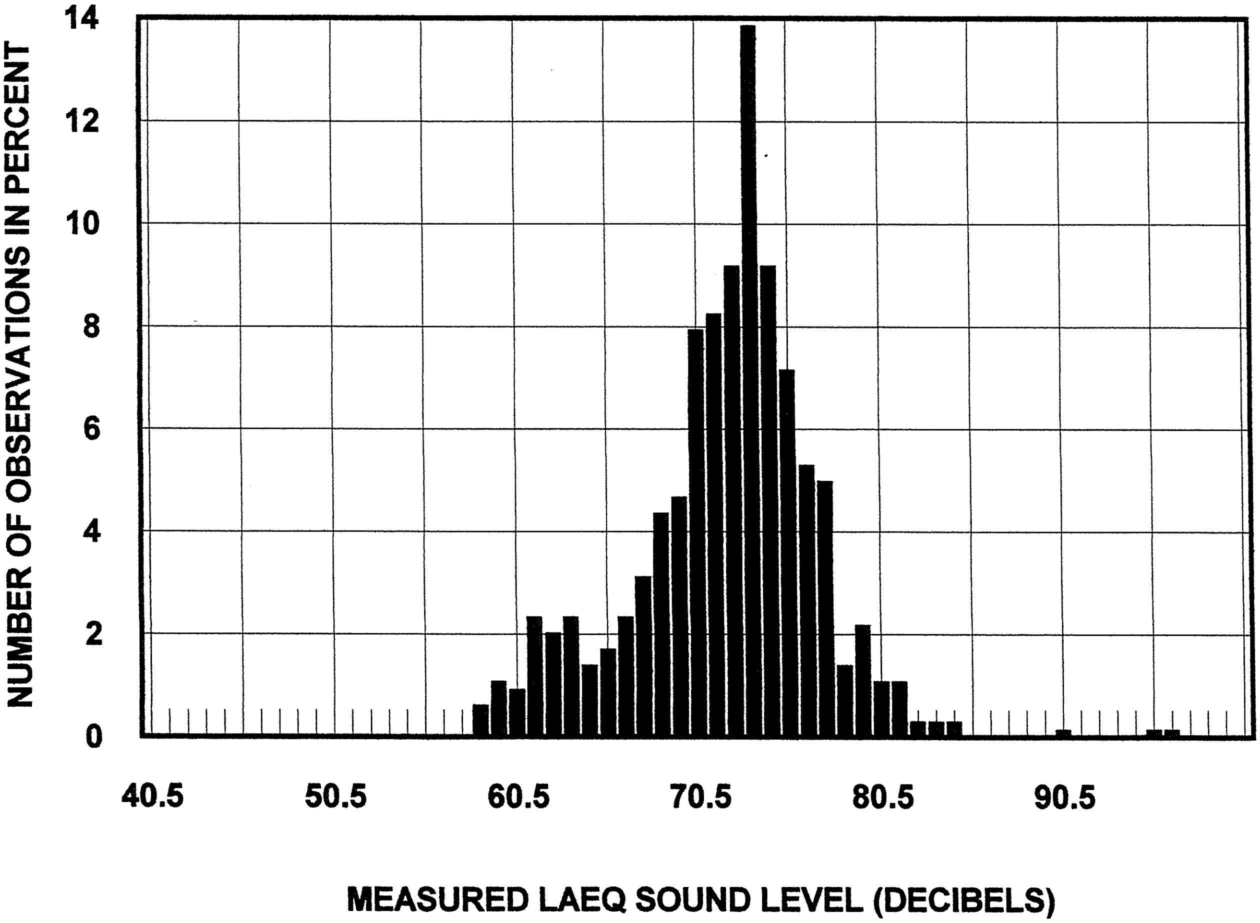
DATE: JUNE 29, 2022
TIME: 1933 - 1942 AND 1948 - 2018 HOURS
METER RESPONSE: SLOW



Lmax:	92.7 dBA
L10:	78.3 dBA
L50:	72.3 dBA
Leq:	75.3 dBA
Lmin:	55.8 dBA

FIGURE IV-11
HISTOGRAM OF MEASURED SOUND LEVELS AT IMU AMPHITHEATER; SITE 5

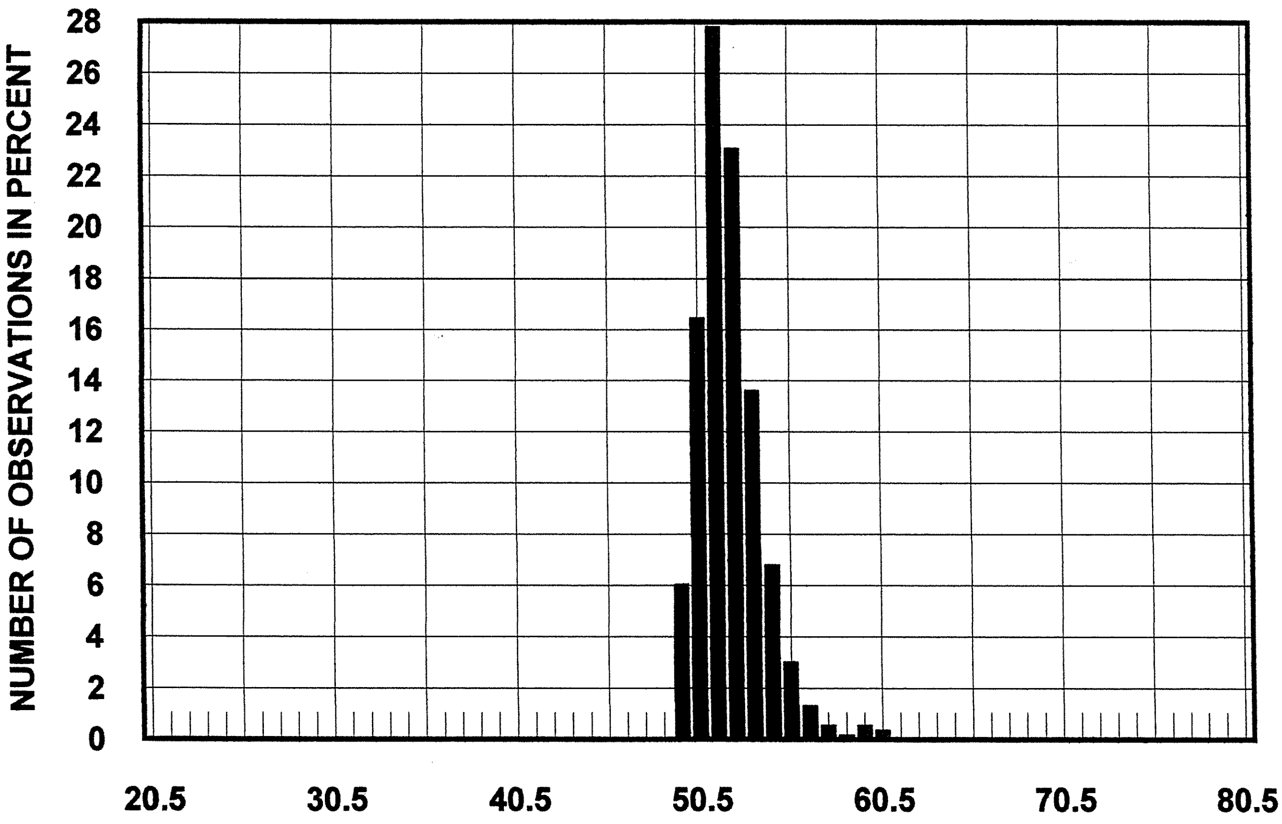
DATE: JUNE 29, 2022
TIME: 1816 - 1827 HOURS
METER RESPONSE: SLOW



Lmax:	96.8	dBA
L10:	77.2	dBA
L50:	72.8	dBA
Leq:	76.1	dBA
Lmin:	58.0	dBA

FIGURE IV-12
HISTOGRAM OF MEASURED SOUND LEVELS AT PARADISE COVE; SITE 6

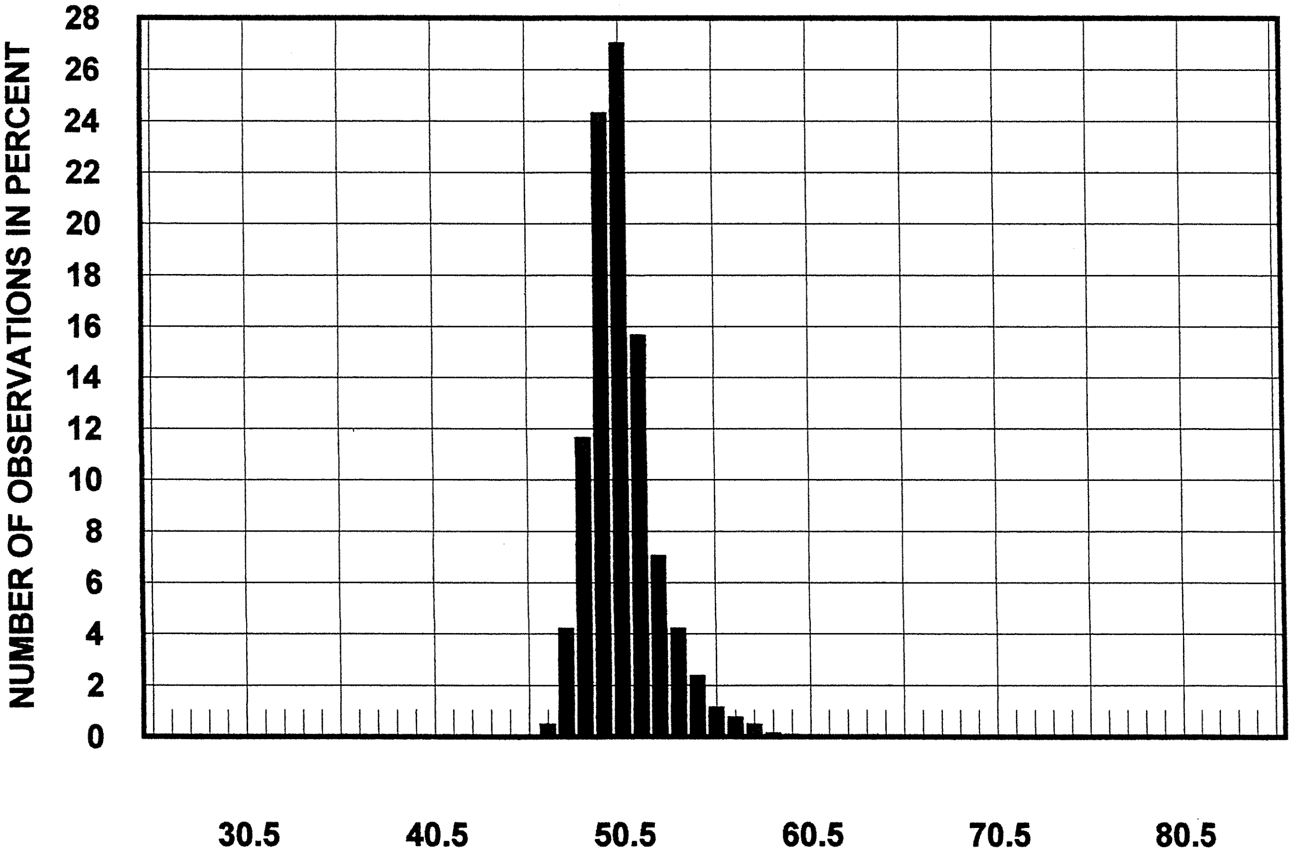
DATE: JUNE 29, 2022
TIME: 1752 - 1802 HOURS
METER RESPONSE: SLOW



