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HAWAII

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BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

DLNR:OCCL:SH

Kahana Bay Erosion Mitigation Project

Scott Glenn
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 S. Beretania St., Rm. 702
Honolulu, HI 96813

SUBJECT: **ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN) FOR THE PROPOSED** Kahana Bay Erosion Mitigation Project
Lahaina District, Island of Maui
Fronting TMK(s), (2) 4-3-005:029; (2) 4-3-005:021; (2) 4-3-005:020; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001.

Dear Mr. Glenn,

Under the provisions of Act 172 (12), the Department of Land and Natural Resources, Office of Conservation and Coastal Lands has determined at the outset that an environmental impact statement is required for the Kahana Bay Erosion Mitigation project situated makai of *TMK(s), (2) 4-3-005:029; (2) 4-3-005:021; (2) 4-3-005:020; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001*, in the Lahaina District on the island of Maui. A completed Bulletin Publication Form and a summary of the proposed action are enclosed (with a copy of the same sent via electronic mail to oeqc@doh.hawaii.gov).

Pursuant to the requirements of Section 11-200-3, Hawaii Administrative Rules, and Section 11-200-15, Hawaii Administrative Rules, we request publication of this statutory determination in the next available periodic bulletin (Environmental Notice) for the public to submit comments to the DLNR-OCCL during a thirty-day public comment period.

Should you have any questions on the matter, please feel free to contact Shellie Habel, Hawaii Sea Grant Extension Agent in the DLNR Office of Conservation and Coastal Lands at (808) 587-0049 or via email at Shellie.L.Habel@Hawaii.gov.

19-265

Sincerely,

SUZANNE D. CASE, CHAIRPERSON
DEPARTMENT OF LAND AND NATURAL RESOURCES

CC: *Land Division – Maui District Office*
Oceanit, Attn: Dayan Vithanage
James Buika, Maui County Planning Department
Kahana Bay Steering Committee
Thorne Abbott, Coastal Planners LLC

Attachments: *OEQC Bulletin Publication Form (hard copy)*
EISPN (1 hard copy)
One (1) CD with electronic copies of the EISPN and OEQC Publication form in both pdf and MS Word document formats

19-265

APPLICANT
PUBLICATION FORM

Project Name:	Kahana Bay Erosion Mitigation Project
Project Short Name:	Kahana Bay Beach Restoration
HRS §343-5 Trigger(s):	Use of state lands – HRS Section 343-5)(a)(1) Use within a conservation district – HRS Section 343-5)(a)(2) Use within a shoreline area – HRS Section 343-5)(a)(3)
Island(s):	Maui
Judicial District(s):	Lahaina
TMK(s):	Fronting, inclusive and/or seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:021; (2) 4-3-005:020; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001.
Permit(s)/Approval(s):	Conservation District Use Permit Clean Water Act Section 401 Water Quality Certification Department of the Army Permit Section 10 and Section 404 Coastal Zone Management Act Consistency Determination County Special Management Area Use Permit County Shoreline Setback Approval or Variance, where applicable Building, Grading, Flood Development, Right ot Entry and other ministerial permits, where applicable
Approving Agency:	The State of Hawai'i Department of Land and Natural Resources Office of Conservation and Coastal Lands 1151 Punchbowl Street, Suite 131 Honolulu, Hawai'i 96813
Contact Name, Email, Telephone, Address	Samuel Lemmo, Administrator Sam.j.lemmo@hawaii.gov (808) 587-0377 P.O. Box 621 Honolulu, HI 96809-0621
Applicant:	The Kahana Bay Steering Committee
Contact Name, Email, Telephone, Address	10 Hoohui Road, Suite 201 Lahaina, HI 96761
Consultant:	Oceanit
Contact Name, Email, Telephone, Address	***Please send all comments to kahana@oceanit.com*** Michael Foley, Ph.D., P.E. Coastal Engineer mfoley@oceanit.com (808) 531-3017 828 Fort Street Mall, Suite 600 Honolulu, HI, 96813

Status (select one)	**Submittal Requirements**
____ DEA-AFNSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.
____ FEA-EISPN	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.

19-265

_X_ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the approving agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
___ FEIS Acceptance Determination	The approving agency simultaneously transmits to both the OEQC and the applicant a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
____ FEIS Statutory Acceptance	The approving agency simultaneously transmits to both the OEQC and the applicant a notice that it did not make a timely determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and therefore the applicant's FEIS is deemed accepted as a matter of law.
____ Supplemental EIS Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____ Other	Contact the OEQC if your action is not one of the above items.

Project Summary
Provide a description of the proposed action and purpose and need in 200 words or less.

Kahana Beach on the island of Maui, Hawai'i has been subject to severe coastal erosion due to sea level rise (SLR), frequent storm events, and past construction of individual seawalls and shoreline armoring. The purpose of the project is to devise a regional approach to provide erosion mitigation Kahana Bay. The Kahana Bay Steering Committee (KBSC) represents nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline threatened by shoreline erosion. In consultation with the Maui County Planning Department, the KBSC plans to restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas. The plan also envisages constructing structures that extend from the shoreline seaward to retain the nourished sand and stabilize the beach. The beach nourishment project would widen the existing beach by 35–150 feet (approximately 50 feet average width). The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors.

Environmental Impact Statement Preparation Notice

Kahana Bay Erosion Mitigation

Approving Agency:

State of Hawai'i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Suite 131
Honolulu, HI 96813

Applicant:

The Kahana Bay Steering Committee
10 Hoʻohui Road, Suite 201
Lahaina, HI 96761

February 2019

Environmental Impact Statement Preparation Notice

Kahana Bay Erosion Mitigation

Applicant:
The Kahana Bay Steering Committee
10 Hoʻohui Road, Suite 201
Lahaina, HI 96761

Approving Agency:
State of Hawai‘i
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
1151 Punchbowl Street, Suite 131
Honolulu, HI 96813

Consultant:
Oceanit
828 Fort Street Mall, Suite 600
Honolulu, HI 96813

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ACRONYMS AND ABBREVIATIONS

<	Less Than
%	Percent
§	Section
°F	Degrees Fahrenheit
ADA	Americans with Disabilities Act
AIS	Archaeological Inventory Study
AMAP	Applicable Monitoring and Assessment Plan
AMP	Archeological Monitoring Plan
AMR	American Medical Response
AOAO	Association of Apartment Owners
BLNR	Board of Land and Natural Resources
BMP	Best Management Practice
CDP	Census Designated Place
CDUP	Conservation District Use Permit
CFR	Code of Federal Regulations
chl a	Chlorophyll a
CIA	Cultural Impact Assessment
CO	Carbon Monoxide
CPP	Countywide Policy Plan
CWA	Clean Water Act
cy	Cubic Yards
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act of 1977
DA	Department of the Army
DAGS	Department of Accounting and General Services
dBA	Decibels
DEIS	Draft Environmental Impact Statement
DLNR	State of Hawai'i Department of Land and Natural Resources
DOE	State of Hawai'i Department of Education
DOH-CWB	State of Hawai'i Department of Health, Clean Water Branch
EA	Environmental Assessment
EIS	Environmental Impact Statement
EISPN	EIS Preparation Notice
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FR	Final Rule
ft	Foot or feet
ft/yr	Feet per Year
FWCA	Fish and Wildlife Coordination Act
GPS	Global Positioning System
HAR	Hawai'i Administrative Rules
HRS	Hawai'i Revised Statutes
HSBPA	Hawai'i Shore and Beach Preservation Association

IPCC	Intergovernmental Panel on Climate Change
KBSC	Kahana Bay Steering Committee
m	Meter(s)
MCC	Maui County Code
mgd	Million Gallons per Day
MHHW	Mean Higher-High Water
MIP	Maui Island Plan
MLLW	Mean Lower-Low Water
mm	Millimeters
MMPA	Marine Mammal Protection Act
mph	Miles per Hour
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NH_4	Ammonium
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NO_3	Nitrate
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O_3	Ozone
OCCL	Office of Conservation and Coastal Lands
OEQC	Office of Environmental Quality Control
OP	State Office of Planning
ORMP	Ocean Resources Management Plan
PM	Particulate Matter
PO_4^{3-}	Phosphorus
ROE	Right-of-Entry
RTE	Rare, Threatened, and Endangered
SHPD	State Historic Preservation Division
Si	Silica
SLR	Sea Level Rise
SLR-XA	Sea Level Rise Exposure Area
SLUD	Sate Land Use District
SMA	Special Management Area
SO_2	Sulfur Dioxide
SOEST	School of Ocean and Earth Science and Technology
SSA	Shoreline Setback Approval
SSBN	Small-Scale Beach Nourishment
SSV	Shoreline Setback Variance
SUP	Stand Up Paddling
TDN	Total Dissolved Nitrogen
TDP	Total Dissolved Phosphorus
TMK	Tax Map Key
TSS	Total Suspended Solids

UH	University of Hawai‘i
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WMCP	West Maui Community Plan
WQC	Water Quality Certification
WQS	Water Quality Standards
WRF	Wastewater Reclamation Facility

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EXECUTIVE SUMMARY

Type of Document:	Environmental Impact Statement (EIS) Preparation Notice (EISPN)
Project Name:	Kahana Bay Erosion Mitigation Project
Proposing/Determination Agency:	State of Hawai'i Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) 1151 Punchbowl Street, Suite 131 Honolulu, HI, 96813
Consultants:	Oceanit 828 Fort Street Mall, Suite 600 Honolulu, HI, 96813
Sub-Consultants:	Coastal Planners, LLC 117 Loi Pohaku Place Wailuku, HI 96793 Planning Consultants Hawaii, LLC 2331 West Main Street Wailuku, HI 96793 Earthplan 35 Meadowbrook Lane Trophy Club, TX 76262
Comments and Information:	Please direct all questions and comments to kahana@oceanit.com
Project Location:	Kahana Bay, Maui, Hawai'i
Tax Map Key (TMK):	Fronting and seaward of TMKs (2) 4-3-005:029; (2) 4-3-005:020; (2) 4-3-005:021; (2) 4-3-005:031; (2) 4-3-005:019; (2) 4-3-005:009; (2) 4-3-005:008; (2) 4-3-010:009; (2) 4-3-010:007; (2) 4-3-010:004; (2) 4-3-010:002; and (2) 4-3-010:001.
Land Area:	Roughly 4 acres (175,000 square feet [ft]) comprised of a ~3,500 ft long by ~50 ft wide beach filled with sand, attendant retaining structures, and offshore submerged sand borrow sites.
State Land Use District (SLUD):	Urban (U) and Conservation (C)

Maui Island Plan:	Within the Urban Growth Boundary
Community Plan Designation:	Hotel (H), Open Space (OS), Multi-Family (MF), Public/Quasi-Public (P), Park (PK)
County of Maui Zoning Designation:	Hotel (H-2), Residential (R-3), and Apartment (A-1 and A-2)
Project Summary:	Kahana Beach on the island of Maui, Hawai'i has been subject to severe coastal erosion due to sea level rise (SLR), frequent storm events, and past construction of individual seawalls and shoreline armoring. The purpose of the project is to devise a regional approach provide erosion mitigation at Kahana Bay. The Kahana Bay Steering Committee (KBSC) represents nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline that are threatened by shoreline erosion. In consultation with the Maui County Planning Department, the KBSC plans to restore, rehabilitate and preserve the sandy beach along Kahana Bay by nourishing it with 50,000-100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas. The plan also envisages constructing structures that extend from the shoreline seaward to retain the nourished sand and stabilize the beach. The beach nourishment project would widen the existing beach by 35–150 feet (approximately 50 feet average width). The additional sand would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents, and visitors.
Regulatory Context:	EIS (Chapters 343/344, Hawai'i Revised Statutes [HRS] and Section (§) 11-200, Hawai'i Administrative Rules [HAR])
Triggers for the EIS:	Use of State Lands, Use of County Lands Use of State Conservation District Lands Use of the Shoreline Area
Estimated Cost:	Approximately $8,000,000
Time Frame:	Construction will begin after all permits and government approvals are obtained. The construction period is projected to occur in the late summer or fall of 2020.

1 PROJECT OVERVIEW

1.1 INTRODUCTION

The project area addressed in this Environmental Impact Statement Preparation Notice (EISPN) is Kahana Beach located along the coastline of West Maui, north of Honokowai and south of Napili. Kahana Beach is approximately 3,500 feet (ft) and is bounded by Kahana Stream mouth to the north and Pohaku "S-Turns" Beach Park to the south. The project area is bounded by a submerged fringing to the west and a string of nine condominium complexes and one Kuleana parcel to the east. The condominium and residential buildings occupy the narrow strip of land between the shoreline and Lower Honoapiʻilani Road.

Kahana Bay has undergone both chronic and episodic coastal erosion, which has caused shoreline recession, beach narrowing, reduction in coastal access, and increased risk of natural hazards to oceanfront resources, buildings, infrastructure, and amenities. Analysis of historical aerial images indicates that Kahana Bay shoreline recedes at an average rate of about one foot per year (Fletcher et al., 2003).

The long-term coastal erosion trend is caused by a variety of factors including tropical storm and hurricane events, land subsidence, changes in sediment supply, prevalent wind and wave patterns, runoff drainage in the area, and/or rising sea levels. Episodes of rapid erosion caused by severe wave and current conditions have led to the installation of a variety of shore protection measures including sandbag revetments, seawalls, sand dune restoration, and sheet-pile structures.

The Kahana Bay Steering Committee (KBSC) represents the nine oceanfront condominiums and one Kuleana parcel along the Kahana Bay coastline. In consultation with the Maui County Planning Department, the KBSC has developed an approach to restore, rehabilitate and preserve the sandy beach along the bay. The plan includes nourishing the beach with 50,000 to 100,000 cubic yards (cy) of sand transported from previously identified offshore borrow areas. The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The beach nourishment project would widen the beach to between 35–150 ft (approximately 50 ft average width). The nourished beach would provide an erosion buffer by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents and visitors.

1.2 BEACH RESTORATION FEASIBILITY

Historically, the threat of shoreline erosion had been addressed by individual property owners and condominium associations by armoring their shorelines. Reports indicate that the existing shoreline armoring fronting four of the nine condominium complexes along Kahana Beach may have negatively impacted overall beach stability. In 2016, the County of Maui conducted a study to investigate the practicality of regional beach nourishment to provide coastal protection and restore the beach at Kahana Bay. The feasibility study was designed to meet two objectives: 1) investigation of a regional solution to the continuing and worsening erosion problem throughout West Maui and 2) to demonstrate that shoreline protection options involving beach nourishment are feasible. Beach

nourishment is a holistic approach to coastal restoration and protection that improves beach resources while enhancing recreational activity and values (County of Maui Department of Planning, 2008).

The study evaluated existing information and data, identified and categorized potential offshore sand sources, and identified alternate dredging and beach fill methods. The study identified many submerged sand deposits; two of which are within one mile of Kahana Beach. The total amount of sand available at these sources was estimated to be over 250,000 cy and was found to be suitable for nourishment. The study concluded that a regional beach nourishment for restoring Kahana Beach is feasible and also developed preliminary concepts for sand nourishment and beach restoration (County of Maui, 2016).