Lmax:	60.8	dBA
L10:	54.5	dBA
L50:	52.0	dBA
Leq:	52.6	dBA
Lmin:	49.2	dBA

FIGURE IV-13
HISTOGRAM OF MEASURED SOUND LEVELS AT THE COCONUT PLANTATION; SITE 7

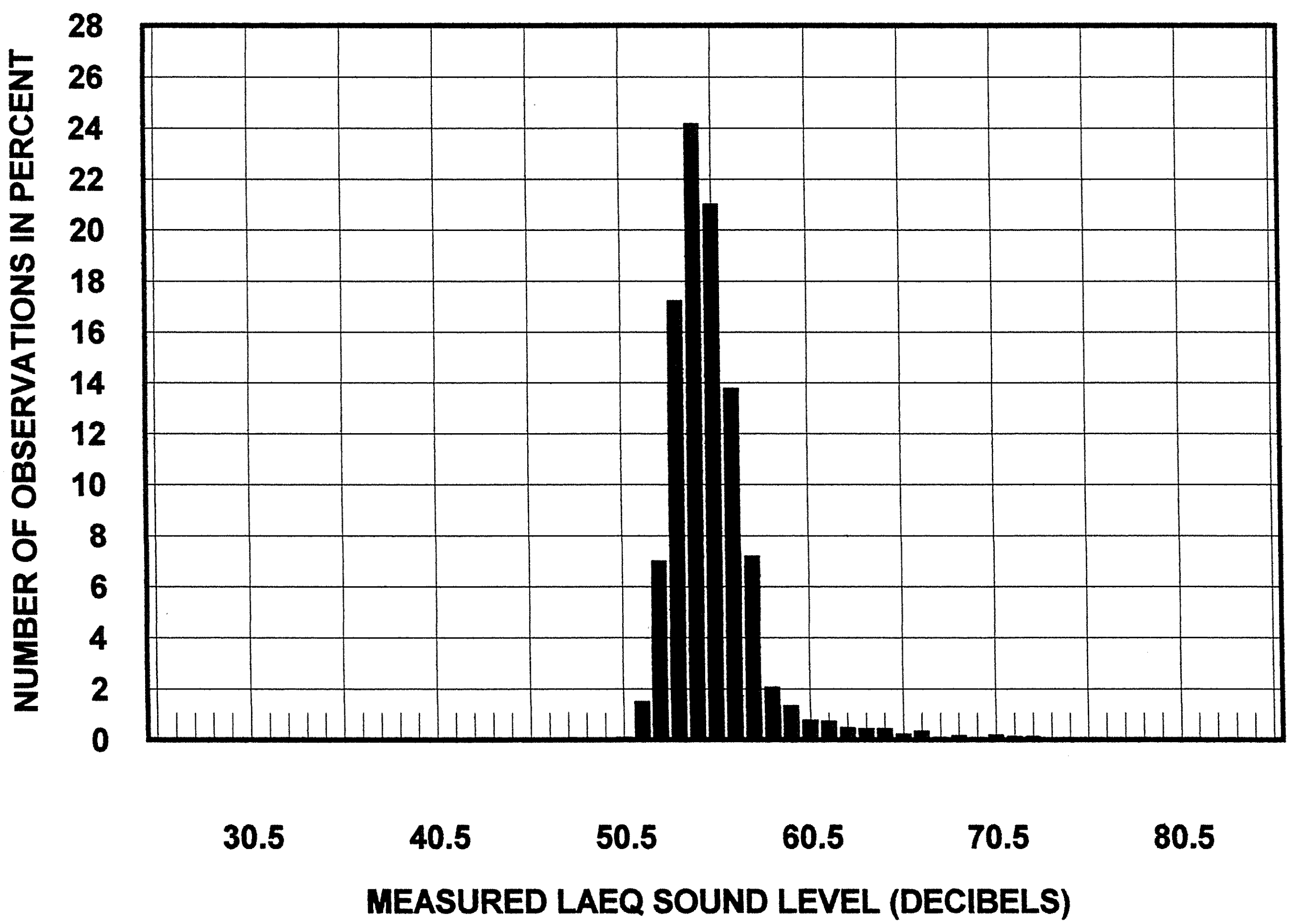
DATE: JULY 6, 2022
TIME: 1622 - 1652 HOURS
METER RESPONSE: SLOW



Lmax:	64.8 dBA
L10:	52.9 dBA
L50:	50.3 dBA
Leq:	51.1 dBA
Lmin:	46.4 dBA

FIGURE IV-14
HISTOGRAM OF MEASURED SOUND LEVELS AT KAI LANI; SITE 8

DATE: JULY 6, 2022
TIME: 1704 - 1735 AND 1805 - 1822 HOURS
METER RESPONSE: SLOW



Lmax: 73.6 dBA
L10: 57.6 dBA
L50: 55.0 dBA
Leq: 57.1 dBA
Lmin: 50.9 dBA

Amphitheater Show and the Luau Dinner Show. Sound level measurement results between 6:15 and 6:27 PM at Sites 5 and 2 on June 29, 2022 were used to estimate the sound levels associated with the Imu Amphitheater Show at The Coconut Plantation-Ko Olina and Kai Lani At Ko Olina. Figures IV-11 and IV-15 depict histograms of the measured sound levels associated with the Imu Amphitheater Show at Sites 5 and 2, respectively. Sound levels measured at Site 2 were at least 18 dBA lower than those measured at Site 5, and much lower than the 11 dBA difference which would be expected from only distance effects between the two measurement locations and the Imu Amphitheater's floor mounted speakers. The measured excess attenuation of at least 7 dBA was attributed to the sound shielding effects from the depressed stage floor of the Imu Amphitheater plus the presence of existing buildings between the Imu Amphitheater and Site 2. With these additional sound shielding effects, plus the added 23 dBA attributable to increased buffer distances between Site 5 and the closest existing residences, existing sound levels during the Imu Amphitheater Show were estimated to be 30 dBA lower than those measured during the Imu Amphitheater Show shown in Figure IV-11, with L10 and Leq sound levels of 47 dBA and 46 dBA, respectively. These predicted sound levels from the Imu Amphitheater show are well below the 60 dBA DOH and Liquor Commission noise threshold, and are lower than the early evening, existing background noise levels measured at Sites 7 and 8 as shown in Figures IV-13 and IV-14, respectively.

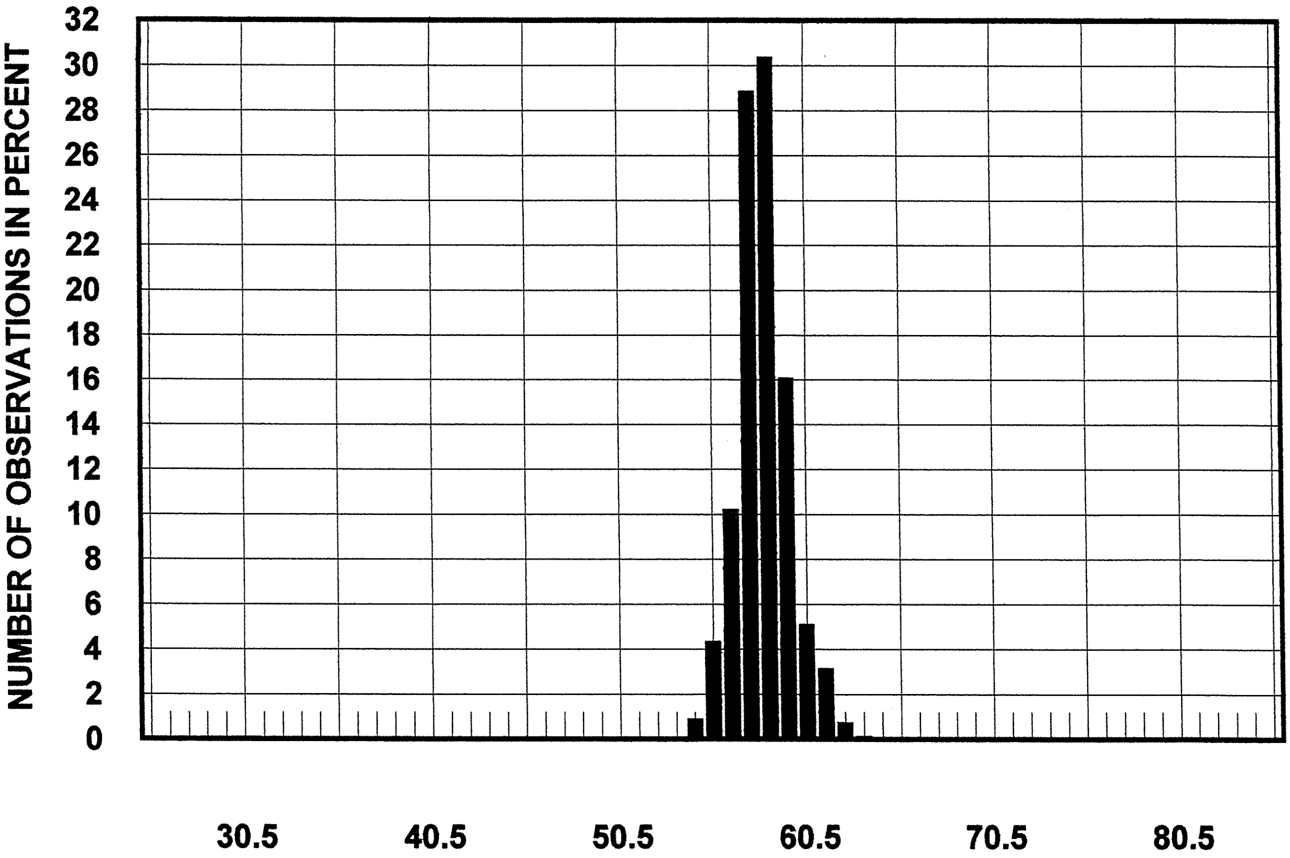
Sound measurement results obtained at Sites 1, 2, 3, and 4 during the Luau Dinner Shows on June 29, 2022 and July 6, 2022 were used to estimate existing sound levels from the dinner show at the closest mauka residences. Figures IV-9, IV-10, IV-16, IV-17, and IV-18 depict the histograms obtained at these measurement locations during these two nights. Sound level measurements obtained at Site 2 during the Luau Dinner Show were higher than those measured during the Imu Amphitheater Show, even though the Imu Amphitheater was at a shorter distance from Site 2 than was the Luau Dinner Stage. The primary reason for this was the depressed elevation of the Imu Amphitheater's speakers and the much higher elevation of the pole-mounted Luau Dinner Show's speaker clusters, which would result in reduced sound shielding effects from the Luau Dinner Show's speaker clusters.

Figures IV-19 and IV-20 depict the dBA vs. time history of the measured levels at Sites 1 and 2 during the July 6, 2022 Luau Dinner Show. Site 1 was selected because it was approximately 744 feet from the Luau Dinner Show stage, and at the assumed future buffer distance between the planned MA/PAV and the closest mauka residences of Kai Lani At Ko Olina. The measured difference in dinner show sound levels at Sites 1 and 2 was approximately 6.4 dBA (after correction for background noise), which was attributed to distance effects.

The closest Kai Lani At Ko Olina and The Coconut Plantation-Ko Olina residences are approximately 977 feet and 873 feet from the Luau Dinner Show stage, respectively, and the estimated existing sound levels at these residences at Kai Lani and The Coconut Plantation are approximately 10 dBA and 9 dBA less, respectively,

FIGURE IV-15
HISTOGRAM OF MEASURED SOUND LEVELS DURING IMU AMPHITHEATER SHOW; SITE 2

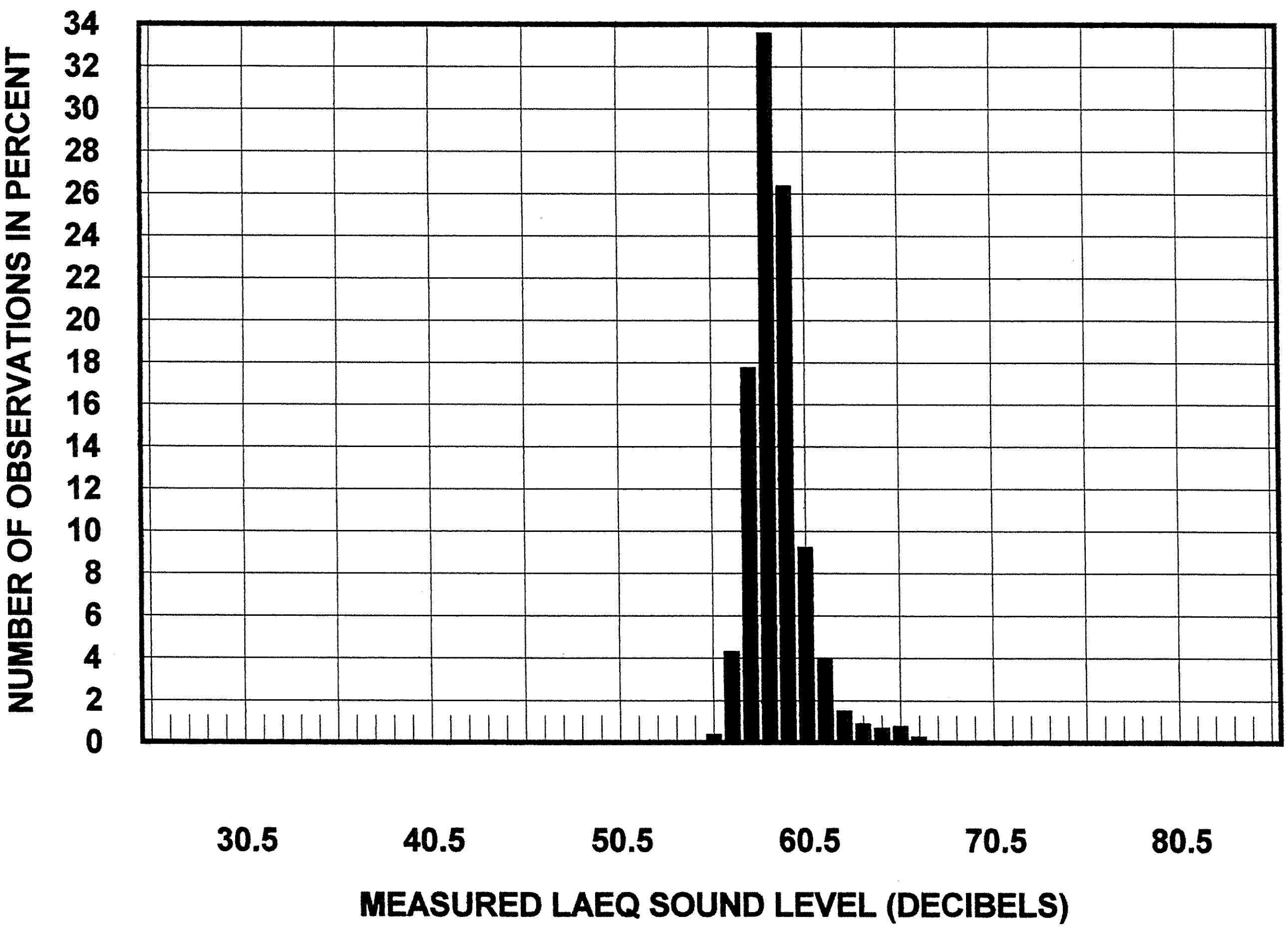
DATE: JUNE 29, 2022
TIME: 1816 - 1827 HOURS
METER RESPONSE: SLOW



Lmax:	63.1	dBA
L10:	59.9	dBA
L50:	58.2	dBA
Leq:	58.5	dBA
Lmin:	54.3	dBA

FIGURE IV-16
HISTOGRAM OF MEASURED SOUND LEVELS DURING LUAU DINNER SHOW; SITE 2

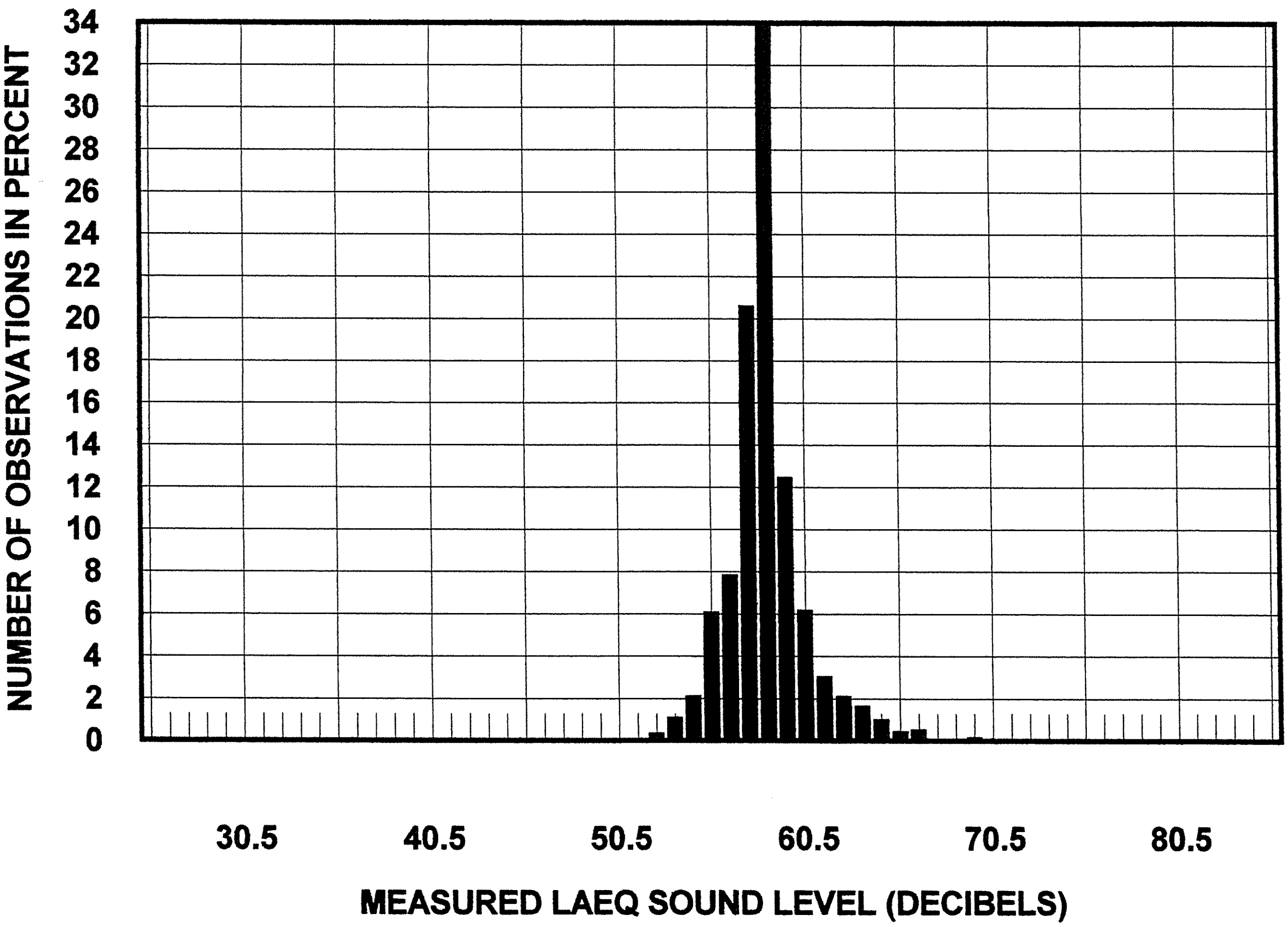
DATE: JUNE 29, 2022
TIME: 2018 - 2036 HOURS
METER RESPONSE: SLOW



Lmax:	66.6	dBA
L10:	60.7	dBA
L50:	58.8	dBA
Leq:	59.3	dBA
Lmin:	55.6	dBA

FIGURE IV-17
HISTOGRAM OF MEASURED SOUND LEVELS DURING LUAU DINNER SHOW; SITE 2

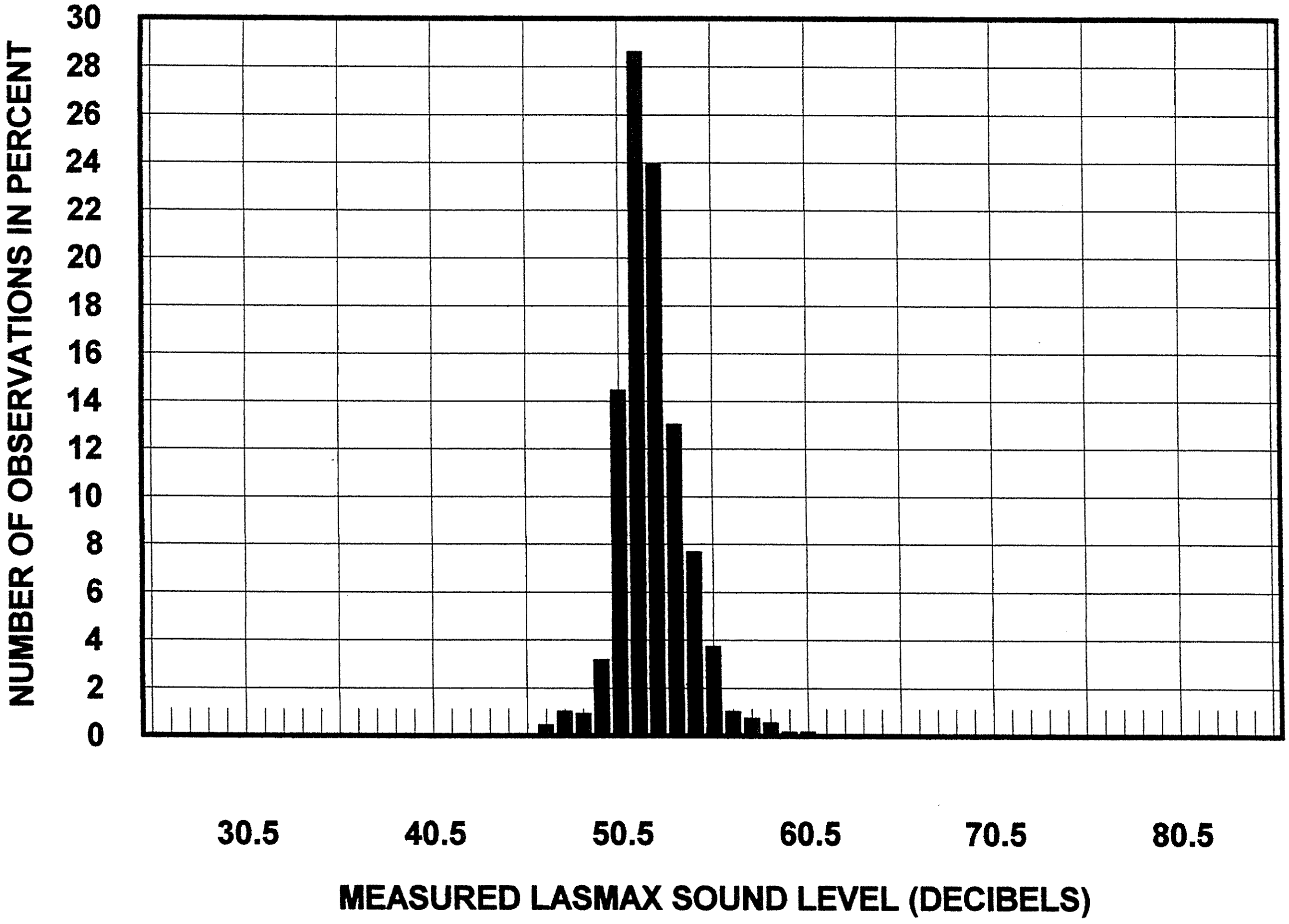
DATE: JULY 6, 2022
TIME: 2014 - 2032 HOURS
METER RESPONSE: SLOW