1.3 PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

Kahana Bay is located along the West Maui coast north of Honokowai and South of Napili (Figure 1-1). The geographic area comprising Kahana Bay, for the purposes of this project, includes an approximately 3,500 ft beach cell bounded by Pohaku Park (also known as "S-Turns") at the south end, Kahana Stream at the north end, and by the Pacific Ocean to the west and Lower Honoapiʻilani Road to the east. The project area encompasses nine condominium complexes and one Kuleana parcel. The nine condominiums on Kahana Bay (from north to south) include Kahana Village, Kahana Outrigger, Kahana Reef, Pohailani, Hololani, Royal Kahana, Valley Isle Resort, Sands of Kahana, and the Kahana Beach Resort. A map showing the parcel ownership is included as Figure 1-2, and one showing County of Maui Zoning is included as Figure 4-2. Land along the coastline is owned by various owners with City and County oversight in park areas. The sandy beach area is under State jurisdiction, while offshore in open water is under Federal jurisdiction.

To address the ongoing erosion problems in a collaborative, coordinated manner, the property owners have banded together to form the KBSC. The KBSC is made up of two Association of Apartment Owners (AOAO) Board-designated representatives from each of the nine condominiums and one representative from the Kuleana parcel on Kahana Bay. The coastline fronting the condominiums is densely developed and used for tourism and recreational purposes.

Pohaku Park (or "S-Turns") at the southern edge of the project site has a popular surf break offshore and consists of a seasonally intermittent and small sandy beach within a short reach of coastline. The park serves as a rocky headland to the end of Kahana Bay and has a long narrow paved parking lot, porta-potties, an outdoor shower, and picnic facilities with benches. Recreational activities at the park include sunbathing, snorkeling, swimming, social gatherings, viewing marine life (primarily resting turtles) and surfing offshore at a popular stand up paddling (SUP) and long-board surf break.

The mouth of the Kahana Stream lies at the northern boundary of the project site. Sediment carried by the stream and distributed at the stream mouth contributed to the formation of Kaea Point: a sand fringed headland at the north end of the project area (Hawaiʻi Watershed Atlas, 2008) (Figure 1-1). Kahana Stream extends 17 miles inland and is somewhat channelized between its ocean outfall and where it passes under a bridge for Lower Honoapiʻilani Road.

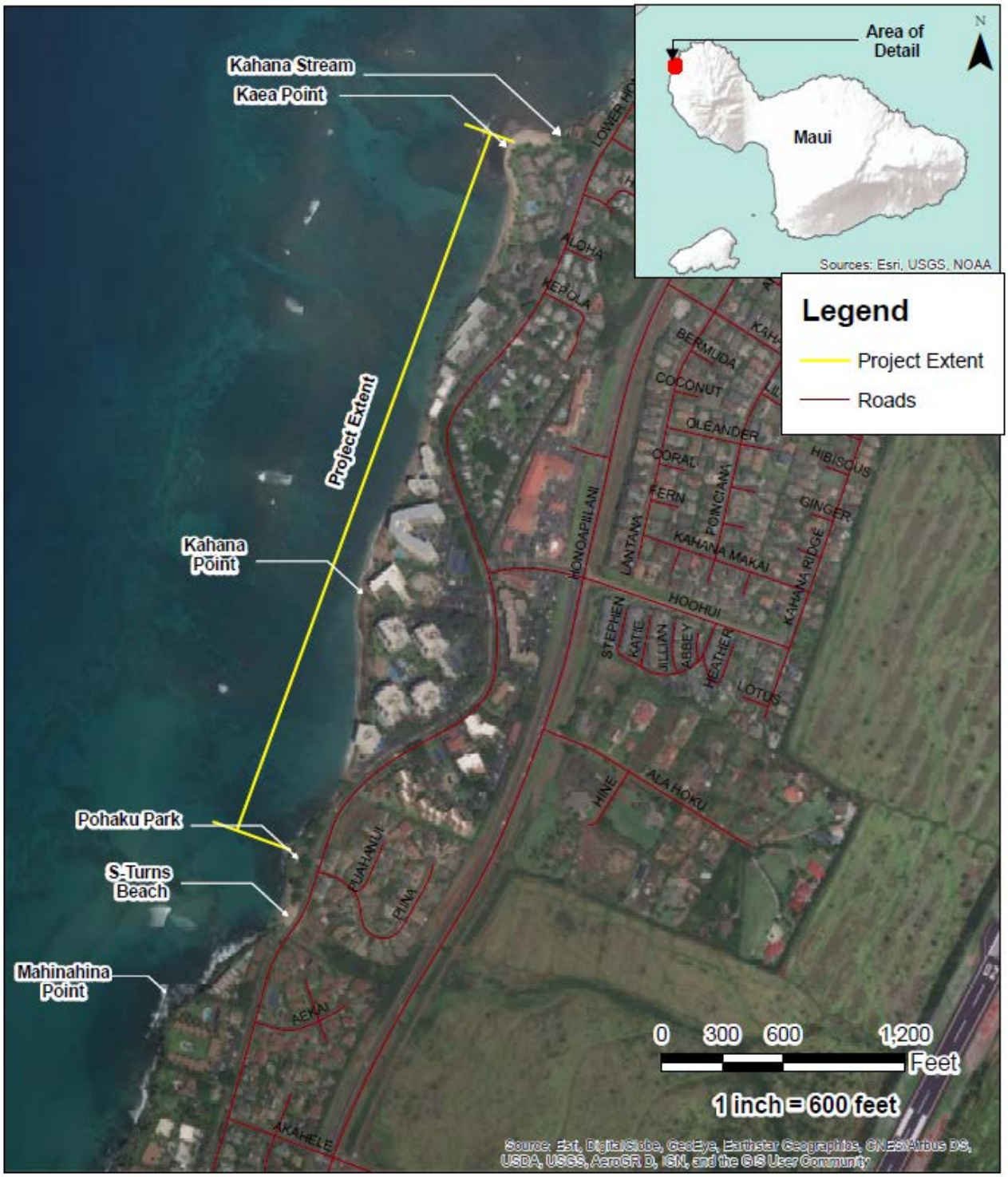


Figure 1-1: Project Site Map

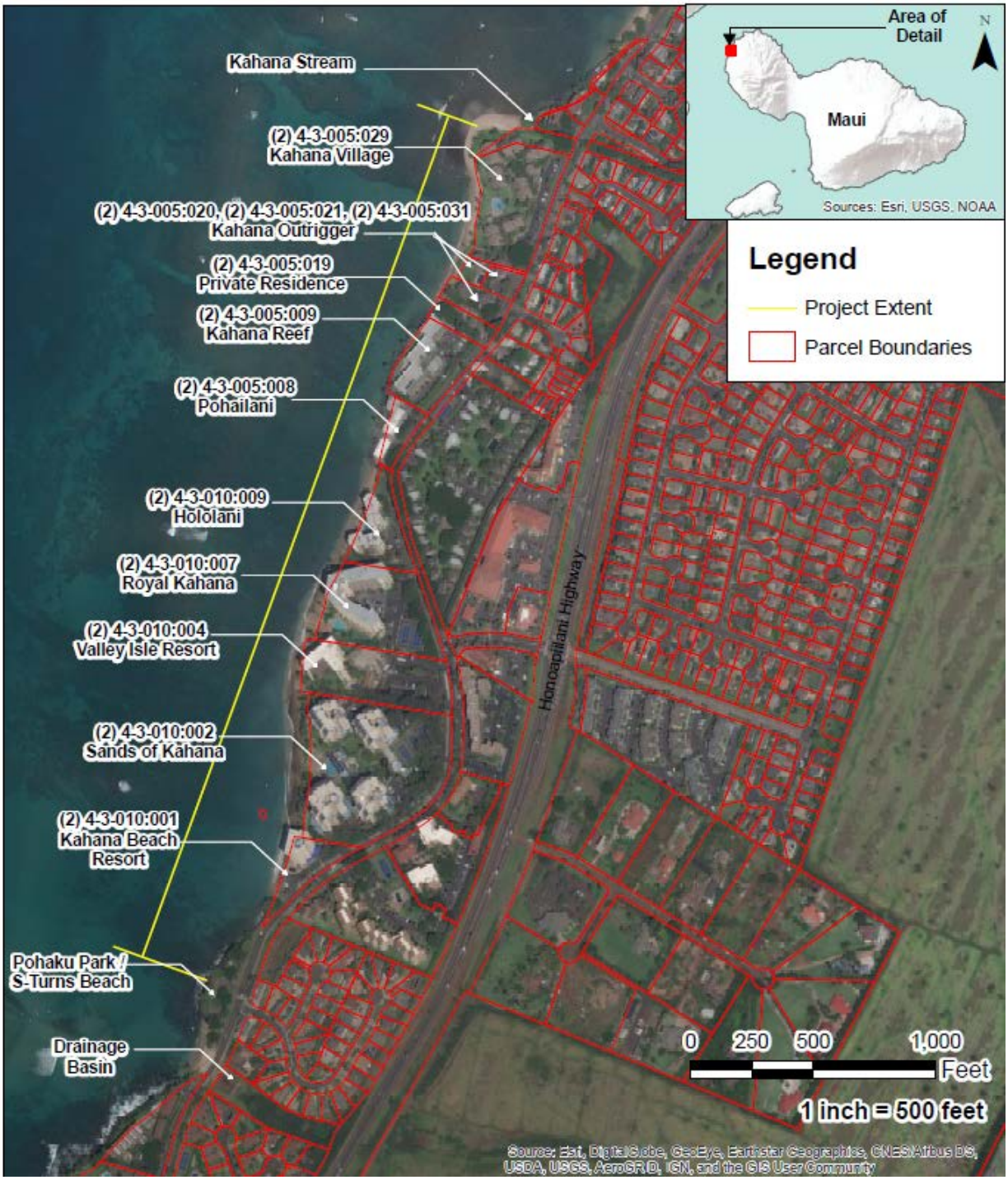


Figure 1-2: TMK and Ownership Map

1.4 PURPOSE AND NEED

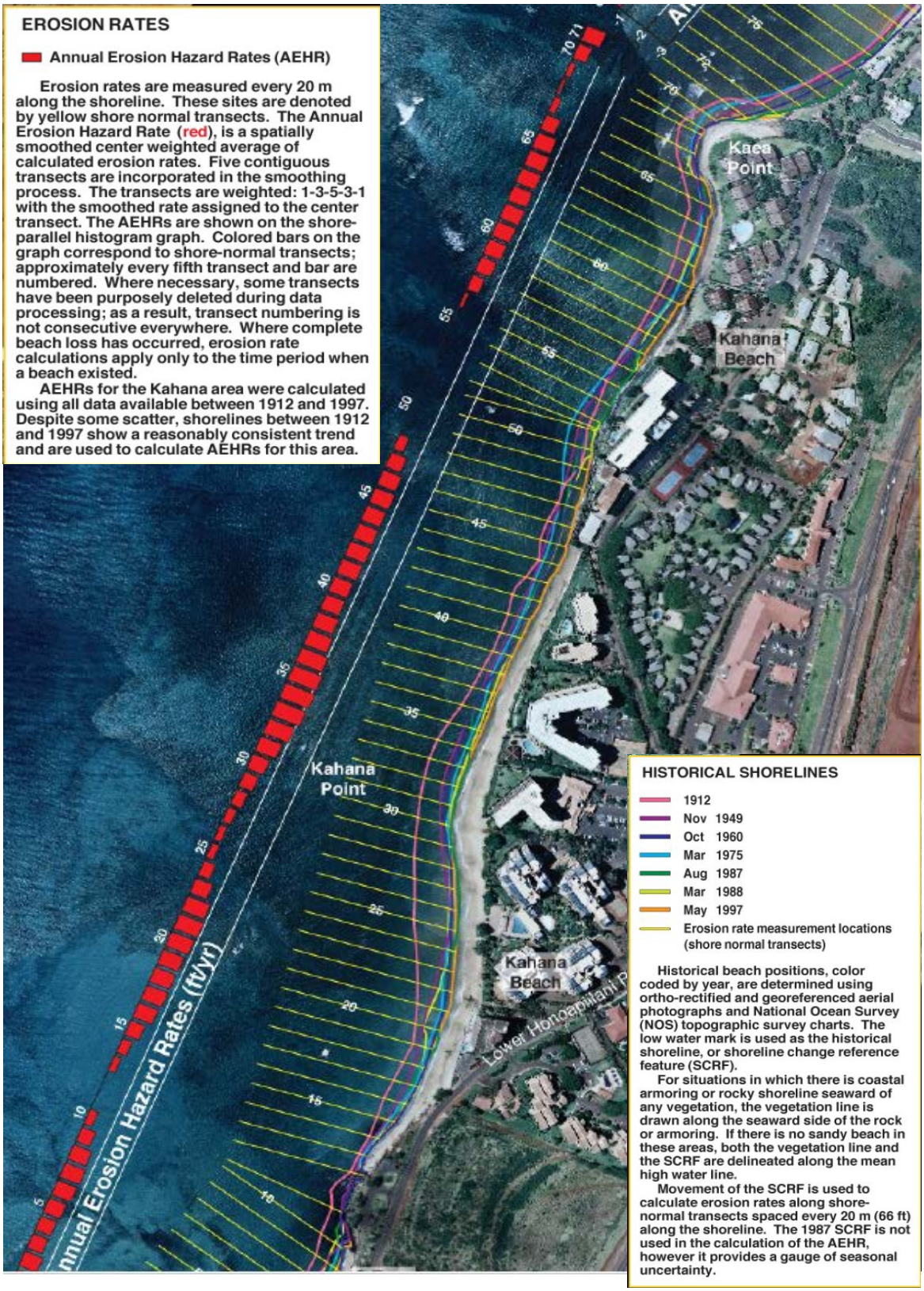
The purpose of the project is to devise a regional approach to provide erosion mitigation at Kahana Bay. Chronic erosion has led to shoreline retreat and the narrowing of Maui's beaches; the island's most valuable natural assets (The Maui News, 2018). This erosion constrains beach access to and along the shoreline, threatens buildings and infrastructure built close to shore, jeopardizes safety, and risks damage to property. Approximately 85 percent (%) of the Maui's sandy shorelines are experiencing long-term erosion trends. The University of Hawai'i (UH) Coastal Geology Group examined nearly 100 years of shoreline data and calculated that Maui has the highest percentage of beach loss (11%) of all of the Hawaiian Islands due, in part, to land use development patterns, storm events, shoreline armoring, and locally higher rates of sea level rise (SLR) (Fletcher et al., 2012). A main cause of beach erosion is sand deficiency. Sand may be naturally transported away from a beach by currents that develop from waves spilling over the fringing reef shelf. The direction of these currents depends on local winds, waves, and tides. Once sand is driven offshore into deep water, the currents in the Pailolo Channel may significantly influence sediment transport away from the beach.