Lmax:	69.9	dBA
L10:	60.7	dBA
L50:	58.4	dBA
Leq:	59.1	dBA
Lmin:	52.5	dBA

FIGURE IV-18
HISTOGRAM OF MEASURED SOUND LEVELS DURING LUAU DINNER SHOW; SITE 1

DATE: JULY 6, 2022
TIME: 2014 - 2032 HOURS
METER RESPONSE: SLOW



Lmax: 61.0 dBA
L10: 54.4 dBA
L50: 52.0 dBA
Leq: 52.7 dBA
Lmin: 46.1 dBA

FIGURE IV-19. 30 MINUTE DBA VS. TIME RECORD DURING LUAU DINNER SHOW; SITE 1 (2011 TO 2034 HOURS; JULY 6, 2022)

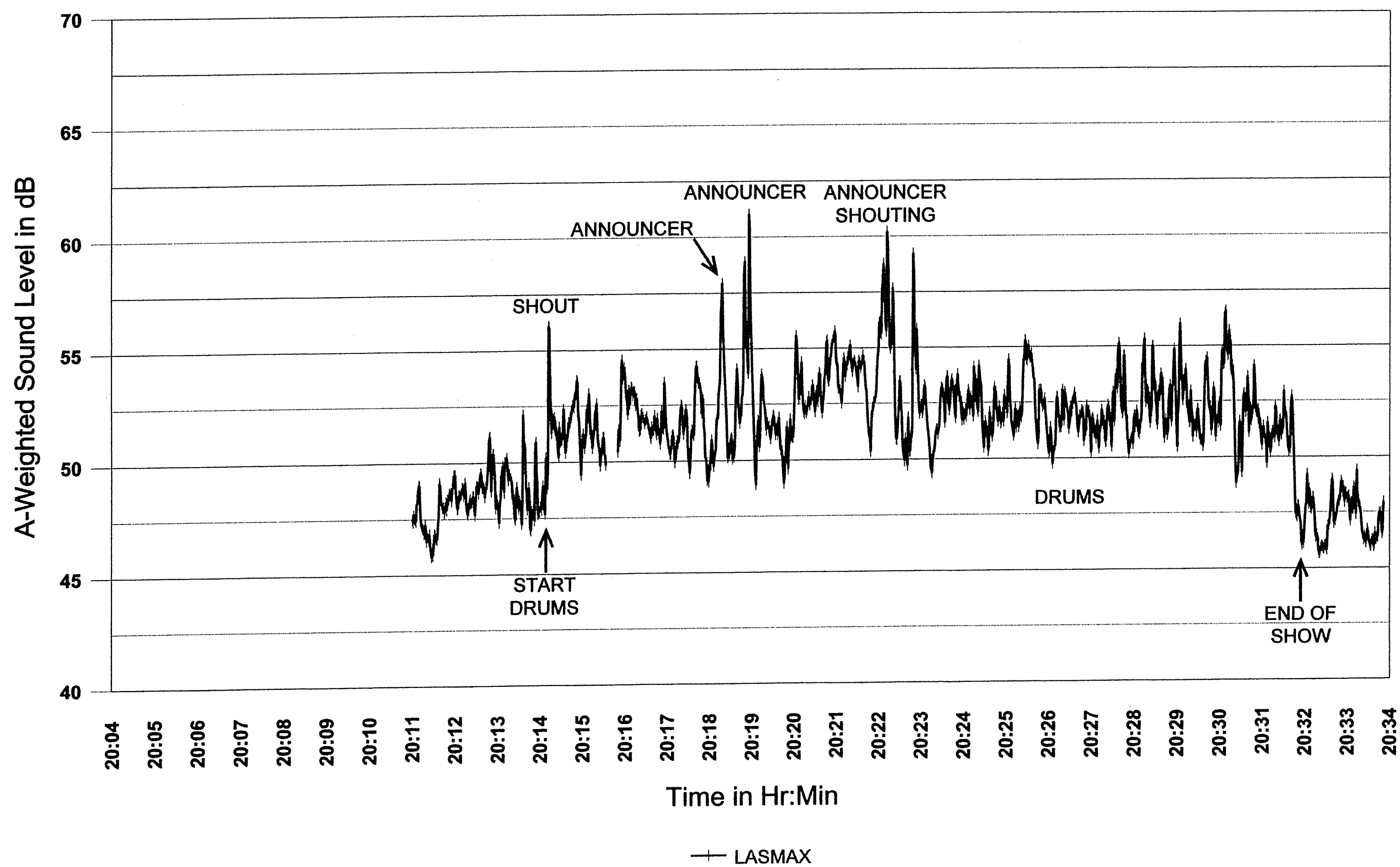
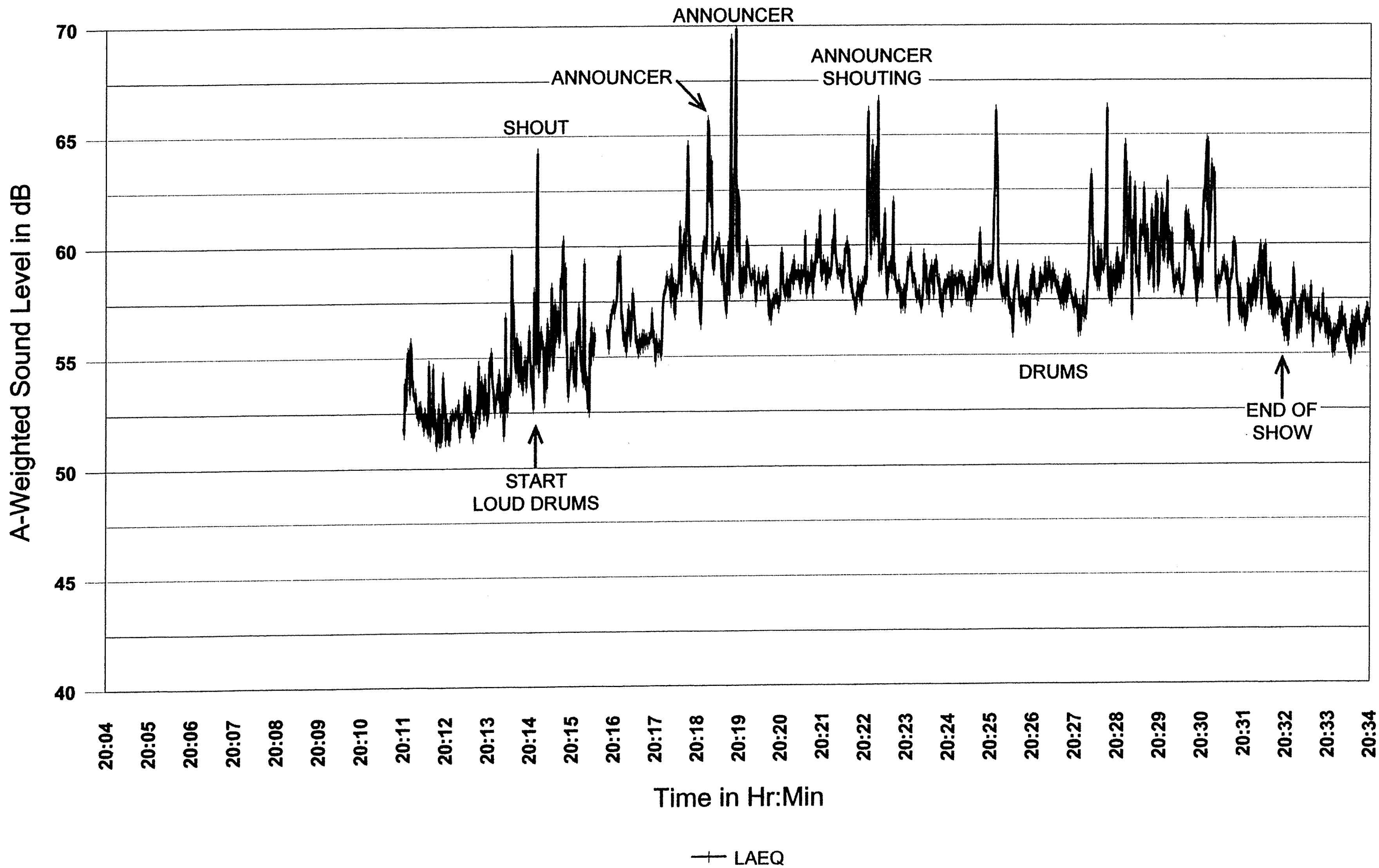


FIGURE IV-20. 30 MINUTE DBA VS. TIME RECORD DURING LUAU DINNER SHOW; SITE 2 (2011 TO 2034 HOURS; JULY 6, 2022)



than those shown at Site 2 in Figure IV-17. It was concluded that existing sound levels associated with the Dinner Luau Show are in the 48 dBA to 52 dBA range, and do not exceed the 60 dBA DOH and Liquor Commission limit at the closest residences at The Coconut Plantation-Ko Olina or Kai Lani At Ko Olina during the Luau Dinner Show.

Table IV-3 summarizes the existing sound levels associated with the Imu Amphitheater and Luau Dinner Show events at various receptor locations at the Paradise Cove property lines (P.L.) and closest residences mauka of Paradise Cove. From the results shown in the table, it was concluded that exceedances of the 60 dBA (L10) threshold may occur during the Dinner Luau Show at the closest points on the mauka and south property lines, but are probably not occurring at the closest residences mauka of Paradise Cove. At the existing Lanikuhonua Cultural Institute to the south, existing sound levels during the Dinner Luau Show are probably similar to those measured at Site 1 (see Figure IV-18), where L10 levels were less than 60 dBA.

TABLE IV - 3
EXISTING AND FUTURE DISTANCES TO AND SOUND LEVELS AT VARIOUS LOCATIONS; PARADISE COVE DEVELOPMENT

LOCATION	REF. MEAS. SITE	REF. SITE FIGURE	NORTH P.L.	MAUKA P.L.	SOUTH P.L.	KAI LANI	COCONUT PLANTA-TION
Existing / Future Entertainment Events:							
Buffer Distance (feet)		340	400	367	654	795	816
Imu Amphitheater, LA10	Site 2	Figure IV-15	56.6 dBA	57.6 dBA	50.5 dBA	47.8 dBA	47.4 dBA
Imu Amphitheater, LA50	Site 2	Figure IV-15	54.0 dBA	55.0 dBA	47.9 dBA	45.2 dBA	44.8 dBA
Imu Amphitheater, LAeq	Site 2	Figure IV-15	54.5 dBA	55.5 dBA	48.4 dBA	45.7 dBA	45.3 dBA
Buffer Distance (feet)		508	606	413	460	977	873
Dinner Luau Show, LA10	Site 2	Figure IV-17	57.6 dBA	62.7 dBA	61.3 dBA	50.5 dBA	52.3 dBA
Dinner Luau Show, LA50	Site 2	Figure IV-17	54.7 dBA	59.8 dBA	58.4 dBA	47.6 dBA	49.4 dBA
Dinner Luau Show, LAeq	Site 2	Figure IV-17	55.6 dBA	60.7 dBA	59.3 dBA	48.5 dBA	50.3 dBA
Buffer Distance (feet)		744	104	413	955	721	944
MA/PAV, LA10	Site 1	Figure IV-18	76.2 dBA	61.3 dBA	49.4 dBA	53.7 dBA	49.6 dBA
MA/PAV, LA50	Site 1	Figure IV-18	73.6 dBA	58.7 dBA	46.8 dBA	51.1 dBA	47.0 dBA
MA/PAV, LAeq	Site 1	Figure IV-18	74.5 dBA	59.6 dBA	47.7 dBA	52.0 dBA	47.9 dBA

Notes:

1. Buffer distances shown are between event stage and reference measurement site or receptor location shown in table columns.
2. "P.L." are receptor locations at applicable Paradise Cove property line.
3. "Kai Lani" and "Coconut Plantation" are receptor locations at the closest residence of each residential area.
4. dBA values shown are A-Weighted, L10, L50, and Leq values based on measured levels at the reference sites indicated.
5. "MA/PAV" represent potential future events at the proposed Makai Amphitheater/Performing Arts Venue.

CHAPTER V. FUTURE NOISE ENVIRONMENT

Predictions of future traffic noise levels along Aliinui Drive, Olani Street, and Kamoana Place were made using the traffic volume assignments of Reference 7. The future predictions of project plus non-project traffic on the roadway sections which would service the project are shown in Table V-1 for the PM peak hour of traffic in CY 2026. Table IV-2 summarizes the predicted increases in setback distances to the 65, 70, and 75 DNL traffic noise contour lines along the roadways servicing the project and attributable to increases in project plus non-project traffic by CY 2026.

Table V-2 presents the calculated increases in traffic noise attributable to project and non-project traffic by CY 2026. From Table V-2, small project plus non-project traffic noise increase of 0.3 to 0.4 DNL are predicted to occur by CY 2026 along sections of Aliinui Drive in the vicinity of Paradise Cove. The increases in traffic noise levels associated with the Paradise Cove Redevelopment Plan along Aliinui Drive will be difficult to measure. Insignificant increases of traffic noise along Olani Street and Kamoana Place are expected with or without the project by CY 2026. The future traffic noise environment in the project environs will not be significantly changed by the proposed project due to the relatively low volumes of traffic expected to be generated by the project.

The Site Plan associated with the Paradise Cove Development Plan is shown in Figure V-1, and its relationship to the existing land uses is shown in Figure V-2. The most significant acoustical change is anticipated to be the replacement of the existing Imu Amphitheater and Luau Dinner Show stage by the Makai Amphitheater / Performing Arts Venue (MA/PAV). Table IV-3 includes the predicted sound levels associated with entertainment events, which may occur in the future at the MA/PAV and are similar to those presently held at the Imu Amphitheater and the Luau Dinner Show Theater. The anticipated buffer distances between the MA/PAV and Kai Lani At Ko Olina and The Coconut Plantation-Ko Olina are 721 feet and 944 feet, respectively. Due to changes in buffer distances, sound levels in the future during the Luau Dinner Show may increase by 3.5 dBA at Kai Lani At Ko Olina and decrease by 2.4 dBA at The Coconut Plantation-Ko Olina. Because the Main House Speaker throw distance to the farthest seated guest at the new facility may be shorter than that at the existing facility (100 feet in the future vs. 117 feet presently), the future amplified sound levels from Main House Speaker system at the MA/PAV may be adjusted to be 1.5 dBA less than current volume levels set at the Luau Dinner Show Theater, while producing similar amplified program sound levels within the MA/PAV audience seating area.

If the June/July 2022 Luau Dinner Show is performed at the planned MA/PAV, resulting program sound levels during the show at the closest residence of Kai Lani At Ko Olina are anticipated to be similar to those shown in Figures IV-7, IV-18, and IV-19. The higher background traffic noise levels at Kai Lani At Ko Olina will tend to increase the total sound levels above those shown in Figures IV-7, IV-18 and IV-18, and make the dinner show program more difficult to hear due to sound masking effects from the

TABLE V-1

FUTURE TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS SECTIONS OF ROADWAYS IN THE PROJECT AREA (PM PEAK HOUR, WITH THE PROJECT)

LOCATION	SPEED (MPH)	TOTAL VPH	********* VOLUMES (VPH) *********** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	150' Leq
Aliinui Drive W. of Olani Street	32	1,440	1,415	22	3	65.0	59.0	55.0
Aliinui Drive Between Olani Street and Kamoana Pl.	32	1,164	1,145	17	2	64.1	58.1	54.1
Aliinui Drive E. of Kamoana Pl.	32	1,014	997	15	2	63.5	57.5	53.5
Olani Street N. of Aliinui Dr.	25	288	262	26	0	57.2	51.2	48.3
Olani Street S. of Aliinui Dr.	25	235	223	12	0	55.1	49.2	46.2
Kamoana Place S. of Aliinui Dr.	25	157	149	8	0	53.4	47.4	44.5

TABLE V-2

CALCULATIONS OF PROJECT AND NON-PROJECT FUTURE TRAFFIC NOISE CONTRIBUTIONS (LEQ OR DNL)

ROADWAY SECTION	NOISE LEVEL (DB) INCREASE DUE TO: NON-PROJECT TRAFFIC	PROJECT TRAFFIC
Aliinui Drive W. of Olani Street	0.00	0.30
Aliinui Drive Between Olani Street and Kamoana Pl.	0.10	0.30
Aliinui Drive E. of Kamoana Pl.	0.00	0.40
Olani Street N. of Aliinui Dr.	0.00	0.00
Olani Street S. of Aliinui Dr.	0.00	0.00
Kamoana Place S. of Aliinui Dr.	0.00	0.00

PARADISE COVE REDEVELOPMENT PLAN MAP

FIGURE V-1

FUTURE PROJECT DEVELOPMENT
AT PARADISE COVE

FIGURE
V-2

background traffic noise levels. The future Luau Dinner Show program's sound levels from the MA/PAV facility should not exceed the 60 dBA(L10) threshold of the DOH or the Liquor Commission at Kai Lani At Ko Olina or at The Coconut Plantation-Ko Olina under the Paradise Cove Redevelopment Plan.

CHAPTER VI. DISCUSSION OF PROJECT RELATED NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES

Traffic Noise. The increases in traffic noise levels attributable to the project are predicted to be approximately equal to or less than 0.4 dB (or DNL) along Aliinui Drive. An increase in traffic noise of 0.4 dB will be difficult to perceive, and is not considered to be significant. For this reason, traffic noise impacts associated with the Paradise Cove Redevelopment Plan are not considered to be significant.

In absolute terms, forecasted noise levels along Aliinui Drive are not expected to exceed the 65 DNL FHA/HUD standard at 59 FT setback distance from the roadway's centerline. Existing and future dwelling units along Aliinui Drive which are not shielded from traffic noise by walls, buildings, or natural terrain features but are at setback distances greater than 59 FT from the roadway's centerline can be expected to be exposed to "Moderate, Acceptable" traffic noise levels based on traffic projections to CY 2026. Along Olani Street and Kamoana Place, future traffic noise level increases are not expected to occur with or without the project.

Along Farrington Highway, where traffic volumes, speeds, and noise levels are significantly higher, the additive noise contributions from project traffic should be even less significant when compared to non-project traffic contributions. Project related traffic noise impacts along Farrington Highway are not anticipated because of the dominating influence of non-project traffic noise over project traffic noise levels.

Sound Levels During Entertainment Events. The on-site facility with the highest potential for causing future noise impacts on noise sensitive receptors in the project environs is the Makai Amphitheater / Performing Arts Venue (MA/PAV). A map of the existing land uses in relation to the Paradise Cove Redevelopment Plan is shown in Figure V-2. Preservation (P-2) zoned lands currently exist between Paradise Cove and the residential areas of Kai Lani At Ko Olina and The Coconut Plantation-Ko Olina. Because the MA/PAV will tend to project amplified sound toward the mauka direction, sound spillover into these apartment zoned areas are expected to continue. It is assumed that the P-2 Zoned buffer spaces between Paradise Cove and the existing residences will continue to remain. As such, it is anticipated that current mitigation measures to minimize sound spillover can continue to be implemented following completion of the new MA/PAV.

Noise impacts at the existing residences mauka of Paradise Cove can be minimized by limiting sound spillover to 60 dB (A-Weighted) or less and to periods between the hours of 7:00 AM to 10:00 PM. The amount of the sound spillover in the future will depend upon the design of the new sound system for the MA/PAV, and the noise shielding effects of intervening building structures within the Paradise Cove complex. The audibility of the sound spillover will depend upon the background ambient noise levels at the residences, as well as the sound levels of the amplified music and voice from Paradise Cove. Conflicts between neighboring residents and Paradise Cove should be avoidable as long as spillover sound is controlled and amplified sound levels from the entertainment events do not increase significantly from current levels.

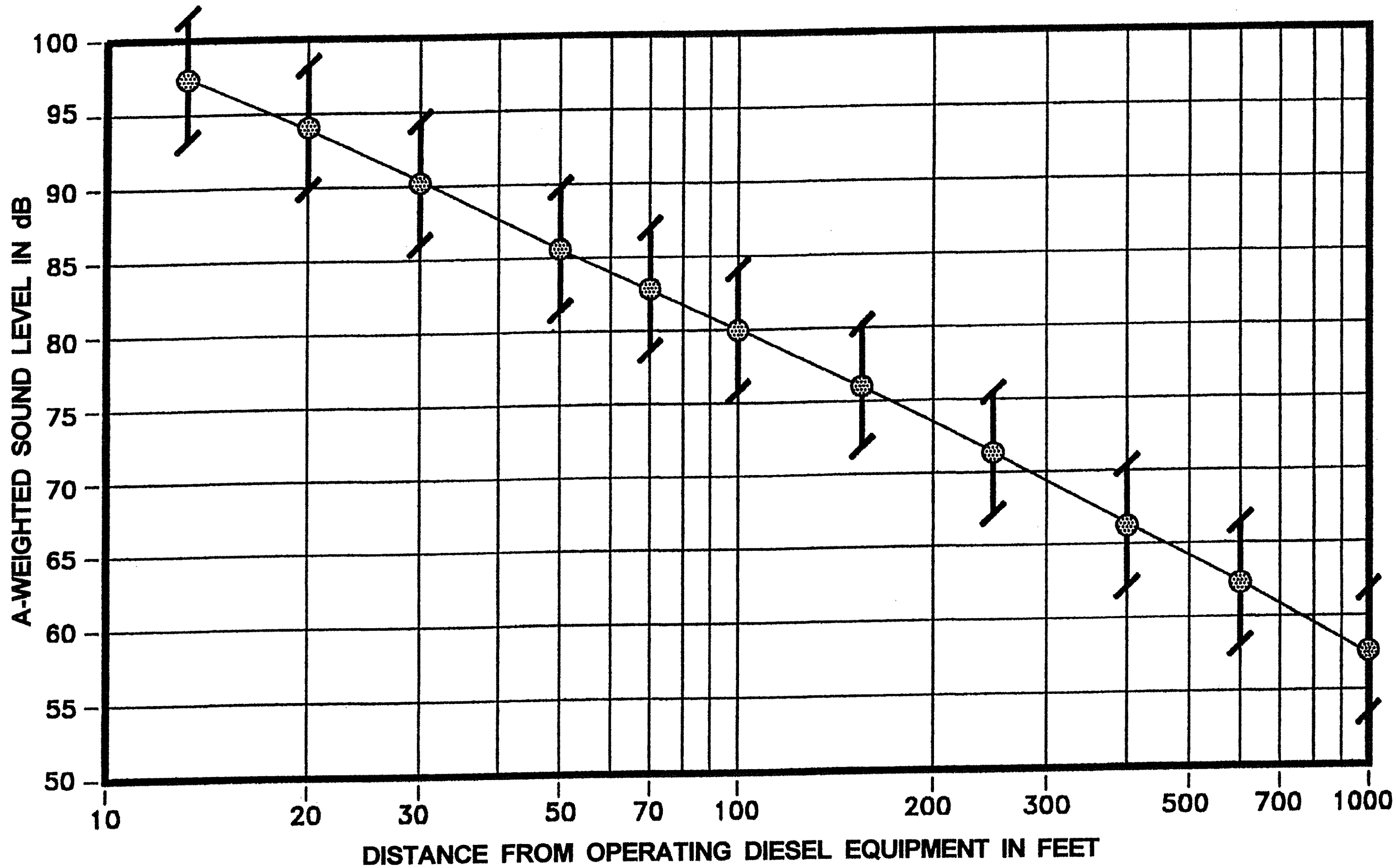
At the present time, scheduling conflicts between entertainment events at Paradise Cove and activities at Lanikuhonua Cultural Institute to the south are rare and spillover sound from the present entertainment events do not adversely impact Lanikuhonua. Under the proposed Redevelopment Plan, Luau Dinner Shows similar to those presently performed at the existing stage should be approximately 11 dBA quieter along the south property line due to the increased separation distance of the MA/PAV from the south property line.