UH's School of Ocean and Earth Science and Technology (SOEST) performed an erosion analysis of historical shorelines in the area from 1912-1997 (Figure 1-3). UH SOEST research estimates the loss of more than 0.5 ft of beach width each year (ft/yr) since 1912, while Fletcher et al., 2003 estimates the erosion rate to be 0.72 ft/yr. The 2016 Feasibility Study analyzed historic shorelines from 1912, 1949, 1960, 1975, 1988, and 1997 to estimate long- and short-term erosion over those periods of time (Table 1-1) (County of Maui, 2016). Prior to 1949, the average rate of erosion was 0.9 ft/yr; this likely represents the rate of erosion for a wide, naturally behaving, unhindered beach and littoral cell. Following shoreline development, the average erosion rate was 1.9 ft/yr.

The condominiums along Kahana Bay Condominiums were built in the 1960's and 1970's prior to Hawai'i's Coastal Zone Management (CZM) Act (CZMA) (CZM, 1977) and Special Management Area (SMA) requirements. The buildings' proximity to the shoreline, combined with SLR and coastal erosion, has put the condominiums at great risk to damage and destruction. Although the risk to condominiums is now recognized by the Maui County Planning Department, the safety of existing buildings, such as those along Kahana Bay, needs to be addressed. The Maui County Planning Department is currently proposing new shoreline setback rules that incorporate SLR data for future developments (The Maui News, 2018).

Several properties that lack long-term shoreline armoring could lose the land required to implement feasible erosion mitigation strategies. Preventing shoreline recession using temporary measures such as sandbag revetments helps to retain dry land, which increases the feasibility of various alternatives to permanently address the erosion problem. Oftentimes seawalls or other types of shoreline armoring are the most feasible long-term solution when erosion is mitigated on a parcel-by-parcel basis.

Although effective in protecting the target property, shoreline armoring can result in edge effects that can increase erosion rates at the ends of the seawalls. As a result, hardened shoreline projects can result in intense public opposition and debate. Four of nine condominium complexes in the Kahana Bay beach cell have existing shoreline armoring, with some in need of reinforcement and/or currently in repair (County of Maui, 2016). A more natural, coordinated, regional solution to coastal erosion and SLR is needed that would benefit and protect all of the structures along Kahana Bay.



Source: UH, 2016

Figure 1-3: Map showing shoreline erosion rates (ft/yr)

Table 1-1: Results of Shoreline Change Analysis

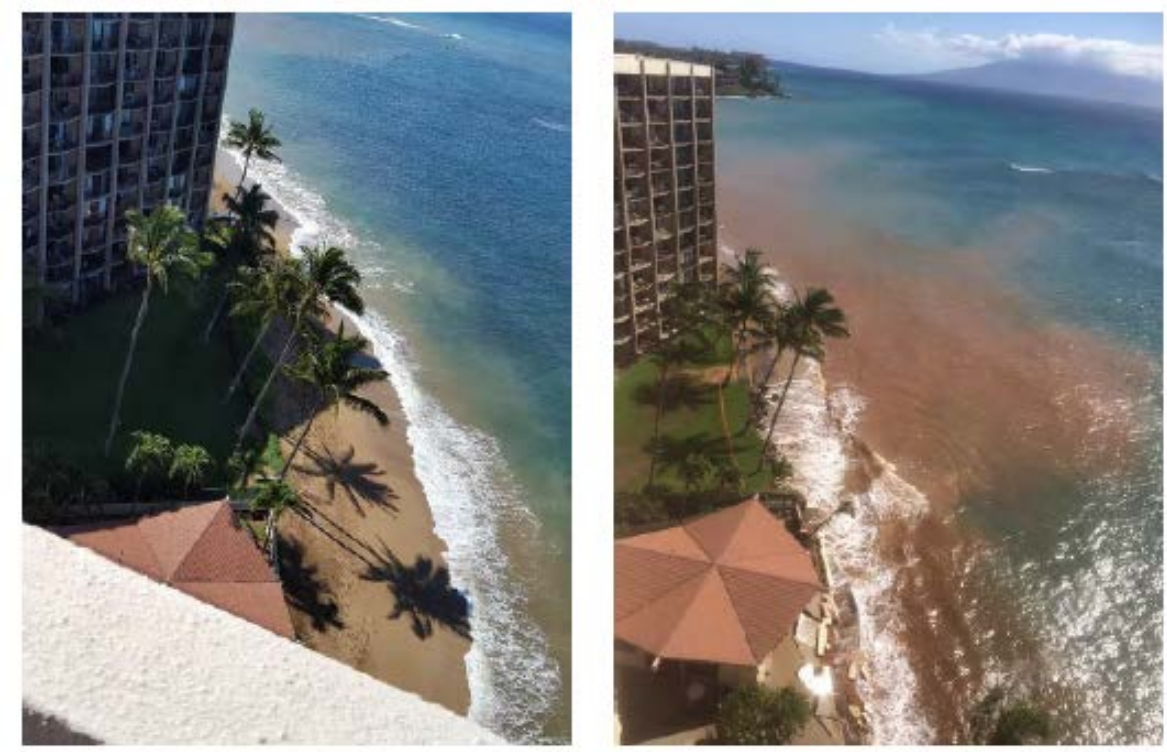
Year	Change in Beach Width since 1912 (ft)	Cumulative Time Span (yrs)	Average Long-term erosion (ft/yr)	Change in Beach Width since Previous Shoreline (ft)	Average Short-Term Erosion (ft/yr)
1912	0		0	0	0
1949	-34.4	27	-0.9	-34.4	-0.9
1960	-54.9	38	-1.1	-20.9	-1.9
1975	-44.6	53	-0.7	10.5	0.7
1988	-58.5	66	-0.8	-13.8	-1.1
1997	-75.8	77	-0.9	-17.4	-1.9

Source: County of Maui, 2016

While erosion is a chronic problem, event-based phenomena also add significantly to beach erosion. Episodic erosion from large storm waves combined with elevated water levels can transport large quantities of sediment offshore over a course of days to weeks. During March and April 2016, Kahana Bay was subject to several large storm events. Damage from these storms included beach loss, failure and undermining of hardened structures, loss of shoreline access, and water quality impairment from soils that were exposed and washed into Kahana Bay. In addition, high waves eroded oceanfront property, jeopardizing the health and safety of the inhabitants of several condominiums. Emergency temporary erosion control structures, such sand-filled geotextile bags and barriers to counteract incoming waves, were placed in an attempt to protect the buildings, but they also inhibited access along the shoreline and narrowed the beach. Figure 1-4 shows two photographs taken from the same location before (February 2016) and after (May 2016) these storms. The figure depicts how an entire beach can be lost in a few months and how buildings can be quickly jeopardized in the face of shifting shorelines.

Four of the oceanfront condominium complexes have existing non-contiguous seawalls that vary in design, construction materials, top elevation, condition, and effectiveness. Even with these armoring structures, waves can still exceed the barriers and damage property (Figure 1-5). Five of the condominiums fronting Kahana Bay either have no protection or have employed "soft" measures of shoreline protection including sand-filled fabric revetments (Table 1-2, Photo #7) or restored sand dunes with native plantings (Table 1-2, Photo #1). For the condominium complexes without a permanent armoring along the eroding beach, the risk to public safety and property is especially severe during the winter months when the area is exposed to north Pacific swells and storms. Table 1-2 shows recent site photos taken from various perspectives along Kahana Bay. The locations from which the photos were taken and their respective orientations are shown in Figure 1-6.

It has become routine for the threatened condominiums to experience annual storm events where waves exceed the property's limited shoreline protection and wash into the yard. Multiple occurrences in recent years have become commonplace for a few of the complexes and residents, owners, and inhabitants are worried about public safety and the risk to the property. Community residents are also concerned with the reduction in access along the shoreline. There is a need for new erosion mitigation strategies that can protect threatened buildings while restoring the natural assimilative capacity of the sandy beach and conserving the natural beach asset and its function to absorb and buffer wave energy.



Source: County of Maui 2016

Figure 1-4: Pre-storm (February 2016, left) and post-storm (May 2016, right) Beach Conditions

Source: County of Maui Planning Department, Tara Owens

Figure 1-5: (a) Wave Overtopping a Seawall Fronting the Pohailani Condominium, (b) Resulting Damage Following a Storm Event

Figure 1-6: Photograph Locations and Directions

Table 1-2: Photograph Log

Photo #1 (9/20/18): Standing near Kahana Village looking south at the dune restoration (left).

Photo #2 (9/20/18): Standing in front of Kahana Reef looking north.

Photo #3 (9/20/18): Hololani sheetpile installation and geotextile containers looking south.

Photo #4 (4/10/17): Geotextile sandbags fronting the Royal Kahana and Hololani Condominium looking south.

Photo #5 (7/13/18): Looking north at geotextile shoreline protection at Royal Kahana.

Photo #6 (7/13/18): Looking south at geotextile shoreline protection at Royal Kahana and Valley Isle Resort.

Photo #7 (7/13/18): Looking north at geotextile shoreline protection at Valley Isle Resort.

Photo #8 (7/13/18): Facing *mauka* at a drainage outlet on the beach between Valley Isle Resort and Sands of Kahana.

Photo #9 (7/13/18): Facing north at a drainage outlet on the beach between Valley Isle Resort and Sands of Kahana.

Photo #10 (9/20/18): Looking north at geotextile shoreline protection at Sands of Kahana.

Photo #11 (9/20/18): Looking south at the shoreline fronting Sands of Kahana and Kahana Beach Resort.

Photo #12 (7/13/18**): Loo**king north at the seawall fronting the Kahana Beach Resort.

Photo #13 (9/20/18): Standing on the north end of Pohaku Park looking north along the Kahana Bay Shoreline.

Photo #14 (7/13/20): Standing at the Pohaku Park headland looking north.

Photo #15 (7/13/20): Standing at the Pohaku Park headland looking south.

Photo #16 (7/13/18): Standing at Pohaku Beach Park looking south at S-Turns Beach.

Photo #17 (9/20/18): Standing on the crest of a storm water retention basin looking west toward S-Turns Beach.

Photo #18 (9/20/18): Standing on the crest of a retention basin looking *mauka*.

1.5 BEACH NOURISHMENT AND RESTORATION

Efforts to restore beaches generally fall into two categories in Hawai'i according to the Hawai'i Shore and Beach Preservation Association (HSBPA) (Romine et al., 2015):

1. Beach Restoration

- Using land-based sand resources (e.g., dune sand);
- Using sand dredged from offshore deposits;
- Beneficial reuse of sediment, such as from a harbor or stream mouth clearing project; and
- Sand imported from outside Hawai'i (not permitted on State submerged lands).

2. Beach Maintenance

- Sand back-passing (recycling) from an area of seasonal beach accretion to an area of seasonal beach erosion;
- Sand pushing or beach scraping to rebuild back-beach volume or dunes using seasonally-accreted sand from lower on the beach profile; and
- Dune restoration using borrowed sediment and other measures such as re-vegetation with native species and dune fencing to capture wind-blown sand.

The above actions are the only management tools that serve the dual purpose of protecting coastal lands and preserving beach resources (County of Maui Department of Planning, 2008). The beach nourishment project proposed herein would widen the existing beach to approximately 50 feet on average, which would provide erosion protection and enhance recreational resources in the area. The sand would buffer erosive waves by absorbing and dissipating wave energy while enlarging the amount of dry beach area available for use by the public, residents, and visitors.

Beach nourishment addresses the erosion problem on a regional basis rather than a property by property basis that is more reactive in nature and does not capture or prevent adverse cumulative impacts to the sandy beach asset. Restoration and nourishment are tools that move away from an ad-hoc, permit-by-permit, reactionary approach to coastal zone management. Beach nourishment is used to restore an eroding or lost beach by placing sand fill with or without supporting structures along the shoreline to widen the beach. It provides a mechanism to improve beach resources while enhancing recreational activity by creating a wider, stable, sandy shore. It is the only management tool that serves the dual purpose of protecting coastal lands and preserving beach resources. Restoring the beach at Kahana Bay could help to counteract the cumulative adverse impacts of shoreline armoring by reversing the erosion trend and protecting the beach asset. Beach nourishment simulates natural coastal protection and is a holistic approach to coastal restoration.

Hawai'i's white sandy beaches are made of carbonate sand derived from skeletal components of marine organisms such as coral, algae, and mollusks. Beach nourishment should take place with compatible sand. Because of the sensitive nature of marine life, it is also important that sand for beach replenishment is as close as possible in size and composition to existing beach sand and that it be as clean, or free from silt and clay, as possible. Silt and clay cause brown sediment plumes to form when they enter the water and can be harmful to marine life. The State of Hawai'i Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) strictly regulates the size, color, and quality of sand used for restoration purposes.

Beach nourishment and dune restoration is a common management practice on the United States (U.S.) mainland (National Research Council, 1995). Places like Miami Beach, FL; Myrtle Beach, NC; and Ocean City, MD have ongoing beach nourishment and/or dune restoration projects. Locally, dune restoration projects have taken place at many locations on Maui, including Kamaole I in 1983, Kamaole II in 1984, Mai Poina Oe Iao Beach Park in 1987 and 1998, at the Hawaiian Islands Humpback Whale National Marine Sanctuary (2000-ongoing), Kanaha Beach (2001), and at Kamaole III Park (2005). These restoration projects have been undertaken largely by volunteer efforts and have significantly enhanced the recreational value of the beach and upland areas. A nationwide resource of beach nourishment projects can be accessed through the American Shore and Beach Preservation Association: https://gim2.aptim.com/ASBPANationwideRenourishment/. Other beach restoration and nourishment projects, such as those in Waikīkī (27,000 cy sand along 1,750 ft of shoreline) and Iroquois Point (85,000 cy of sand stabilized with T-head groins across 4,400 ft of shoreline) on Oʻahu and Stable Beach on Maui (3,000 cy sand along 550 ft of shoreline), have been successfully conducted in Hawaiʻi.

Any beach nourishment project needs to be carefully analyzed and considered for ecological, economical, and feasibility. Beach nourishment success rates are much higher for embayed shorelines (coves, pocket beaches) than for straight or convex (curved outward) coasts, unless structures such as groins are used to simulate the effect of headlands. In addition, areas with sensitive marine ecosystems such as coral reefs may be negatively impacted by the addition of sand to the nearshore area. As such, it is necessary to survey the marine environment adjacent to the potential nourishment site in order to determine whether beach replenishment will be appropriate. Additionally, water quality and marine life surveys are important before, during, and after sand placement to determine whether any negative impacts arise from the addition of sand.