Construction Noise. Audible construction noise will probably be unavoidable during the construction of the proposed Redevelopment Plan improvements at Paradise Cove. Short term noise impacts associated with construction at the project site may occur at the adjacent Lanikuhonua Cultural Institute and at the existing residences at Kai Lani At Ko Olina and The Coconut Plantation-Ko Olina. Typical levels of exterior noise from construction activity (excluding pile driving activity) at various distances from the job site are shown in Figure VI-1.

Figure VI-1 is useful for predicting exterior noise levels at short distances (within 500 FT) from the work when visual line of sight exists between the construction equipment and the receptor. Direct line-of-sight distances from the construction equipment to the closest existing residential and educational buildings could range from 450 FT to 550 FT, with corresponding average noise levels of 65 to 64 dBA (plus or minus 5 dBA). For receptors along a cross-street, the construction noise level vs. distance curve of Figure VI-1 should be reduced by approximately 8 dBA when the work is occurring at the intersection with the cross street, and should be reduced by 15 dBA when work is occurring at least 100 FT from the intersection (and the visual line-of-sight is blocked by intervening buildings). Typical levels of construction noise inside naturally ventilated and air conditioned structures are approximately 10 and 20 dB less, respectively, than the levels shown in Figure VI-1.

The occupants in the existing buildings at the Lanikuhonua Cultural Institute and residents at Kai Lani At Ko Olina and The Coconut Plantation-Ko Olina are predicted to experience the highest average noise levels (between 65 and 64 dBA) during construction activities. Predicted construction noise levels may intermittently exceed 70 dBA during earthwork activities and exceed 51 dBA during building erection activities. The closest residence is located approximately 450 feet mauka of the anticipated construction work, with construction noise levels as high as 65 dBA possible during the site preparation phase and as high as 51 dBA possible during the building erection phase. These anticipated construction noise levels are not extreme and are similar to existing background noise levels measured at Site 7 and Site 8 (see Figures IV-13 and IV-14).

Severe noise impacts are not expected to occur inside air conditioned structures



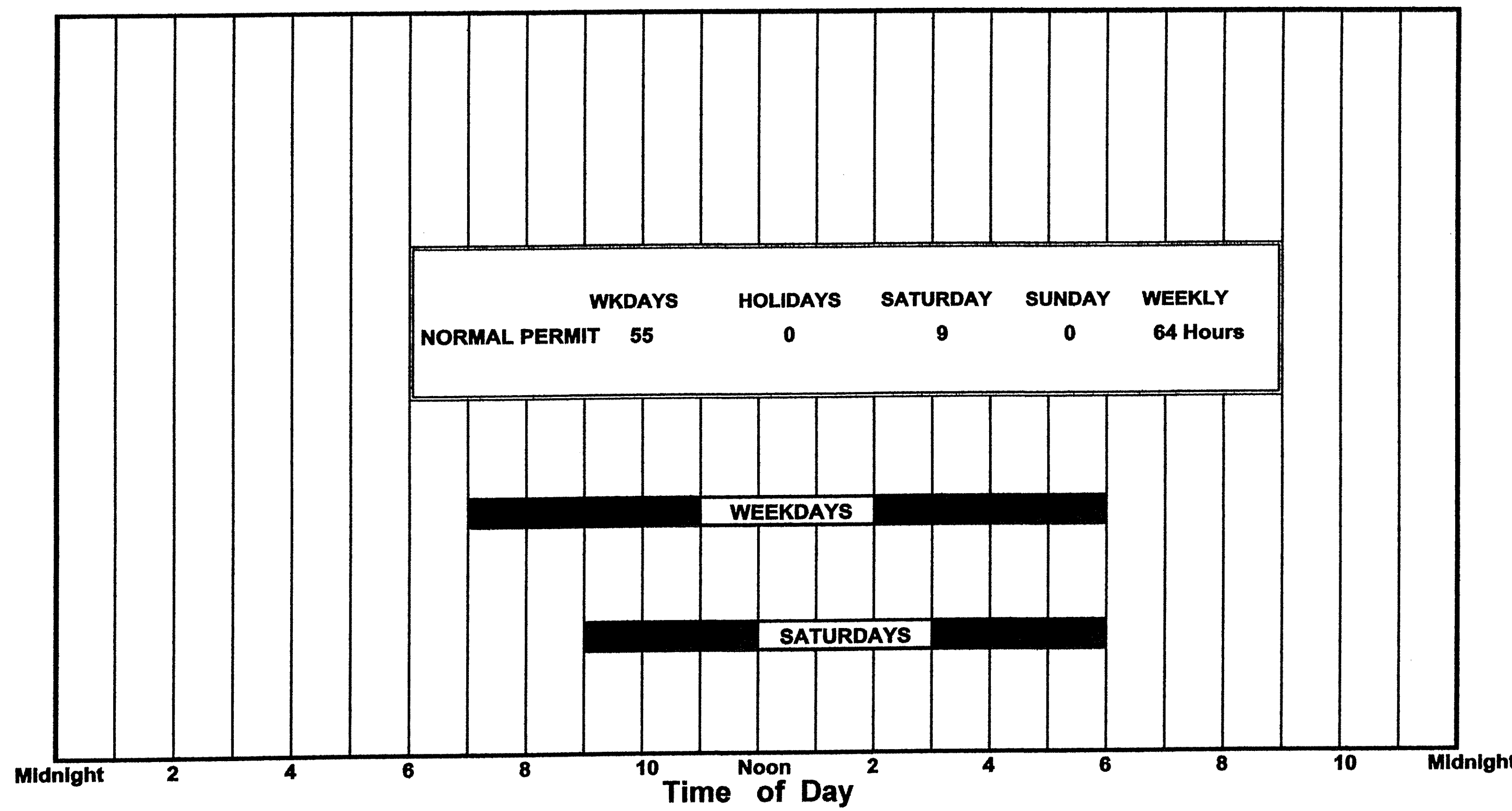
ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE VI-1

which are beyond 450 FT of the project construction site. Inside naturally ventilated structures, interior noise levels (with windows or doors opened) are estimated to range between 56 to 55 dBA at 450 FT distance from the construction site. Closure of all doors and windows facing the construction site would generally reduce interior noise levels by an additional 5 to 10 dBA. With windows and doors closed, the highest construction noise levels of 65 dBA at 450 FT outdoors should decrease to approximately 50 to 45 dBA indoors.

Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work, and the regulation of construction noise by the State Department of Health (DOH). Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site. Because of the relatively high noise levels associated with construction activities (75 to 85+ dBA at 100 FT distance), and due to the exterior nature of the work (grading and earth moving, trenching, concrete pouring, hammering, etc.), mitigation of construction noise to inaudible levels will not be practical in all cases. The use of properly muffled and maintained construction equipment should be required on the job site.

Permissible noise levels during construction are regulated by the State Department of Health under the permit procedures of Reference 4. The incorporation of State Department of Health construction noise limits and curfew times, which are applicable throughout the State of Hawaii (Reference 4), is a noise mitigation measure which is normally applied to construction activities. Figure VI-2 depicts the normally permitted hours of construction. Noisy construction activities are not allowed on Sundays and holidays, during the early morning, and during the late evening and nighttime periods under the DOH permit procedures.



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE VI-2

APPENDIX A. REFERENCES

(1) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.

(2) "Environmental Criteria and Standards, Noise Abatement and Control, 24 FR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, l979.

(3) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety;" Environmental Protection Agency (EPA 550/9-74-004); March 1974.

(4) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

(5) Rules of the Liquor Commission; Para. 3-82-38.23, Compliance with Allowable Noise Levels; City and County of Honolulu, November 2018.

(6) "FHWA Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

(7) Base Year and 2026 Traffic Turning Movement Diagrams; Paradise Cove Redevelopment Project; Wilson Okamoto Corporation; August 2022.

(8) 24-Hour Traffic Counts At Station B7200000H1-1, Mainline Farrington Highway At Ko Olina Interchange; Hawaii State Department of Transportation, Highways Division; April 18, 2019.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

	TERM	SYMBOL
1.	A-Weighted Sound Level	L_A
2.	A-Weighted Sound Power Level	L_{WA}
3.	Maximum A-Weighted Sound Level	L_{max}
4.	Peak A-Weighted Sound Level	L_{Apk}
5.	Level Exceeded x% of the Time	L_x
6.	Equivalent Sound Level	L_{eq}
7.	Equivalent Sound Level Over Time (T) [(1)]	$L_{eq(T)}$
8.	Day Sound Level	L_d
9.	Night Sound Level	L_n
10.	Day-Night Sound Level	L_{dn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$
12.	Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be speficied as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACCOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

	TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1.	Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2.	Sound Power Level	L_{WA}		L_{WB}	L_W
3.	Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4.	Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5.	Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6.	Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7.	Equivalent Sound Level[4] Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8.	Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9.	Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10.	Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12.	Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13.	Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14.	Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15.	Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C

SUMMARY OF BASE YEAR AND FUTURE YEAR WITH AND WITHOUT THE PROJECT

ROADWAY LANES	**** CY 2022 *****		CY 2026 (NO BUILD)		CY 2026 (BUILD)	
	AM VPH	PM VPH	AM VPH	PM VPH	AM VPH	PM VPH
Aliinui Drive W. of Olani Street (WB)	450	659	457	669	492	723
Aliinui Drive W. of Olani Street (EB)	653	668	663	678	689	717
Two-Way	1,103	1,327	1,120	1,347	1,181	1,440
Aliinui Drive Between Olani Street and Kamoana Pl. (WB)	410	553	417	563	452	617
Aliinui Drive Between Olani Street and Kamoana Pl. (EB)	523	499	532	508	558	547
Two-Way	932	1,052	949	1,071	1,010	1,164
Aliinui Drive E. of Kamoana Pl. (WB)	348	502	355	512	390	566
Aliinui Drive E. of Kamoana Pl. (EB)	448	401	457	409	483	448
Two-Way	796	903	812	921	873	1,014
Olani Street N. of Aliinui Dr. (NB)	105	168	105	168	105	168
Olani Street N. of Aliinui Dr. (SB)	108	120	108	120	108	120
Two-Way	213	288	213	288	213	288
Olani Street S. of Aliinui Dr. (NB)	68	133	68	133	68	133
Olani Street S. of Aliinui Dr. (SB)	146	102	146	102	146	102
Two-Way	214	235	214	235	214	235
Kamoana Place S. of Aliinui Dr. (NB)	83	78	83	78	83	78
Kamoana Place S. of Aliinui Dr. (SB)	81	79	81	79	81	79
Two-Way	164	157	164	157	164	157

Appendix H

Economic Impact Report

FINAL

Economic Impact Report for the Cove at Ko Olina Redevelopment

April 2024

EXECUTIVE SUMMARY

This Economic Impact Report (EIR) was conducted to assess the economic impacts that the proposed Cove at Ko Olina Redevelopment project would have on the economy of the City and County of Honolulu (C&C of Honolulu) and the fiscal revenue of the State of Hawaii and C&C of Honolulu governments. Potential economic and fiscal impacts are assessed for the construction phase and operations phase of the project.