1.6 PROPOSED ACTION

In consultation with the Maui County Planning Department, the KBSC has developed an approach to restore, rehabilitate and preserve the sandy beach along the bay by nourishing it with 50,000 to 100,000 cy of sand transported from previously identified offshore borrow areas. The placed sand may be retained by installing beach stabilization structures (e.g., groins) extending seaward from the shore. The proposed action would result in an average 50-ft beach width along the approximately 3,500 lineal ft of the Kahana Bay coastline (Figure 1-7). Typical cross sections of the possible groin and beach fill are shown in Figure 1-8. The sand source will come from nearby offshore sand deposits identified as compatible sand in the 2016 Feasibility Study (Figure 1-9) (County of Maui, 2016). Beach nourishment is a "soft" alternative solution to erosion that would provide similar benefits without some of the negative effects associated with "hardened" structures that are often relied upon for coastal erosion response.

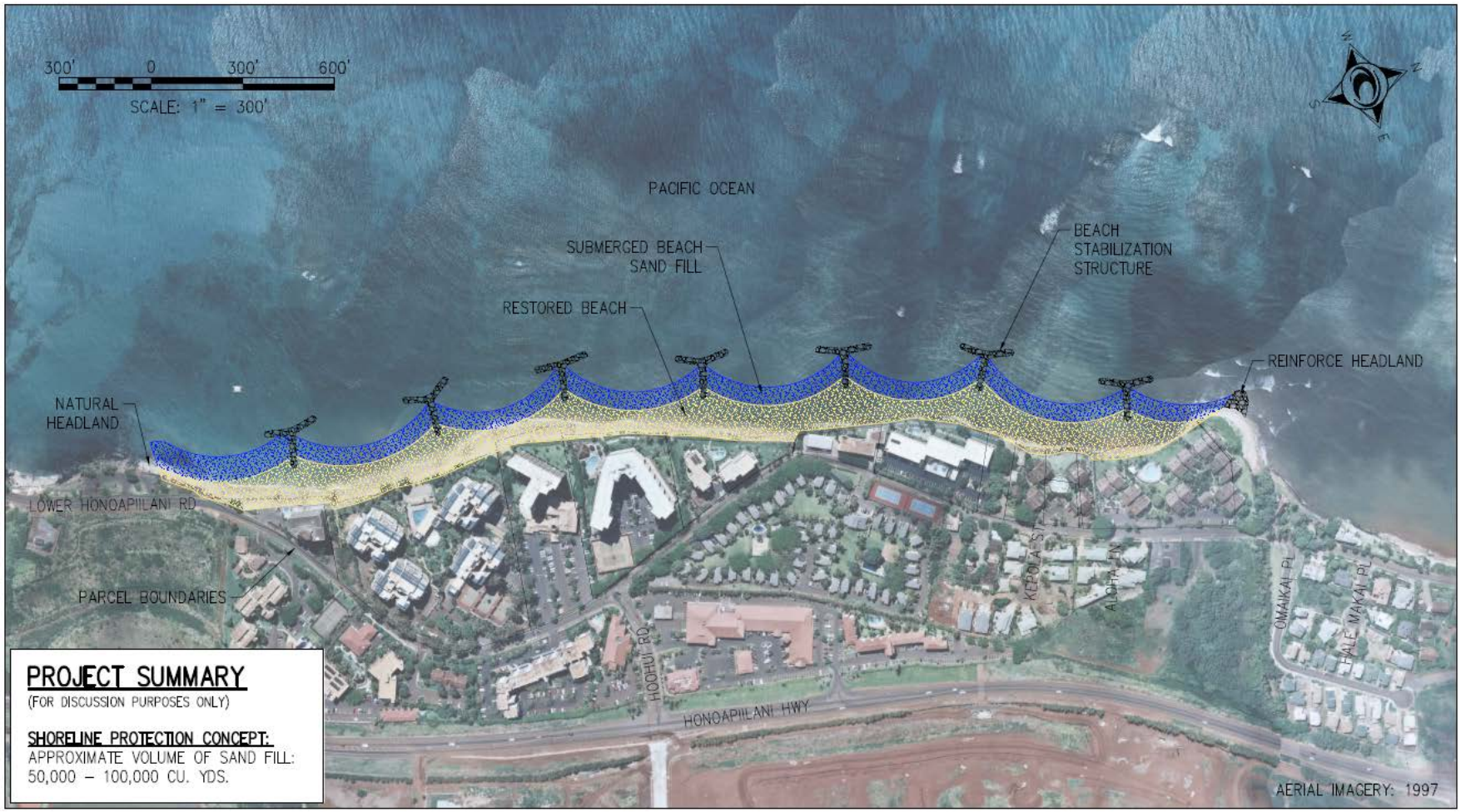


Figure 1-7: Conceptual Sketch of 50,000-100,000 cy Beach Nourishment with Beach Stabilization Strucures

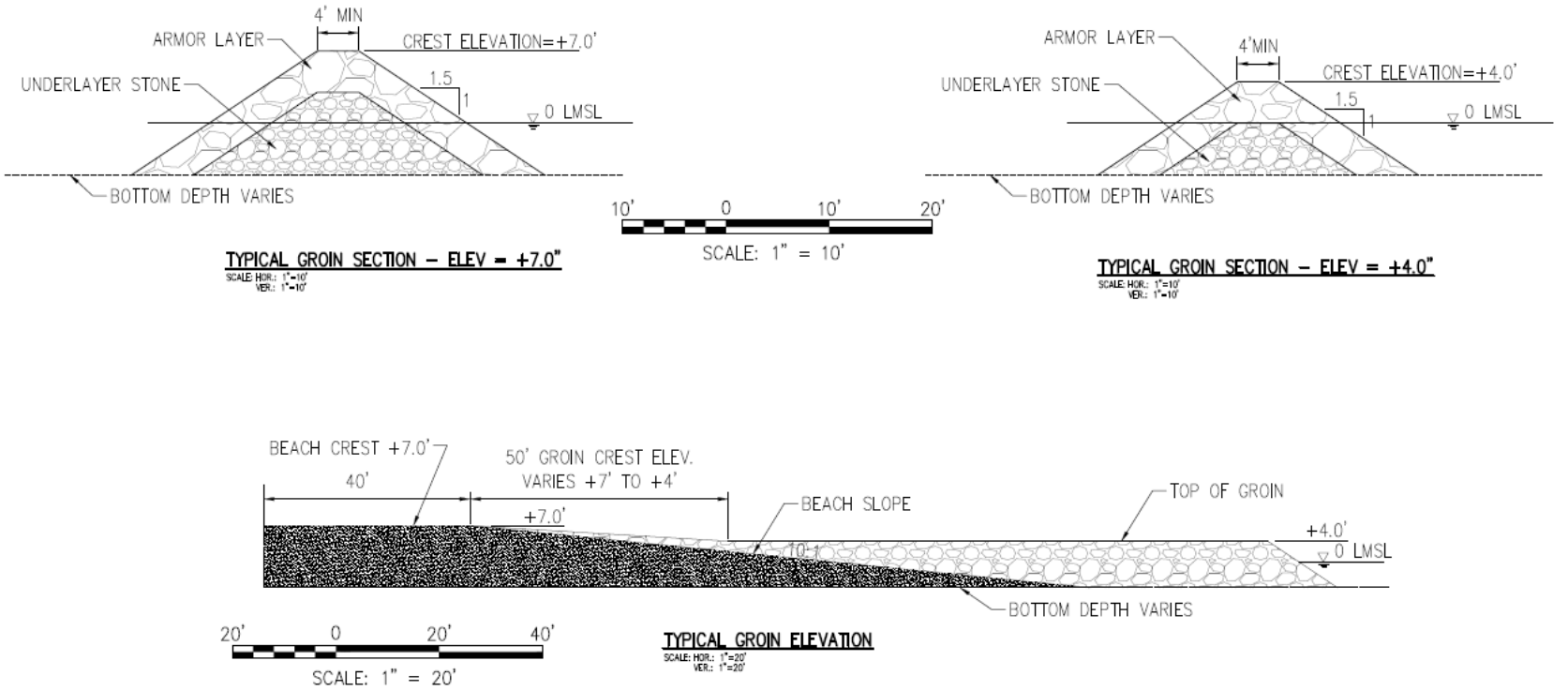


Figure 1-8: Typical Cross Section of Groin and Beach Fill

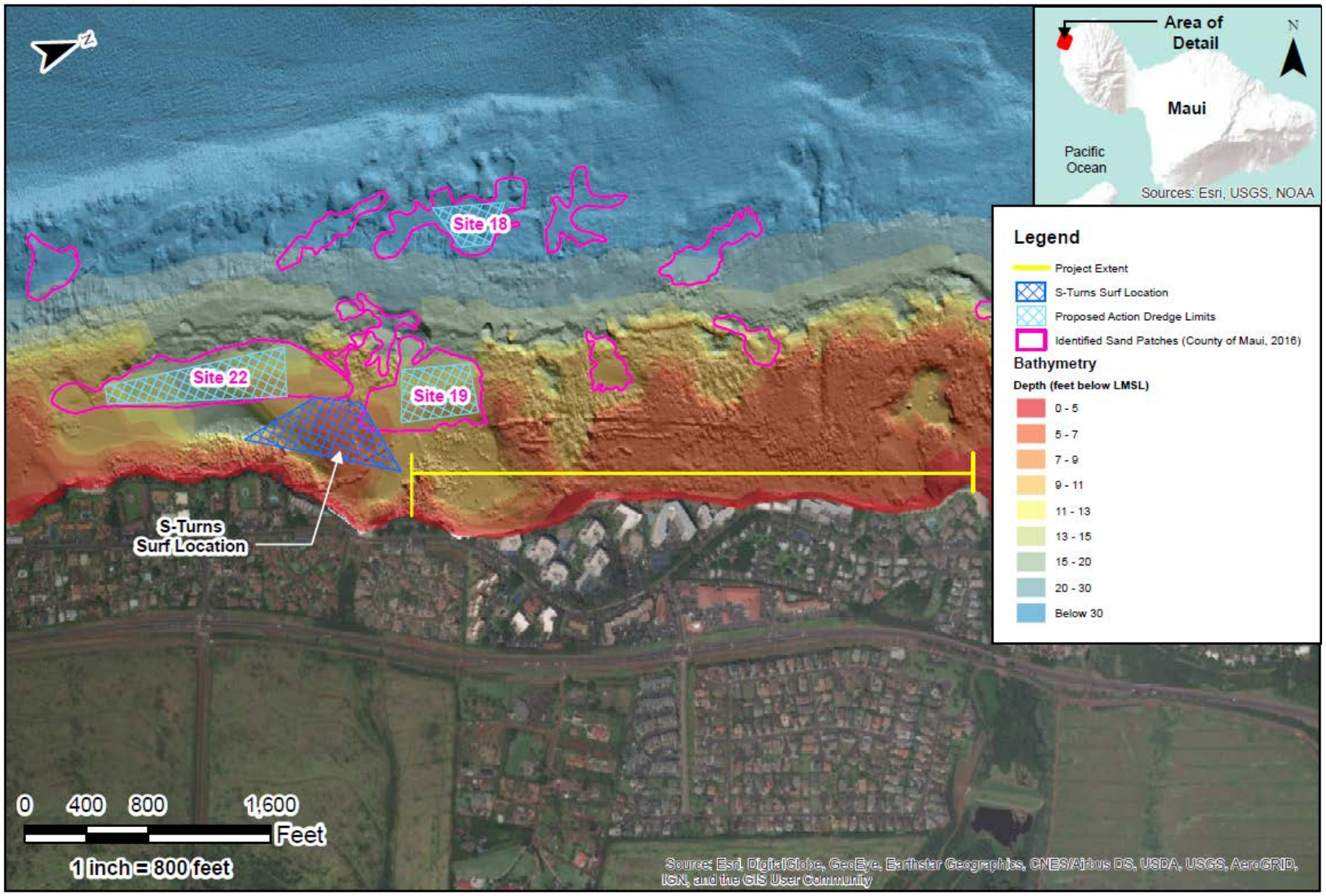


Figure 1-9: Proposed Dredge Limits and Bathymetry

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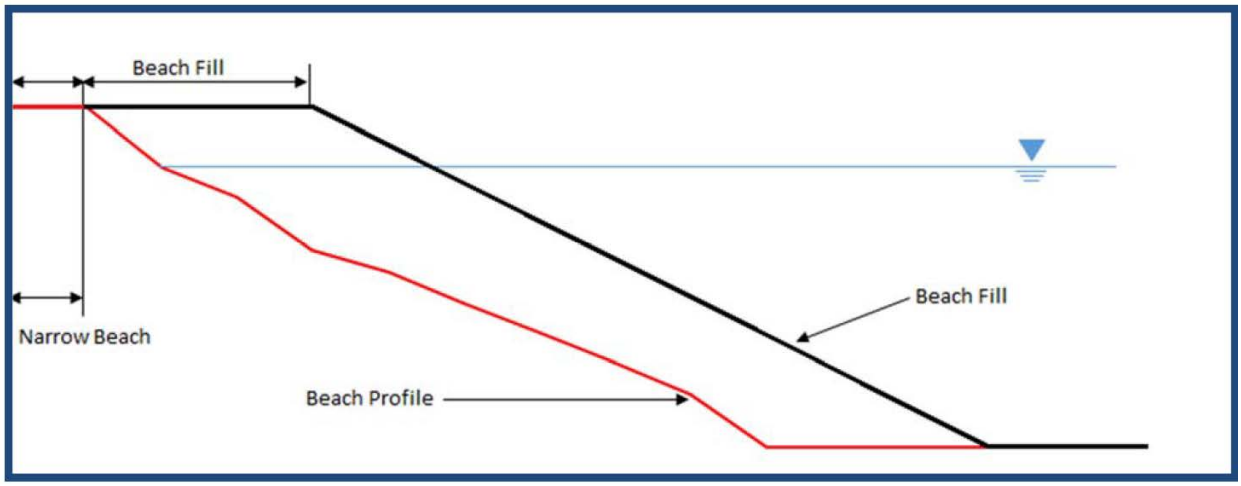
1.6.1 Beach Nourishment

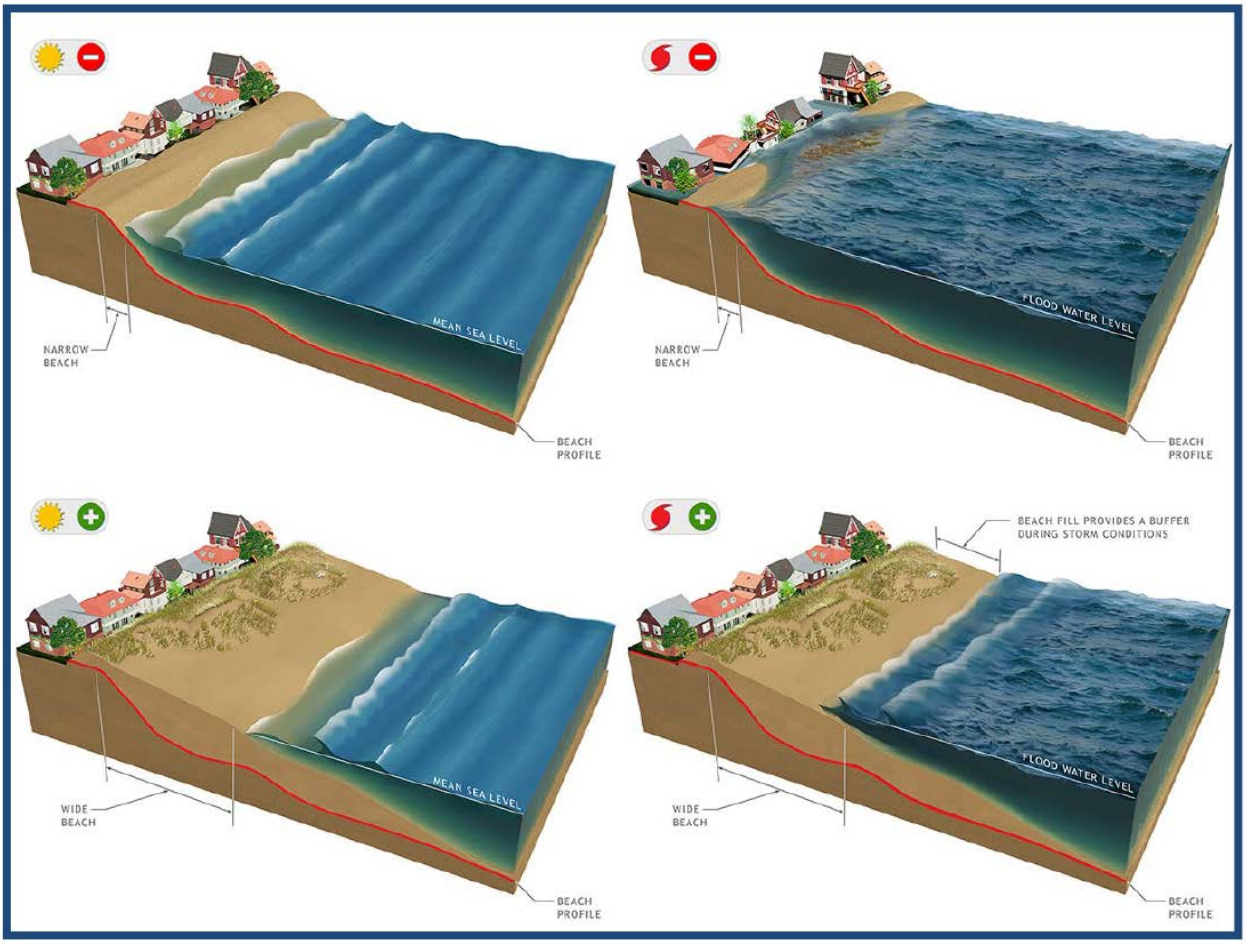
A generic cross section of the proposed beach nourishment/fill is shown in Figure 1-10. The pre-project beach profile is shown in red, while the mean sea level waterline is the blue horizontal line. Beach fill is represented by the area between the red and black lines. The beach fill extension is the horizontal distance between the pre-project and beach fill lines. The beach toe in the study area is where the beach profile ends and terminates at the ocean floor. The berm elevation is determined by its vertical location on the pre-project beach profile.

Figure 1-11 demonstrates how beach fill would protect inland and upland development. The top two panels of Figure 1-11 (a, b) show the pre-project condition, where the beach fronting the upland development is narrow. The red line highlights the pre-project beach profile. The top left panel (a) is the pre-project condition during a typical day. The narrow beach is sufficient to protect the development; however, during a storm event as shown in the top right panel (b), the narrow beach is incapable of protecting the development. The buildings are in danger of undermining and flood damage from wave attack propagating landward due to the presence of the storm surge.

The bottom two panels in Figure 1-11 (c, d) show how the beach nourishment alternative can protect coastal development from storm damages. The red line indicates the pre-project beach profile. Sand placed on the beach spreads over the entire profile as shown on the bottom left panel (c). This extends the beach profile and the beach toe seaward and widens the overall beach along the coastline. Under normal conditions, a wide beach is available for recreational purposes (c). Even during a storm, as shown on the bottom right panel (d), the wider beach prevents the storm surge and waves from reaching the development along the coastline.



Source: County of Maui, 2016
Figure 1-10: Section View of Beach Fill Alternative



Source: County of Maui, 2016
Figure 1-11: Storm Impacts With and Without Beach Fill

Beach nourishment would provide the recreational and shoreline protection benefits of moving the wave breaking zone seaward due to the creation of a wider sandy beach. The restoration of the beach area in Kahana Bay would also provide additional haul out areas for endangered monk seals and protected sea turtles. A sandy berm at the back of the beach could serve as a reservoir of surplus sand during high wave events and winter storms.

Sand placed as fill without retaining structures would be at risk of moving down drift and along the shore in response to waves, wind, and currents. The longshore and cross shore transport of sand could result in very high erosion rates and large losses of loose sand placed as fill for the widened beach. These forces may have contributed to the removal of the sand along the Kahana Beach and/or its deposition on the seafloor just offshore at sand source areas #19 and #22.

The longevity of the placed sand fill could be significantly improved with the addition of stabilization structures. Such structures would inhibit the movement of sand along the shore from prevailing down drift currents. Retaining structures could also be designed to better retain the sand in place during large swell and storm waves that could move placed sand offshore during episodic erosion events.

1.6.2 Beach Stabilization Structures

Beach stabilization structures such as T-head groins would be necessary to retain the nourished sand in place, given the chronic erosion trend at Kahana Bay. The beach stabilization structures' design would be tuned to optimize their efficacy related to prevailing currents and wave patterns near the project area.

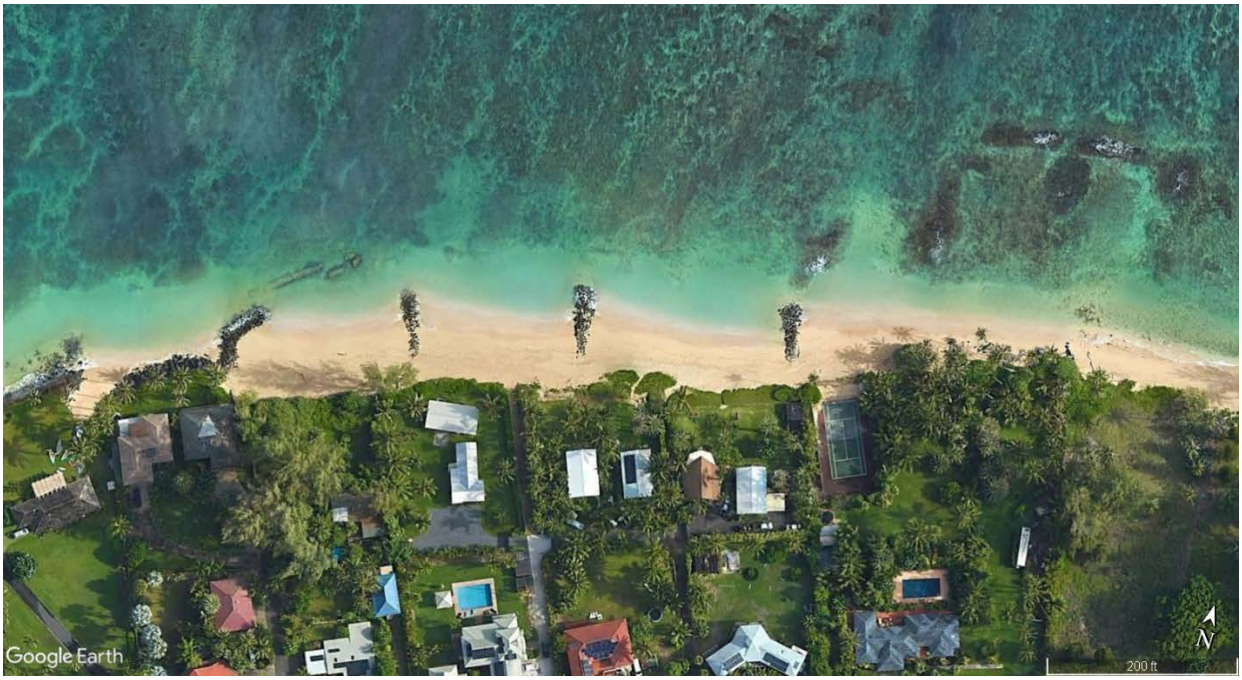
Additionally, beach stabilization structures placed in the nearshore waters could act as artificial reefs to create new marine ecosystem habitat. Components may be specifically designed to mimic the structure and function of natural reef formations. These unique artificial reef components could be incorporated into the beach stabilization structure design at locations where increased marine ecosystem habitat is desired. For example, precast modular units placed in sheltered areas could provide new microhabitats that could be utilized by a variety of marine species.

Beach nourishment projects with sand retention structures have been proven successful in other locations in Hawai'i, such as at Iroquois Point on O'ahu and Stable Road Beach on Maui. Iroquois Point (constructed in May 2013) included a beach nourishment of 85,000 cy of sand stabilized with nine T-head groins. Even after a recent El Niño winter, the sand appears to be well maintained on the beach. The rock groins were designed to serve as substrate and habitat for reef fish and marine life. A photograph of Iroquois Point taken in February 2016 is included in Figure 1-12. The Stable Road Beach Restoration began with pilot stabilization structures made of sand-filled geotubes. These tubes were later replaced by permanent four stub groins in 2014. The stub groins appear to have retained the sand on the beach to the present (Figure 1-13).

Although the stabilization structures will slow erosion at Kahana Bay, sand re-nourishment may still be needed following the initial construction of the structures and beach nourishment. A combination of SLR, recreational use, and storms will continue to erode sand from the beach, albeit slower than the current rate of erosion. The nourished beach will be considered adequate for protection of shoreline infrastructure as long as the beach is not susceptible to being lost in one storm. A beach monitoring plan would be implemented to indicate when the relevant trigger would be reached, indicating that nourishment is necessary. As presented in Section 1.4 and Table 1-1, the estimated erosion rate for a wide, undeveloped beach condition is 0.9 ft/yr. This represents a conservative value to estimate future erosion, since the beach widths achieved by a nourishment project would be combined with the sand retention provided by beach stabilization structures. Based on estimated 0.9 ft/yr rate of beach loss, re-nourishment would be necessary after 30 years (County of Maui, 2016).

Source: Google Earth, 2017

Figure 1-12: Iroquois Point Beach Nourishment and T-Head Groin Stabilization Project



Source: Google Earth, 2018

Figure 1-13: Stable Beach Restoration Project with Stub Groins

1.7 CONSTRUCTION METHODS

1.7.1 Construction Sequence

The overall construction sequence depends on the beach width available, as construction of coastal structures requires beach access and sufficient area to stockpile armor stone and maneuver construction equipment. It will be necessary to first nourish the beach to create stockpile areas and space for construction equipment. As the construction moves from south to north, new construction access points from the roadway will be utilized and additional stockpile locations on the widened beach will be created.

There are several public access points along the Kahana Bay coastline. To initiate construction, construction equipment (e.g., dump trucks, backhoes, excavators or similar machines) will access the beach from the roadway through the public access way located between Kahana Beach Resort and Sands of Kahana properties (Figure 1-14). The beach will be restored in phases along the length of the bay; as the beach is nourished and stabilized, the construction equipment will have sufficient width to traverse further along the coastline. Each section would be constructed in a step wise progression, from south to north, until the entire shoreline project area is nourished with sand held by retaining structures. Construction equipment will primarily be limited to the nourished portions of the beach and the staging access and routes will be clearly indicated during construction activity.

Beach sand will be retrieved from borrow areas located offshore and a barge or pipeline will be used to transport the sand to shore. Depending on how the sand is transported (i.e., hydraulically or mechanically), a sand/water slurry may need to be dewatered prior to placement along the beach profile. Earth moving equipment will build a temporary settling basin on or near the beach if hydraulic pumping is used to transport sand. Due to the presence of shallow reef areas, barge access from the ocean to the beach may not be feasible.

Beach sand fill will be transported along the beach and graded to the designed beach profile using construction equipment. Structures will be constructed starting from the land and extending into the sea. The equipment will drive over the portion of the structure constructed above water to place material seaward until the structure is complete. Silt-curtains or similar barriers will be placed around structures during construction to protect water quality from potential contaminants. A water quality monitoring plan approved by the State Department of Health, Clean Water Branch (DOH-CWB) will be implemented pre-, during, and post-construction to ensure water quality is protected and to address any issues that may arise.

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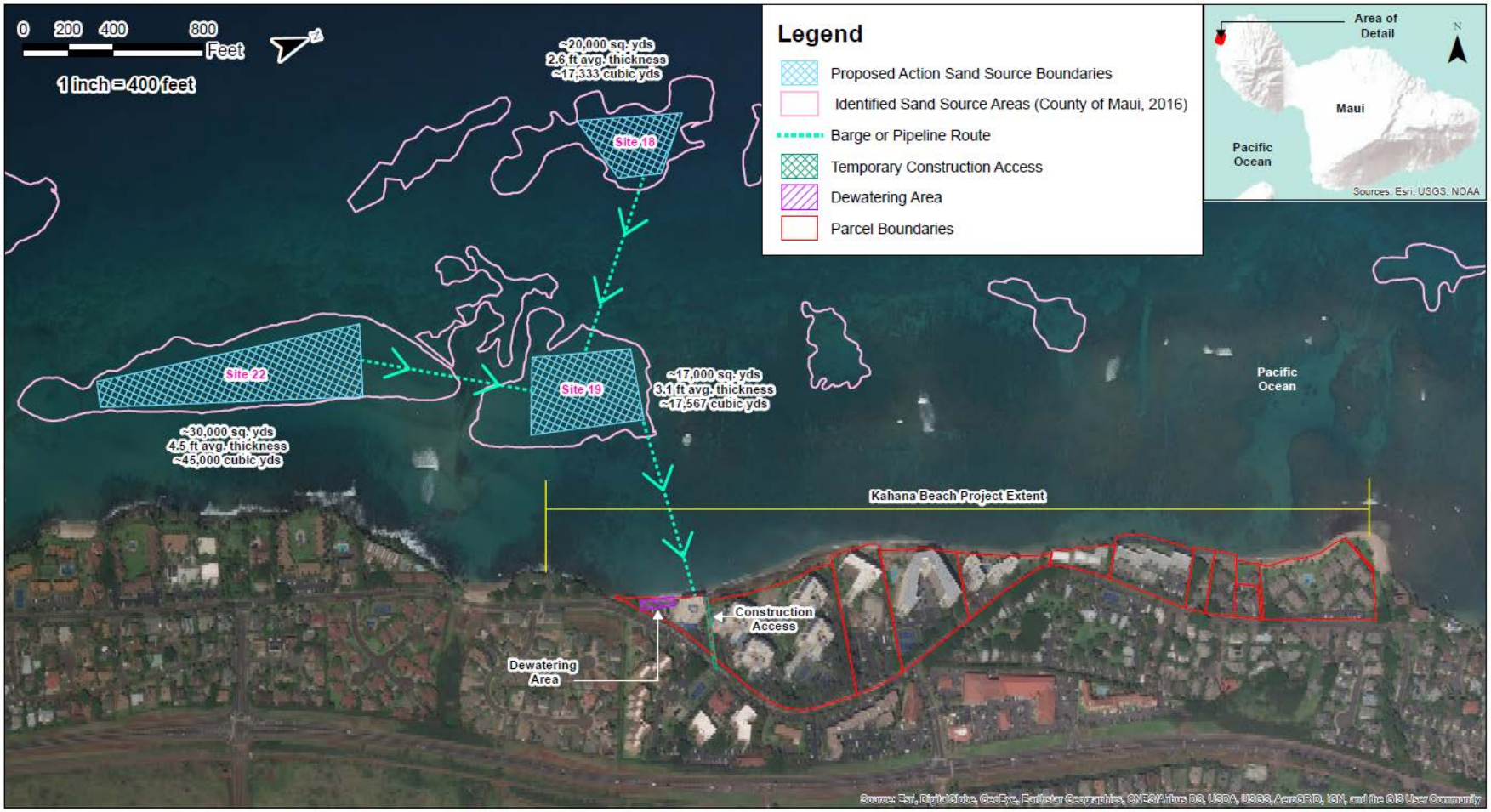

Figure 1-14: Proposed Action Construction Methods Concepts

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1.7.2 Sand Sources

Extensive investigation, sampling, and analyses of available sand sources near the project area were performed and recorded in the 2016 Feasibility Study (County of Maui, 2016). The three sand sources best identified as sand source sites were Sites 18, 19, and 22. Based on the feasibility of dredging within these areas, more realistic proposed dredge limits were delineated within each sand patch (Figure 1-14). Grain size analyses on sand from Sites 19 and 22 were performed, and the sand was found to be compatible with the native beach sand (Figure 1-15).