Table ES-1 shows that over the course of the 24-month construction phase of the project, a total of 1,429 jobs would be generated or sustained, which equates to 1,386 full-time equivalent (FTE) jobs. Approximately $114.4 million in labor income would be generated through that employment, and total economic output over the 24-month construction phase would be approximately $247.0 million.

Table ES-1. Economic Impacts, Short-term (24-month Construction Phase), 2024 $s

Impact Type	Total Jobs	FTE Jobs	Labor Income	Economic Output
Direct	900	873	$79,789,032	$135,637,819
Indirect and Induced	529	513	$34,647,427	$111,317,473
Totals	**1,429**	**1,386**	**$114,436,459**	**$246,955,292**

Table ES-2 shows that, on an annual basis, for the life of the project, a total of 817 jobs would be generated or sustained, which equates to 678 full-time equivalent jobs. An estimated 484 FTE would be direct, on-site, jobs. Approximately $34.5 million in labor income would be generated through that employment and total economic output, on an annual basis, would be approximately $100.0 million.

Table ES-2. Economic Impacts, Long-term (Annual Operations), 2024 $s

Impact Type	Total Jobs	FTE Jobs	Labor Income	Economic Output
Direct	583	484	$20,379,543	$53,779,740
Indirect and Induced	234	194	$14,115,633	$46,173,174
Totals	**817**	**678**	**$34,495,176**	**$99,952,914**

Table ES-3 shows estimated fiscal impacts, for both phases of the project, in terms of revenue to the State of Hawaii and C&C of Honolulu governments. The State of Hawaii would accrue approximately $10.2 million in revenue due to project construction over the course of 24-months while the C&C of Honolulu would accrue about $3.3 million. On an annual basis, from project operations, the State of Hawaii would accrue approximately $4.6 million per year, while the C&C of Honolulu would accrue approximately $2.1 million per year.

Table ES-3. Fiscal Impacts, 2024 $s

Project Phase	State of Hawaii Government Revenue	C&C of Honolulu Government Revenue
Short-term (Construction)	$10,170,535	$3,309,537
Long-term (Annual Operations)	$4,591,378	$2,062,228

Economic Impact Report
for the Cove at Ko Olina Redevelopment Project
TABLE OF CONTENTS

List of Tables

Abbreviations and Acronyms

Acronym	Definition
%	percent
$s	dollars
CCD	Census County Division
CCK	Cove Campbell Kobayashi LLC
C&C	City and County
DBEDT	Department of Business Economic Development & Tourism
EIR	Economic Impact Report
FTE	Full-time Equivalent
GET	General Excise Tax
IMPLAN	Impact Analysis for Planning
ROI	Region of Influence

1 Introduction

Cove Campbell Kobayashi LLC (CCK) plans to improve the 10.85-acre property located between Ali'inui Drive and the shoreline makai of the entrance to the Ko Olina Resort. The site is currently occupied by the Paradise Cove lūʻau/entertainment operations. The redevelopment of the site as The Cove at Ko Olina (also referred to as the "project") will be the first major improvement of the property in over 25 years. Proposed improvements will update the existing property and create an authentic, welcoming, and enjoyable experience for the public that recognizes the unique setting and the history of the ʻEwa region. Redevelopment of the site includes a new entertainment/performing arts venue capable of housing a daily-run entertainment experience focused on Hawaiian culture. The property will also serve as a landscaped gathering area where educational or interactive experiences could occur during the daytime hours. Other planned improvements to modernize the property include the addition of small-scale retail shops, as well as restaurants highlighting local cuisine and agricultural products, and engaging common areas. This Economic Impact Report (EIR) was conducted to assess and report on the impacts that the proposed Cove at Ko Olina would have on the C&C of Honolulu economy where project construction and operations would take place. Additionally, fiscal benefits to both the C&C of Honolulu and State of Hawaii governments are presented.

Estimates are provided for the two major phases of the project: 1) construction, and 2) operations. For purposes of analysis, the construction phase is assumed to take place over an approximate 24-month period while operations would be expected to begin just after construction is complete and continue for the foreseeable future. Given these timeframes, economic and fiscal impacts for construction are presented on a total basis (to include all impacts over the 24-month period) and impacts for operations are presented on an annual basis and are assumed to be consistent on an ongoing basis for the life of the project.

Impacts are presented in terms of jobs, labor income, economic output, State of Hawaii government revenue, and C&C of Honolulu government revenue. Input data and results are presented in a year 2024 constant dollar basis. Primary input data for the analysis were provided by CCK and estimated impacts were calculated using the Impact Analysis for Planning (IMPLAN) economic model.

2 Approach to Analysis

2.1 Region of Influence

The Region of Influence (ROI) considered in this EIR is the C&C of Honolulu, which is the location of the proposed project. All fiscal impacts that would accrue to the State of Hawaii government are those that would be generated by economic activity that would take place within the C&C of Honolulu. Some economic benefits may spill over into locations outside of the ROI, as workers are likely to spend portions of their income elsewhere, such as Maui, Hawaii, and Kauai Counties but these potential spill-over effects would likely be minimal and are not captured in this report.

2.2 Input Data and Modeling Procedures

Primary data on construction expenditures and operations revenue by industry were provided by CCK. These data were input into appropriate sectors of the IMPLAN model, which was fitted with year 2022 data (the most recent available) for the C&C of Honolulu to calculate estimated economic and fiscal impacts of the proposed project. The IMPLAN model is an economic input-output modeling application, which develops detailed data sets at various levels of geography on an annual basis (IMPLAN, 2024a); it is the current industry standard for economic modeling. The data that were input into the IMPLAN model are presented below in Section 2.2.1 and Section 2.2.2.

2.2.1 Construction Inputs

Table 2-1 shows how estimated Cove at Ko Olina construction expenditures were applied to the IMPLAN model, as Industry Output, to calculate economic impacts for construction, which is anticipated to take place over an approximate 24-month period. Table 2-1 shows combined inputs for construction related management, administration, and insurance expenditures with specific detailed spending in those respective industry sectors withheld in this report due to disclosure issues.

Table 2-1. Construction Inputs, 2024 $s

IMPLAN Sector Description	IMPLAN Code(s)	Estimated Expenditure
Construction of new commercial structures	55	$97,665,081
Management, Administration, and Insurance	462, 444, & 470	$10,191,500
Architectural, Engineering, and Related Services	457	$27,781,238

2.2.2 Operations Inputs

As shown in Table 2-2, anticipated Cove at Ko Olina revenues, by industry, were applied to the IMPLAN model, as Industry Output, to calculate estimates of operations impacts. The inputs shown below, and the subsequent economic impact results, described in Sections 4.2 and 5.2, are presented on an annual basis and would be expected to recur, annually, for the life of the proposed project.

Table 2-2. Operations Inputs, 2024 $s

IMPLAN Sector Description	IMPLAN Code	Estimated Revenue
Performing Arts Companies	496	$31,595,872
Full-service Restaurants	509	$15,458,811
Miscellaneous Store Retailers	412	$11,258,717
Other Amusement & Recreation	504	$284,431

2.3 Economic Result Variables

Economic variables that are presented as results include jobs, labor income, and economic output. Each of these variables consists of a direct, indirect, and induced element. Estimated results for the variables were calculated by the IMPLAN model using the input data described above in Section 2.2. Increases in the result variables are considered beneficial as they tend to be associated with higher living standards.

Direct impacts are associated with the proposed project itself and include workers directly associated with initial project-related expenditures, the incomes earned by those workers, and the economic output generated by these initial project-related expenditures.

Indirect impacts are generated by the businesses that would supply goods and services that would facilitate various aspects of the project. Indirect jobs include jobs at companies that supply goods and services that support direct activities. Indirect jobs extend to include jobs related to the manufacture of products, to the extent that activity may occur in the C&C of Honolulu. Indirect labor income includes the income earned by people working indirect jobs. Indirect economic output includes the total sales volume related to the supply of goods and services net intermediate purchases.

Induced impacts are the result of spending of the wages and salaries of the direct and indirect workers on items such as food, housing, transportation, and medical services. This spending creates induced employment, labor income, and economic output in nearly all sectors of the economy, especially service sectors.

2.3.1 Jobs

Job impacts represent the number of jobs that would be created or sustained within the ROI as a result of the proposed project. The IMPLAN model generates job numbers that include both full-time and part-time jobs including jobs that may be short-term. Short-term jobs may include, for example, construction trades specialists such as carpenters that may only conduct part of the construction work. Additionally, Full-time Equivalent (FTE) jobs are presented – FTE jobs numbers provide a different perspective on jobs estimates by approximating what the total jobs number would look like if each of those jobs were a full-time, 40-hour per week, job. The IMPLAN model provides results for total jobs and those total jobs were converted to FTE using a bridge-table developed by IMPLAN (IMPLAN 2024b). For construction, total jobs were converted to FTE at a rate of approximately 0.97 (i.e., one construction job is equivalent to 0.97 FTE). For operations, total jobs were converted to FTE at a rate of approximately 0.83 (i.e., one operations job is equivalent to 0.83 FTE).

2.3.2 Labor Income

Labor income impacts represent the income generated through the jobs that would be created or sustained as a result of the construction, operations, and other related economic activity in the ROI. All labor income estimates were calculated by the IMPLAN model based on either planned expenditures (for construction) or anticipated revenues (for operations). Results were calculated in 2024 $s.

2.3.3 Economic Output

Economic output equals the total value of production, by industry, in a calendar year. It can also be described as annual revenues plus net change in inventory. Results were calculated in 2024 $s.

2.4 Fiscal Result Variables

Fiscal variables that are presented as results include State of Hawaii government revenue and C&C of Honolulu government revenue. Each of these consists of multiple sources of revenue as described below in Section 2.4.1 and Section 2.4.2. Increases in government revenue are generally considered beneficial as revenue can be used by governments to fund public services and capital expenditures. Also, when governments spend the revenue that they receive from the project, additional jobs, labor income, and economic output would be generated; however, effects of government expenditures are not captured in this EIR.

2.4.1 State of Hawaii Government Revenue

Revenue that would be accrued by the State of Hawaii government as a result of construction and operations are presented in four categories: 1) General Excise Tax (GET) and Use Tax, 2) Corporate Profits Tax, 3) Personal Income Tax, and 4) Other. Estimates were calculated by the IMPLAN model based on incomes, spending of incomes, and industry expenditures. Results were calculated in 2024 $s.

2.4.2 City and County of Honolulu Revenue

Revenue that would be accrued by the C&C of Honolulu government as a result of construction and operations of the project are presented in two categories: 1) Property Tax, and 2) Other. Estimated property tax was calculated by the IMPLAN model based on additional property tax revenue associated with income from project-related jobs. Other revenue to the C&C of Honolulu calculated by the IMPLAN model include, but are not limited to, sales tax revenue and revenue from licenses and fees. Property tax revenue associated with the Cove at Ko Olina site itself were estimated based on a commercial property tax rate of 1.24%, historical land values, and, for future payments that include new construction, the value of new construction. Results were calculated in 2024 $s.

3 Economic Background

Table 3-1 provides population data for 2010, 2015, and 2021 for the State of Hawaii, the C&C of Honolulu, and each of the Census County Divisions (CCDs) on Oahu, along with average annual growth rates from 2010 to 2015 and 2015 to 2021. As of 2021, the population for the State of Hawaii was about 1.44 million, with about 1 million of that population residing in the C&C of Honolulu (about 70% of the State population). The Ewa CCD, where the proposed project would be located, had a 2021 population of about 360,000, making up about 35% of the C&C of Honolulu population.

Population growth rates statewide, countywide, and through most CCDs were lower from 2015 to 2021 than they were from 2010 to 2015. The Ewa CCD grew at an average annual rate of 1.1% from 2010-2015 matching the State rate, and maintained that growth rate from 2015-2020 while the state rate slowed (1.1% in Ewa compared to 0.4% statewide).