1.7.2.1 *Offshore Site 18*

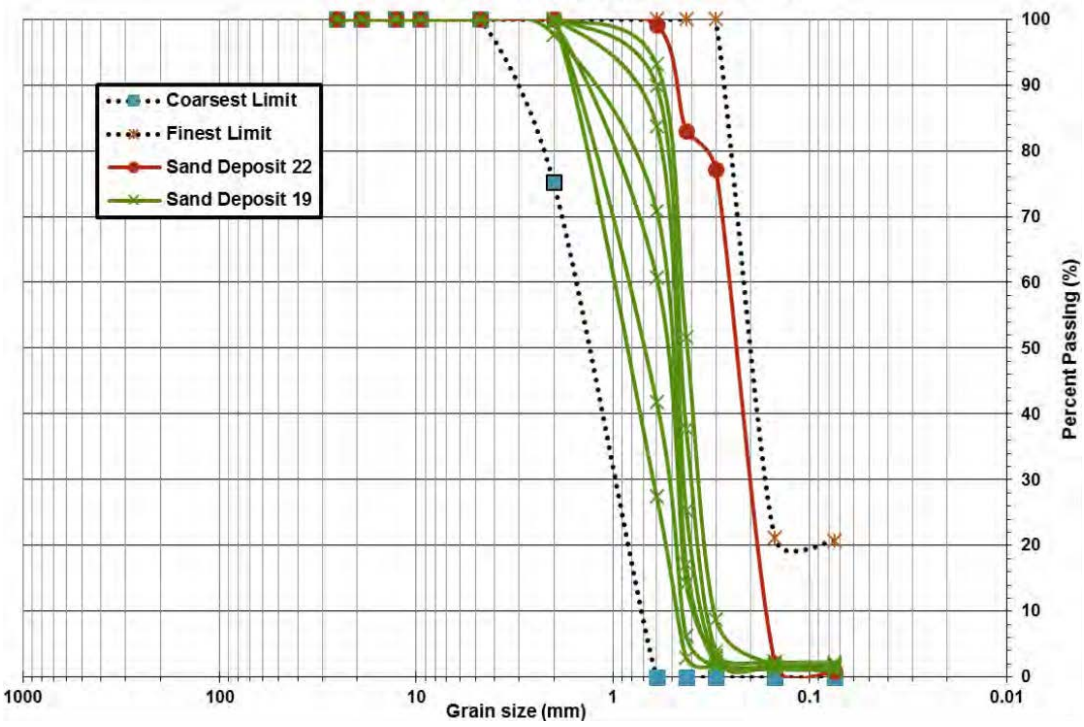
Sand source Site 18 is located approximately 2,000 ft offshore and is estimated to contain 17,000 cy of sand (Figure 1-14). Site 18 is the furthest offshore sand deposit considered for the nourishment.

1.7.2.2 *Offshore Site 19*

Sand source Site 19 is located nearshore approximately 500 ft offshore (Figure 1-14) and contains approximately 17,000 cy of sand. The grain size distribution of sand deposit 19 is shown in Figure 1-15.

1.7.2.3 *Offshore Site 22*

Offshore sand Site 22 contains approximately 45,000 cy of sand (Figure 1-14). Site 22 is located approximately 400 ft offshore. The grain size distribution of sand deposit 22 is shown in Figure 1-15.



Source: County of Maui, 2016

Figure 1-15: Comparison of Offshore Sand Deposits 19 and 22 to Native Sand

An additional sand field investigation was conducted in September 2018 to confirm the results of the 2016 County of Maui study performed with the intention to verify that the offshore sand deposits are compatible to the current beach sand at Kahana Bay. Composite sand samples were collected from various areas around the project site. Each composite sample was collected to represent several sections of the beach: approximately 25 percent (%) of the sample was taken from the back beach, 25% from the foreshore, 25% from the berm or waterline, and 25% from the nearshore. The samples were then homogenized to create a single composite sample. The six sites from which sand was collected are presented on the map in Figure 1-16. For each site, two pictures were taken: one from the collection site and one of the representative sand sample (Table 1-2; Photos 1-12)

Offshore sand samples (#2 - #13) were collected in October 2018 from approximate locations along a transect that extended from Pohaku Beach park through offshore Sand Sites 19 and 18 (Figure 1-16). Sand Sample #2 was collected from the furthest location offshore, and subsequent samples were collected sequentially as the sampler swam toward the shore, all the way to the sand in the shore break fronting Pohaku Park (Sample #13). One sample (#14) was collected from Hale Mahina Park. Photographs of sand samples collected in October 2018 are included as Photos #13-24 in Table 1-3. In general, sand grain size increased as proximity to the shoreline decreased.

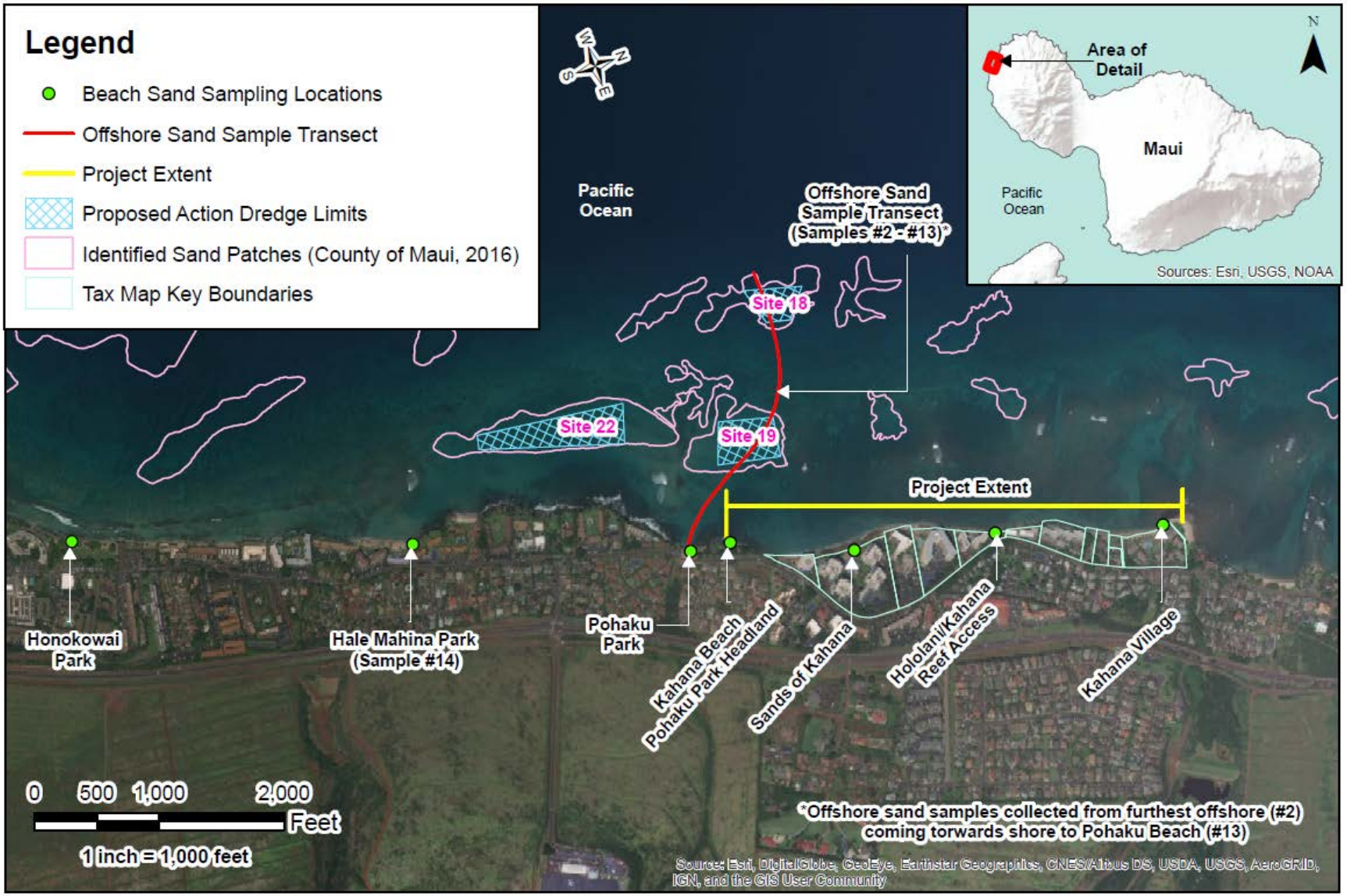


Figure 1-16: Sand Sampling Location Map

Table 1-3: Photographs of Sand Sampling Sites and Sand Samples

Photo #1 (9/20/18): Kahana Village Sampling Site facing south.

Photo #2 (9/20/18): Hololani/Kahana Reef Access sampling site looking southeast.

Photo #3 (9/20/18): Sands of Kahana sampling site looking south.

Photo #4: Kahana Village Sand Sample. Grid size 1/10 inch.

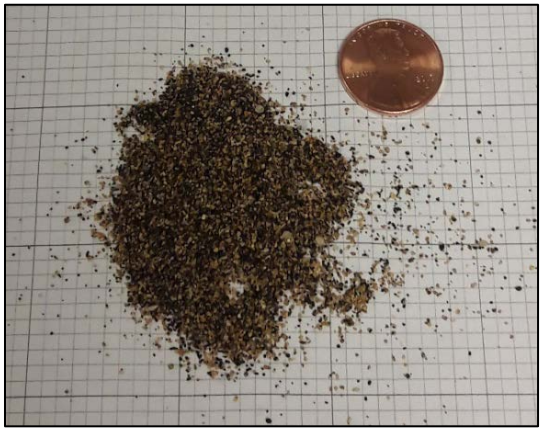


Photo #5: Hololani/Kahana Reef Access sand sample. Grid size 1/10 inch.

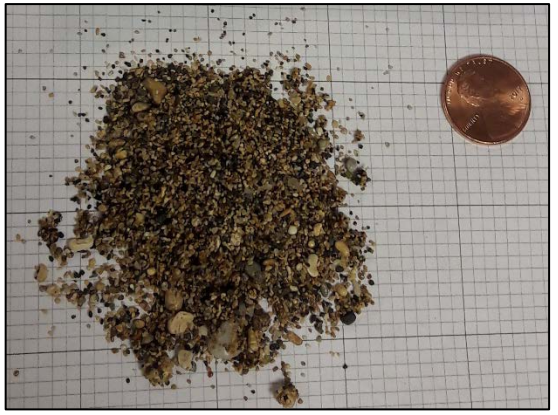


Photo #6: Sands of Kahana sand sample. Grid size 1/10 inch.

Photo #7 (9/20/18): Kahana Beach Pohaku Park Headland sampling site looking north.

Photo #8 (9/20/18): Pohaku Park sampling site looking north.

Photo #9 (9/20/18): Honokowai Park sampling site looking south.

Photo #10: Kahana Beach Pohaku Park Headland sand sample. Grid size 1/10 inch.

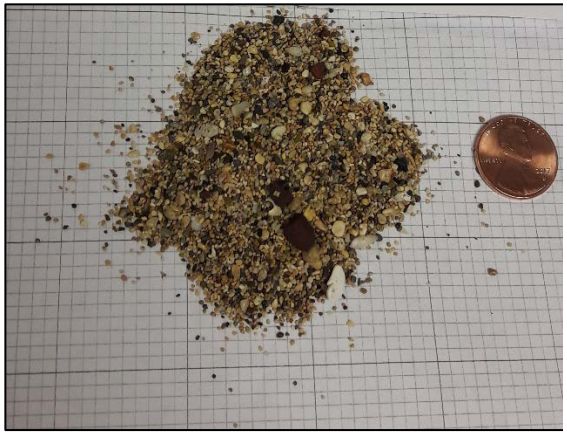


Photo #11: Pohaku Park sand sample. Grid size 1/10 inch.

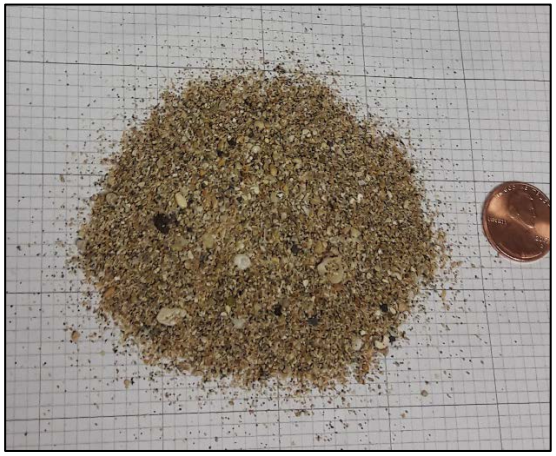


Photo #12: Honokowai Park sand sample. Grid size 1/10 inch.

Photo #13: Offshore Sand Sample #2 (farthest sample collected from offshore). Grid size 1/10 inch.

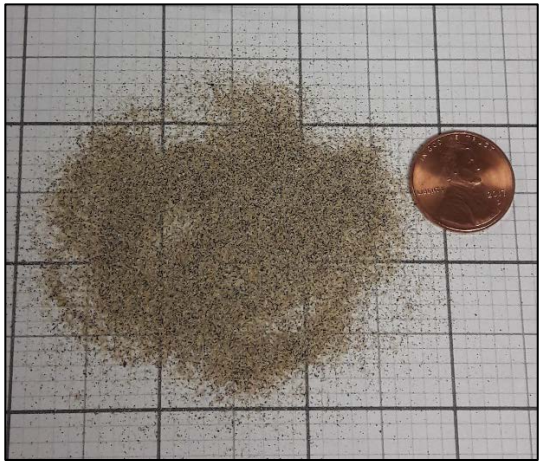


Photo #14: Offshore Sand Sample #3. Grid size 1/10 inch.

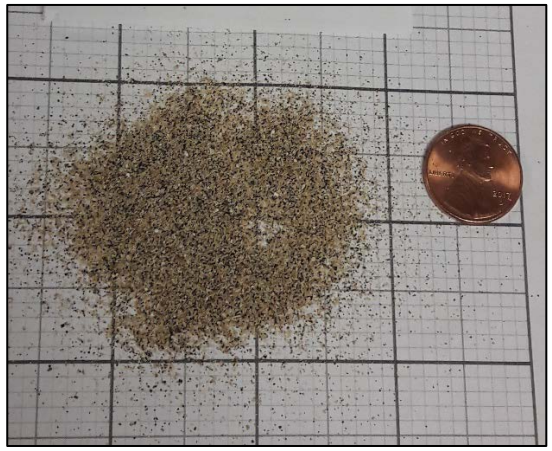


Photo #15: Offshore Sand Sample #5. Grid size 1/10 inch.

Photo #16: Offshore Sand Sample #6. Grid size 1/10 inch.

Photo #17: Offshore Sand Sample #7. Grid size 1/10 inch.

Photo #18: Offshore Sand Sample #8. Grid size 1/10 inch.

Photo #19: Offshore Sand Sample #9. Grid size 1/10 inch.

Photo #20: Offshore Sand Sample #10. Grid size 1/10 inch.

Photo #21: Offshore Sand Sample #11. Grid size 1/10 inch.

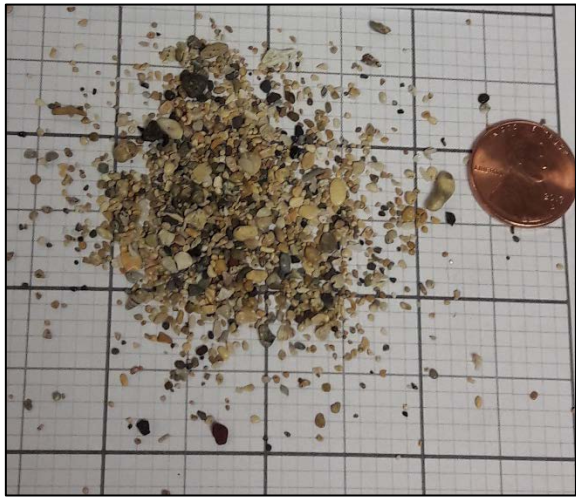


Photo #22: Offshore Sand Sample #12. Grid size 1/10 inch.

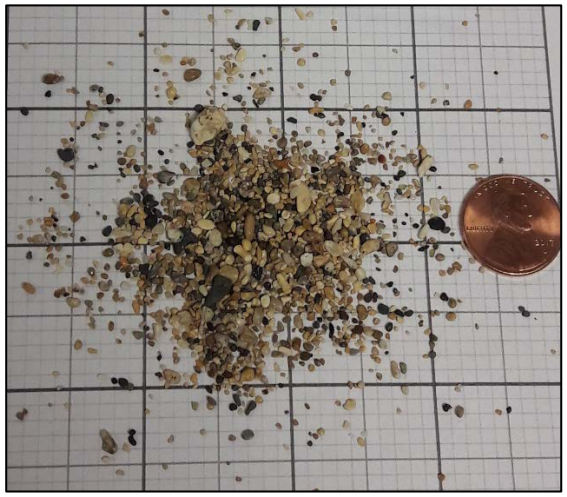


Photo #23: Offshore Sand Sample #13 (nearest sample collected from offshore). Grid size 1/10 inch.

Photo #24: Sand Sample #14 – Hale Mahina Park. Grid size 1/10 inch.

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1.7.3 Offshore Dredging

Offshore dredging of sand deposits will be accomplished using either hydraulic suction pumping or mechanical dredging. Both possible dredging methods and related construction procedures are described below.

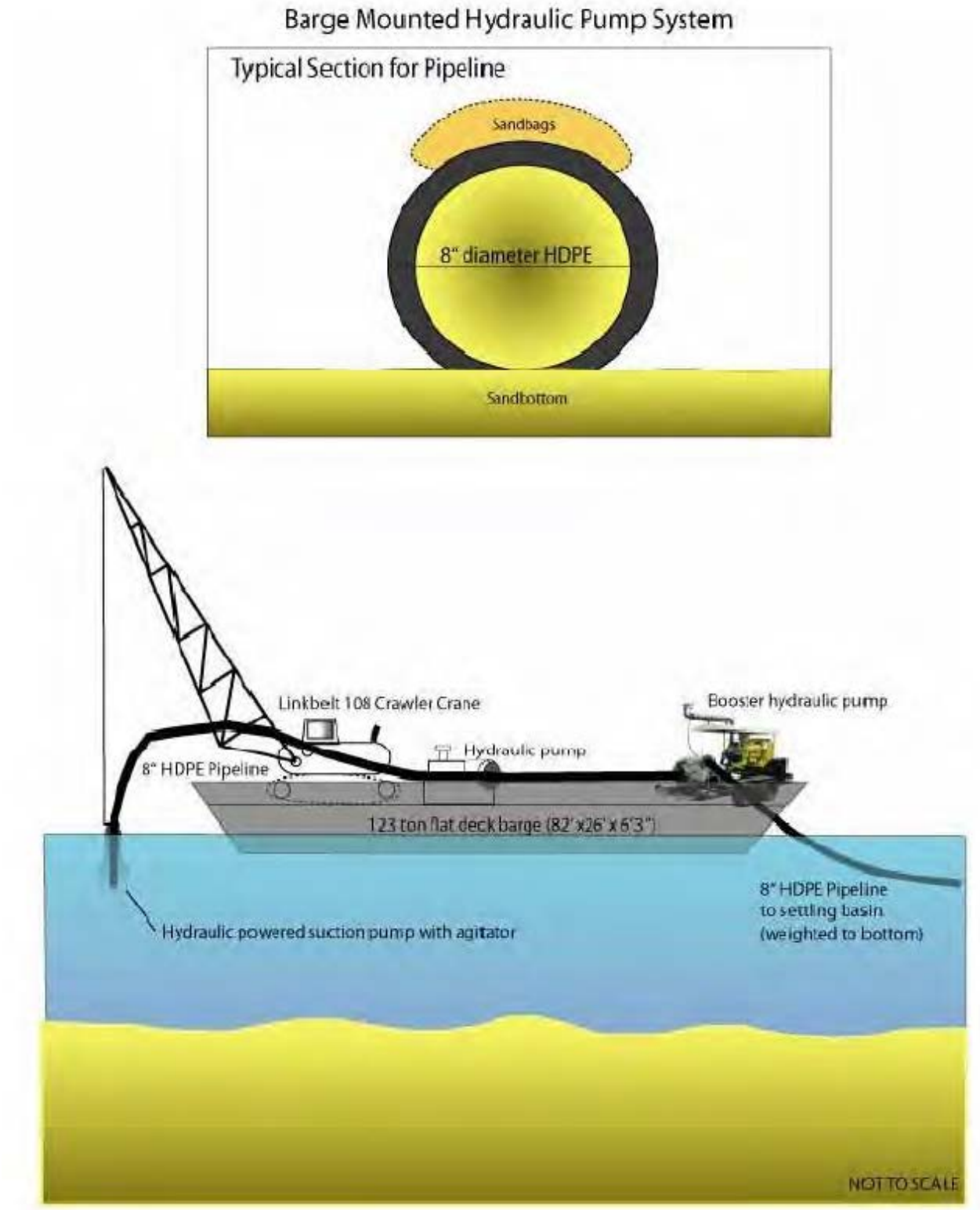
1.7.3.1 *Hydraulic Suction Dredge*

A hydraulic suction dredge system would entail staging a hydraulic pump system on a barge that is anchored above the sand deposit (Figure 1-17) using a booster pump with a downsized hose to maintain adequate pressure and flow velocities. Sand is pumped into a rigid suction pipe through a pipeline to shore. The wind and wave climate off of Kahana Beach could pose some construction challenges, depending on the size and type of dredging equipment used. These challenges could result in delays or lower production rates but are not expected to affect project feasibility. Timing the work to occur in low swell seasons and avoiding periods of inclement weather are key elements of a project of this nature.

In hydraulic suction dredging, submersible sand slurry hydraulic pumps are lowered from overhead and suspended above the seafloor. A barge and crane are used to position the pump. The barge is positioned using mooring and spuds, and the pipeline and hydraulic lines must be maneuvered with each positioning. A jet ring using a water pump and an additional 4-inch hose is sometimes used to increase the proportion of sand in the slurry.

The benefits of using sand slurry pump is that it is very precise and can be used with a crane-tip Global Positioning System (GPS); however, operating the sand slurry pump is very labor intensive, requiring many hired personnel. Other drawbacks are that the pump must be held at a relatively constant height above the sea floor and the barge cannot withstand waves greater than one to two feet. Thus, the dredge depth capability is limited to the suction head pipe length.

The sand search confirmed the feasibility of constructing a pipeline from the sand deposits 19 and 22 to the shoreline near Pohaku Park. Potential submarine channels sufficiently wide and free of obstructions to route the submerged pipeline were identified in the study from each submerged sand deposit (County of Maui, 2016). An additional sub-bottom profile and a scuba survey would be performed to finalize the pipeline routes if this method is used.



Source: DLNR, 2010

Figure 1-17: Theretical Barge-Mounted Hydraulic Pump System

1.7.3.2 *Mechanical Dredging*

Mechanical dredging consists of mechanically scooping and lifting sand from the seafloor using an excavator or a clamshell bucket attached to a crane on a barge. Bucket sizes can vary from 1 cy to 20 cy and would be left open to dewater as the bucket is lifted out of the water. Silt curtains would be installed around the dredge area to prevent water pollution from fine particles. The excavated sand/sediment is deposited on a second barge, which transports the sand to the shore. The barge docks, and the sand is loaded into dump trucks to transport the material to the desired location.

The sand offloading barge could dock at many potential locations. A temporary trestle may be constructed in the location of a stabilization structure, for example. The boat ramp at the Kuleana property may also provide a feasible offloading location. Alternately, a landing craft may be used to directly offload sand to the beach.

Advantages of mechanical dredging are that pipelines and onshore dewatering areas are not needed. This reduces the possible impact to marine benthos as well as the construction footprint in the nearshore area where a dewatering pit would be placed. Turbidity from dredging could be reduced by using an environmental clamshell bucket, which is an industry best practice and has been used to minimize turbidity during dredging of harbor channels in Hawai'i. Environmental clamshell buckets typically have tighter seals and overlapping sides. These buckets are designed to minimize sediment loss from within the bucket, re-suspension at the dredge site, and water entrainment with each grab. A disadvantage of mechanical dredging is that the large equipment needed can be restricted by water depth of the sand recover depth (DLNR, 2010). In addition, channels need to be deep enough to accommodate the second sand-holding barge's path to the shoreline.

1.7.4 Construction Schedule Considerations

The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) suggest that beach nourishment projects not be conducted during peak coral spawning or when marine animals are nesting or birthing. As these sensitive life-cycle activities occur during the spring and early summer, the project's schedule would avoid work during these time periods. These considerations will be taken into account when developing the construction schedule.

1.7.5 Construction Costs

The total project cost is estimated to be $8,000,000; however, actual costs could vary significantly. The project is being funded entirely by private funds.

1.8 ADDITIONAL STUDIES

Additional studies anticipated for the Environmental Impact Statement (EIS) include:

- Benthic Survey and Reef Delineation;
- Cultural Impact Assessment;
- Archaeological Inventory Survey;
- Terrestrial Flora and Fauna Assessment; and
- Traffic Assessment and Parking Analysis.

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2 ALTERNATIVES TO THE PROPOSED ACTION

2.1 FORMULATION OF THE PROPOSED ACTION ALTERNATIVE

Several beach management plans have been proposed for the Kahana Bay area. The plans generally outline the problems and give overviews of possible management alternatives for the area, drawing on input from the local community, regulatory agencies, and stakeholders. The regulatory environment, coastal processes, shoreline history, and local and agency interests in the area identified the key management consideration as beach restoration over shoreline armoring.

Given this consideration, concept designs were developed for the following erosion mitigation tasks at Kahana Bay:

- Restoration of Kahana Beach through placement of additional sand (i.e., beach nourishment). This is a technique supported by the State and County regulatory agencies;
- Constructing beach stabilization structures to protect the nourished sand site and reduce the need for re-nourishment in the future; and
- Harvesting nearshore beach compatible sand off of Kahana Beach.

The following alternatives are introduced for consideration only. Each alternative will be evaluated thoroughly and a detailed alternatives analyses will be included as part of the Draft EIS (DEIS).

2.2 NO ACTION ALTERNATIVE

The No-Action Alternative provides a benchmark against which to compare the magnitude of environmental effects of the proposed alternative. It provides a reasonable baseline for assessing the impacts of an "action" alternative.

If no action is taken to protect the Kahana Bay shoreline, the buildings and infrastructure along the Kahana Bay shoreline remain at risk to inundation and wave damages from elevated water levels during storm events. Larger storms could erode significant portions of shoreline where no seawall exists. Where seawalls do exist, the shoreline may hold for an extended period; however, where seawalls end, shoreline erosion may be accelerated. If unmaintained, seawalls may eventually deteriorate and cease to protect the landward property

Under future no action conditions, the stretch of Kahana Bay may become an increasingly inaccessible, rocky beach with little to no sand. Residential buildings, recreation areas, properties, and resorts would be damaged or destroyed. The loss of the iconic Kahana Bay in West Maui could dampen tourism and the economy in the area.

2.3 OTHER ALTERNATIVES

The feasibilities of other alternatives were considered. Some alternatives considered are depicted in Figure 2-1 to visualize how they would work within the project area. Combinations of alternatives were also considered; however, each individual alternative is described for simplicity.

2.3.1 Beach Fill Without Retaining Structures

Beach nourishment/fill would provide the recreational and shoreline protection benefits of moving the wave breaking zone seaward due to the creation of a wider sandy beach. Beach fill in the project area would occupy the approximate footprint shown in Figure 2-1.

Beach nourishment without retaining structures is less costly to complete and less challenging to design, construct, and permit than constructing retaining structures for the sand. Sand placement without retaining structures avoids potential impacts associated with the placement of beach stabilization structures, use of geotextile materials, or excavation for construction.