More recent population estimates for 2022 indicate that the population has grown to 1,440,196 for the State of Hawaii and 995,638 for the C&C of Honolulu (U.S. Census 2024).

Table 3-1. Population and Anuual Growth Rates by Area, 2010-2021

	2010	2015	2021	Average Annual Growth Rate 2010-2015	Average Annual Growth Rate 2015-2021
State of Hawaii	1,333,591	1,406,299	1,441,553	1.1%	0.4%
C&C of Honolulu	936,984	984,178	1,015,167	1.0%	0.5%
Honolulu CCD	382,622	400,823	406,004	1.0%	0.2%
Ewa CCD	320,373	338,521	360,178	1.1%	1.1%
Koolaupoko CCD	118,083	115,873	119,225	-0.4%	0.5%
Waianae CCD	46,482	48,350	52,829	0.8%	1.5%
Wahiawa CCD	36,724	46,707	42,608	5.4%	-1.5%
Koolauloa CCD	19,634	20,837	21,079	1.2%	0.2%
Waialua CCD	13,066	13,067	13,244	0.0%	0.2%

Source: U.S. Census, 2010, 2015, and 2021

Table 3-2 provides labor statistics for the State of Hawaii and C&C of Honolulu for the years 2017 to 2023. The labor statistics include the size of the labor force, the total number of employed individuals, the total number of unemployed individuals, and the unemployment rate. Unemployment rates for both the State and C&C were generally very low from 2017 to 2019 but surged in 2020 due to business closures and travel restrictions associated with the COVID-19 pandemic.

From 2019 to 2020, the unemployment rate for the both the State and C&C more than quadrupled, with the State unemployment rate in 2020 being 4.64 times the rate in 2019, and the 2020 rate being 4.43 times the 2019 rate for the C&C. Data for 2021 through 2023 indicate that unemployment rates are in decline, falling statewide from 11.7% in 2020 to 3.0% in 2023 and from10.3% to 2.7% for the C&C. The size of the labor forces and the number employed in the State and C&C have not yet returned to 2019 levels.

Table 3-2. State of Hawaii and C&C of Honolulu Labor Statistics, 2017-2023

	2017	2018	2019	2020	2021	2022	2023
State of Hawaii							
Labor force	695,303	692,457	686,123	664,085	669,987	676,299	676,335
Employment	679,865	675,849	668,774	586,179	629,626	652,677	656,336
Unemployment	15,438	16,608	17,349	77,906	40,361	23,622	20,019
Unemployment Rate	2.2%	2.4%	2.5%	11.7%	6.0%	3.5%	3.0%
C&C of Honolulu							
Labor force	472,592	469,787	464,847	450,653	452,578	458,128	465,989
Employment	462,531	458,947	453,660	404,352	427,310	442,291	444,454
Unemployment	10,061	10,840	11,187	46,311	25,268	15,837	12,534
Unemployment Rate	2.1%	2.3%	2.4%	10.3%	5.6%	3.5%	2.7%

Source: U.S. Bureau of Labor Statistics, 2024

Table 3-3 shows data on visitor arrivals to the State of Hawaii and Oahu from 2010 to 2023 along with year-over-year rates of change and the Oahu proportion of total arrivals. The State and Oahu saw increases in visitor arrivals every year from 2010 to 2019, with the largest year-over-year growth being experienced from 2011 to 2012 (9.7% and 11.4% increases respectively). From 2017 to 2019 there was steady growth in visitor arrivals that hovered around 5.0% per year. Travel restrictions in 2020 led to massive declines in visitor arrivals, down 73.%% and 75.5% respectively from 2019. Visitor arrivals have surged from 2020 to 2023 but have yet to reach the levels seen in 2019.

Table 3-3. Statewide & Oahu Visitor Arrivals, 2010-2023

Year	Statewide Visitor Arrivals (by Air)	Statewide Year over Year Change	Oahu Visitor Arrivals (by Air)	Oahu Year over Year Change	Oahu % of Statewide Total
2010	6,916,894		4,273,658		61.8%
2011	7,174,397	3.7%	4,401,624	3.0%	61.4%
2012	7,867,143	9.7%	4,904,046	11.4%	62.3%
2013	8,003,474	1.7%	5,044,276	2.9%	63.0%
2014	8,196,342	2.4%	5,192,621	2.9%	63.4%
2015	8,563,018	4.5%	5,339,912	2.8%	62.4%
2016	8,821,802	3.0%	5,447,229	2.0%	61.7%
2017	9,277,613	5.2%	5,683,344	4.3%	61.3%
2018	9,761,448	5.2%	5,862,358	3.1%	60.1%
2019	10,243,165	4.9%	6,154,248	5.0%	60.1%
2020	2,686,403	-73.8%	1,506,316	-75.5%	56.1%
2021	6,777,761	152.3%	3,326,622	120.8%	49.1%
2022	9,138,674	34.8%	4,858,170	46.0%	53.2%
2023	9,488,477	3.8%	5,614,956	15.6%	59.2%

Source: DBEDT, 2024

4 Economic Impact Results

4.1 Construction

4.1.1 Jobs

Table 4-1 shows that over the 24-month construction period there would be an estimated total of 1,429 jobs (1,386 FTE) generated or sustained from project construction – 900 (873 FTE) of the jobs would be direct, 152 (148 FTE) indirect, and 377 (366 FTE) induced.

Table 4-1. Jobs, 24-month Total

	Total Jobs	FTE Jobs[1]
Direct	900	873
Indirect	152	148
Induced	377	366
Total[2]	**1,429**	**1,386**

Notes: [1]FTE calculated at a rate of 0.97 using IMPLAN employment to FTE ratios.
[2]Some totals may not appear to sum from their parts due to rounding.

4.1.2 Labor Income

Table 4-2 shows that over the 24-month construction period there would be an estimated total of $114.4 million in labor income generated or sustained from project construction – $79.8 million would be direct, $11.3 million indirect, and $23.4 million induced.

Table 4-2. Labor Income, 24-month Total (2024 $s)

	Total
Direct	$79,789,032
Indirect	$11,254,773
Induced	$23,392,655
Total	**$114,436,459**

Note: Some totals may not appear to sum from their parts due to rounding.

4.1.3 Economic Output

Table 4-3 shows that over the 24-month construction period, there would be an estimated total of $247.0 million in economic output generated or sustained from project construction – $135.6 million would be direct, $35.4 million indirect, and $75.9 million induced.

Table 4-3. Economic Output, 24-month Total (2024 $s)

	Total
Direct	$135,637,819
Indirect	$35,417,259
Induced	$75,900,214
Total	**$246,955,292**

Note: [1]Some totals may not appear to sum from their parts due to rounding.

4.2 Operations

4.2.1 Jobs

Table 4-4 shows that there would be an estimated total of 817 jobs (678 FTE) generated or sustained from project operations annually – 583 (484 FTE) of the jobs would be direct, 121 (100 FTE) indirect, and 113 (94 FTE) induced.

Table 4-4. Jobs, Annual

	Total Jobs	FTE Jobs[1]
Direct	583	484
Indirect	121	100
Induced	113	94
Total[2]	**817**	**678**

Notes: [1]FTE calculated at a rate of 0.83 using IMPLAN employment to FTE ratios.
[2]Some totals may not appear to sum from their parts due to rounding.

4.2.2 Labor Income

Table 4-5 shows that there would be a total increase of $34.5 million in labor income generated or sustained from project operations annually – $20.4 million of the labor income would be direct, $7.1 million indirect, and another $7.0 million induced.

Table 4-5. Labor Income, Annual (2024 $s)

	Annual Total
Direct	$20,379,543
Indirect	$7,081,787
Induced	$7,033,846
Total	**$34,495,176**

Note: Some totals may not appear to sum from their parts due to rounding.

4.2.3 Economic Output

Table 4-6 shows that there would be a total increase of $100.0 million in economic output generated or sustained from project operations annually – $53.8 million of the economic output would be direct, $23.4 million indirect, and another $22.8 million induced.

Table 4-6. Economic Output, Annual (2024 $s)

	Annual Total
Direct	$53,779,740
Indirect	$23,350,764
Induced	$22,822,409
Total	**$99,952,914**

Note: Some totals may not appear to sum from their parts due to rounding.

5 Fiscal Impact Results

5.1 Construction

Table 5-1 shows that over the 24-month construction period there would be a total of approximately $10.2 million in State of Hawaii government revenue generated or sustained from project construction. The majority of this revenue would be generated through GET & Use taxes and personal income taxes.

Table 5-1. State of Hawaii Government Revenue, 24-month Total (2024 $s)

Tax Category	Total
GET & Use	$5,205,067
Corporate Profit	$292,067
Personal Income	$4,177,300
Other	$496,101
Total	**$10,170,535**

Note: Some totals may not appear to sum from their parts due to rounding.

Table 5-2 shows that over the 24-month construction period there would be a total of approximately $3.3 million in C&C of Honolulu government revenue generated or sustained from project construction. The majority of this revenue ($2.4 million) would be generated through property taxes, including two annual on-site property tax payments of $115,000 (a total of $230,000).

Table 5-2. C&C of Honolulu Government Revenue, 24-month Total (2024 $s)

Tax Category	Total
Property[1]	$2,426,065
Other	$883,472
Total[2]	**$3,309,537**

Note: [1]Includes two annual on-site property tax payments of $115,000.
[2]Some totals may not appear to sum from their parts due to rounding.

5.2 Operations

Table 5-3 shows that there would be a total of approximately $4.6 million in State of Hawaii government revenue generated or sustained from project operations, annually. The majority of this revenue ($3.1 million) would be generated through GET and Use taxes.

Table 5-3. State of Hawaii Government Revenue, Annual (2024 $s)

Tax Category	Annual Total
GET & Use	$3,073,521
Corporate Profit	$202,166
Personal Income	$1,272,425
Other	$43,266
Total	**$4,591,378**

Note: Some totals may not appear to sum from their parts due to rounding.

Table 5-4 shows that there would be a total of approximately $2.1 million in C&C of Honolulu government revenue generated or sustained project operations, annually. The majority of this revenue ($1.6 million) would be generated through property taxes, including annual payments of approximately $1.2 million for the site itself.

Table 5-4. C&C of Honolulu Government Revenue, Annual (2024 $s)

Tax Category	Annual Total
Property[1]	$1,620,748
Other	$441,480
Total[2]	**$2,062,228**

Notes: [1]Includes estimated annual on-site property tax payments of $1.2 million.
[2]Some totals may not appear to sum from their parts due to rounding.

6 References

State of Hawaii Department of Business, Economic Development & Tourism. 2024. Economic Data Warehouse, Total Visitor Arrivals. Available online at: http://dbedt.hawaii.gov/economic/datawarehouse/

The IMPLAN Group. 2024a. Company website. Available online at: https://www.implan.com/

The IMPLAN Group. 2024b. IMPLAN to FTE and Income Conversions. Available online at: https://implanhelp.zendesk.com/hc/en-us/articles/115002782053-IMPLAN-to-FTE-Income-Conversions

U.S. Census Bureau. 2010. 2010 Decennial Census. Available online at: https://data.census.gov/cedsci/advanced

U.S. Census Bureau. 2015.American Community Survey 5-year estimates for 2015. Available online at: https://data.census.gov/cedsci/advanced

U.S. Census Bureau. 2021.American Community Survey 5-year estimates for 2021. Available online at: https://data.census.gov/cedsci/advanced

U.S. Census Bureau. 2024.American Community Survey 1-year estimates for 2022. Available online at: https://data.census.gov/cedsci/advanced

U.S. Bureau of Labor Statistics. 2024. Local Area Unemployment Statistics for the State of Hawaii and Honolulu County. Available online at: https://www.bls.gov/lau/