Sand placed as fill would be at risk of moving down drift and along the shore in response to waves, wind, and currents. The longshore and cross shore transport of sand could result in very high erosion rates and large losses of sand placed as fill for the widened beach. These forces may have contributed to the removal of the sand along the Kahana Beach and/or its deposition on the seafloor just offshore at sand source areas #19 and #22. The primary disadvantage of this option is the limited project longevity and potential for having to re-nourish the beach with sand fill approximately every six months to two years, depending on storm events and natural erosion conditions.

2.3.2 Dune Restoration

Dune restoration at the back of the beach could serve as a reservoir of surplus sand during high wave events and winter storms (Figure 2-1). Sand stockpiled along the backshore between the beach crest and the vegetation line can augment the sand on the beach as well as provide a buffer to wave action during extreme weather events. Dune restoration implemented by itself would require periodic replenishing and restoring of sand as wave action would continually pull sand onto and away from the beach.

2.3.3 Alternative Sand Sources

Extensive investigation, sampling, and analyses of available sand sources near the project area were performed and recorded in the 2016 Feasibility Study. A comprehensive report of other sand sources is included in the 2016 Feasibility Study (County of Maui, 2016; Figure 2-1).

Figure 2-1: Some Alternatives to the Proposed Action

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2.3.4 Groin Design

2.3.4.1 *Groin Shape and Structure*

Groin length depends on characteristics of offshore environment (i.e., marine substrate), beach sand availability, and aesthetic considerations of number of structures. Longer groins have the potential for wider, stable beaches and require less frequent placement along a horizontal shoreline.

2.3.4.2 *Geotextile Tube Groins*

Geotextile tube groins are made from high-strength geosynthetic fabrics that allow water to flow through pores while retaining the filling materials. Geotextile tubes are generally low in construction cost, equipment, and time, and do not require extensive skill to assemble. Geotextile tubes are good alternatives to hard coastal structures and are easy to remove if needed. The drawbacks of using geotextile tubes are that they are less able to sustain wave action than hardened and permanent groin structures (Lee et al., 2014).

2.3.5 Temporary Shoreline Protection

Temporary, non-emergency shore protection has been used to protect landscaping, boardwalks, and pool complexes at Kahana while permanent solutions are planned and designed, or until the erosive condition passes. The allowable installation term set forth by DLNR for temporary shore protection is typically three years or less. The most commonly utilized form of temporary shore protection is stacks of large geotextile sand bags. Geotextile fabric draped over an erosion scarp ("erosion skirt") has also been successful at slowing the progress of erosion in areas of low wave energy.

Temporary shore protection is often less expensive than permanent shore protection. It can be deployed and removed easier than permanent shore protection. If carefully implemented, temporary shore protection can also have less of an environmental impact than permanent shore protection.

Temporary shore protection is often unsightly and unnatural in appearance. There are minimal design guidelines for temporary shore protection, and performance in large wave events such as hurricanes or tsunamis is unpredictable. As their namesake implies, temporary shore protection projects have the tendency to degrade rapidly, and often require considerable maintenance in both the mid-term and long-term. Thus, temporary shore protection was not chosen as a preferred alternative at Kahana Bay (County of Maui, 2016).

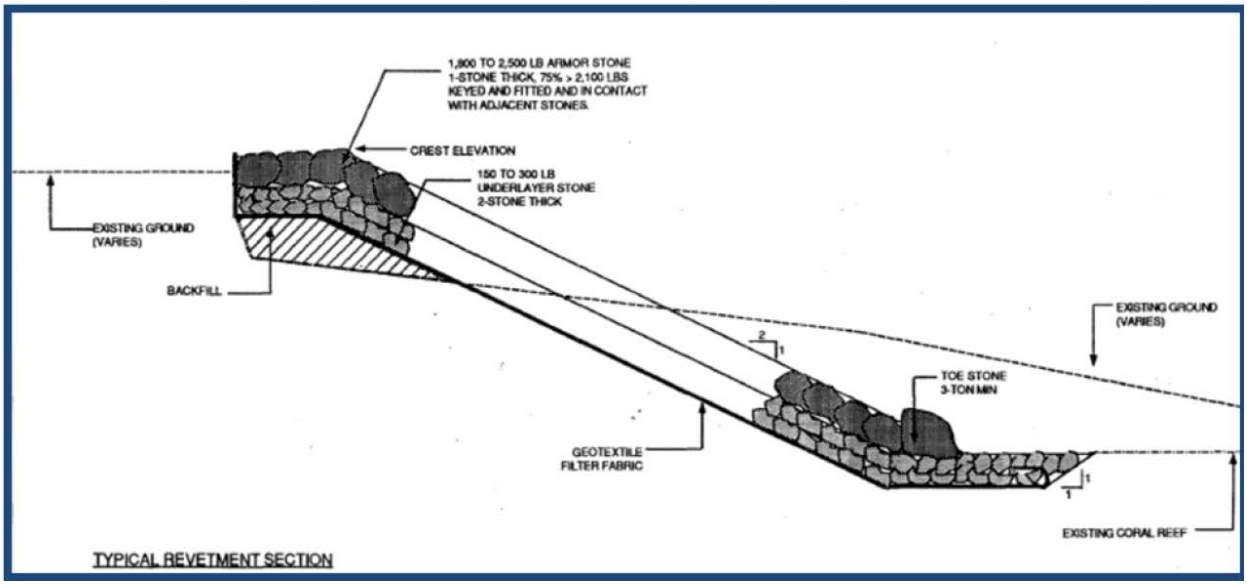
2.3.6 Permanent Shore Protection

Permanent shore protection and seawall armoring uses hard, durable materials to fix the shoreline at desired locations (Figure 2-1). Permanent shore protection measures considered were revetments, seawalls, and breakwaters.

2.3.6.1 *Rock Revetment*

A rock revetment consists of one layer of armor stone and two layers of underlayer stone placed onto geotextile filter fabric (Figure 2-2). The armor layer would be comprised of stones designed to be stable under the impact of elevated water levels and associated storm waves. The underlayer stone

would be sized to resist displacement through the armor layer and provide a relatively even surface for placement of armor stone. The geotextile filter fabric would confine the foundation material under the revetment, which could include hard substrate and/or unconsolidated sediment. The revetment toe would either be notched into hard substrate (if existent) or have a sacrificial design in which toe scour would be anticipated. The revetment crest elevation would be determined through performance criteria required for the project along with the elevation of the existing backshore and upland development (County of Maui, 2016).

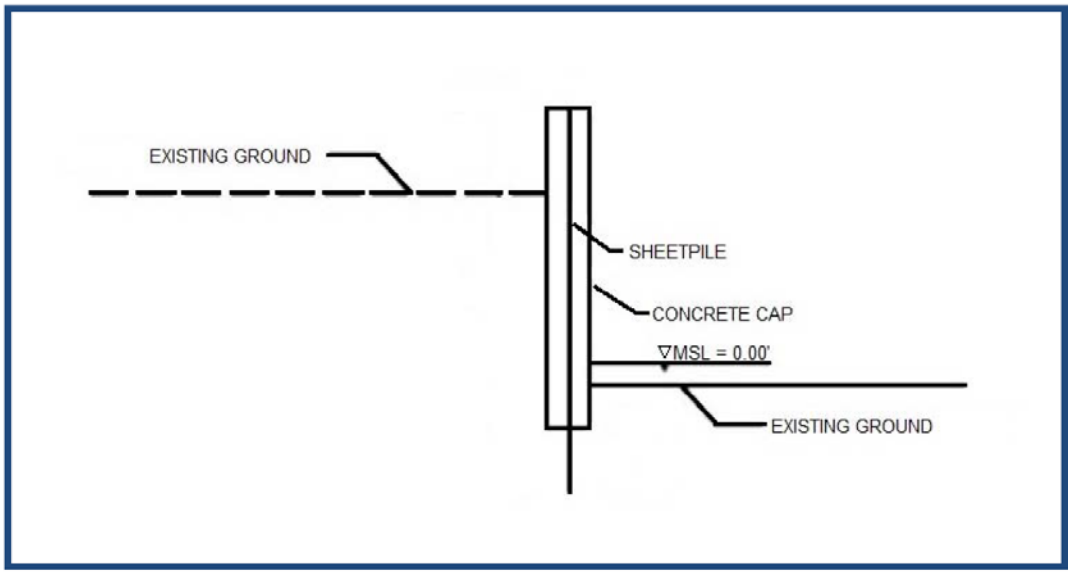


Source: County of Maui, 2016
Figure 2-2: Section View of a Rock Revetment

2.3.6.2 *Seawalls*

Seawalls, such as reinforced concrete seawalls and sheet pile seawalls, are widely used permanent shoreline protection methods. One type of seawall that can be constructed is a sheet pile seawall (Figure 2-3), which consists of sheet piles either driven to refusal into hard substrate or to a depth of penetration that would provide the necessary earth pressures for it to remain stable under design conditions. A concrete cap is formed and poured in-place in the upper portion of the sheet pile wall to provide added strength and resistance to corrosion. The concrete cap extends from the crest of the sheet pile seawall to below existing ground on the oceanside of the structure. Similar to the revetment, the crest elevation of a seawall would be determined through performance criteria required for the project along with the elevation of the existing backshore and upland development (County of Maui, 2016).

Advantages of seawalls are that they are relatively inexpensive and highly durable, making them widely used and effective permanent shoreline protection methods. Seawalls also occupy smaller footprints compared to revetments. Disadvantages of seawalls are that they do not provide any wave dissipation; therefore high wave reflection along the seawall occurs, which can erode adjacent properties or scour loose materials such as sand fronting the seawall more quickly. Natural beach aesthetic may be lost and access to the shoreline can also be hindered by the seawall itself.



Source: County of Maui, 2016
Figure 2-3: Section View of a Sheet Pile

2.3.6.3 *Offshore Breakwater*

Offshore breakwater systems use large stone structures or rubble mounds placed offshore to deflect incoming waves and create stable pocket beaches between headlands (Center for Coastal Resources Management, 2017). One major disadvantage of breakwaters is that they do not absorb all wave energy due to gaps in the breakwater, which can still result in moving sand. In addition, breakwaters can disrupt surf breaks in the area and can be visually unappealing.

2.3.7 Dewatering Methods

2.3.7.1 *Concrete Lined Stormwater Retention Basin*

An existing, concrete lined stormwater retention basin is located on the mauka side of Lower Honoapi'ilani Road (Figure 2-1). Excess storm water flows by gravity over a weir, through the settling basin, and under the roadway via a concrete box culvert that discharges into the ocean. The culvert and its headwall are surrounded be chain-link fencing for safety purposes. The concrete lined settling basin is purposely designed to be accessible to large trucks and heavy equipment so that accumulated sediment can be removed and the basin maintained after large storm events or at regular intervals.

Since the basin is accessible from the ocean side through the concrete box culvert under the road, it was considered as a potential de-watering basin for dredged sand. Trucks and heavy equipment could readily access the basin given its design and orientation; however, this option would have associated infiltration and water quality concerns associated with runoff being discharged into the ocean. Additionally, contingencies would have to be explored in the event of a heavy rainstorm or upland rain events. Use of the basin may necessitate traffic interruptions while heavy equipment, such as excavators, transport dried sand across the roadway in order to place the fill material on the beach or in stock pile areas for use further up the beach. While such operations could occur during periods of

low traffic flow, such as at nighttime, it could cause traffic impacts even if using flagmen or temporary placed signal lights.

2.3.7.2 *Geotubes*

Another strategy for retaining sand would be to directly fill large geotextile tubes (geotubes) with the dredged material. The fluid portion of the slurry seeps out of the geotextile fabric and seeps out of ports in the top of the tube, leaving only the sediment contained within the geotextile. There are several variations of this method that could be employed.

Once filled, the geotubes could be arranged to create a settling basin, essentially a more robust version of the conventional method in which the water/sand slurry flows along the length of the basin allowing sediment to fall out of suspension (Figure 2-4). The geotextile used to form the temporary settling basins would be removed as a part of the final beach grading to leave the sand contained within it in place.

Source: County of Maui, 2016
Figure 2-4: Geotube Use in Beach Nourishment Projects

2.3.7.1 *Crib Wall*

Crib walls are gravity retaining walls constructed from a series of hollow stacked unit systems and filled with porous soil or rock to allow for easy drainage. Crib walls are easy to assemble and disassemble by hand and are durable and easy to arrange. A concrete crib wall detention basin at the southern end of Kahana Beach was considered, however, crib walls are not very economical for short lengths and pre-cast concrete unit blocks would need to be purchased from a manufacturer and transported to the site, increasing costs.

2.3.8 Managed Retreat

Maui's historic coastal permitting and site development practices did not account for site substrate, structural design or construction materials, or shoreline erosion rates and coastal dynamics. Since the 1970s, Maui's average lot depth shoreline setback policy resulted in many buildings being constructed less than 40 ft from the shoreline. In 2003, the County of Maui implemented a new setback policy based on site-specific erosion rates for any new development along the shoreline. Since that time, new buildings have been built out of the setback zone. The 2003 policy incorporates the idea of managed retreat where buildings and infrastructure can be relocated over time in recognition of the planned obsolescence of structures.

Managed retreat from the shoreline can be an effective strategy to adapt to sea level rise and eroding coastlines. Managed retreat or adaptive realignment involves the landward movement or relocation of buildings and infrastructure over time. This planned obsolescence approach allows for the incremental relocation of structures as they reach the end of their useful lifespan and have to be replaced or built anew. The framework directs new investment and construction to areas inland, outside and above flood or erosion prone areas. Adaptive relocation is also supported by the Federal Emergency Management Agency (FEMA) through its disaster mitigation program, which offers funds to purchase heavily damaged, formerly developed properties after a major hurricane so the land may be retired to open space that buffers major coastal storms and flooding. An analysis of managed retreat as an alternative to the proposed action would be included in the DEIS.

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3 REGULATORY CONTEXT

3.1 DEPARTMENT OF THE ARMY, SECTION 10 AND SECTION 404

Department of the Army (DA) permits are issued by the U.S. Army Corps of Engineers (USACE) pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S. Code [USC] Section [§] 403) and Section 404 of the Clean Water Act (CWA) of 1972 (33 USC 1344). All work or structures that obstruct or alter navigable waters of the U.S will require a DA permit pursuant to Section 10. All actions that involve the discharge of dredged or fill material into waters of the U.S. will require a DA permit pursuant to Section 404. As the proposed project will involve work in the navigable waters of the U.S. and will result in a discharge of fill material including placement of sand in the waters of the U.S., a DA permit pursuant to both Section 10 and Section 404 will be required.

3.2 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Section 402 of the CWA requires a National Pollutant Discharge Elimination System (NPDES) authorization any time construction activity covers an area one acre in size or greater. In this case, the project area is anticipated to be on approximately four acres. The NPDES is intended to prevent pollutants from reaching coastal waters as a result of storm water runoff. Information required to obtain a permit include project specific details and construction drawings, receiving state water information, storm and non-storm water discharge, a Best Management Practices (BMP) Plan, and Post-Construction Pollutant Control Measures. The permit application procedure requires the applicant to show that the necessary BMPs will be in effect during the construction phase, and that these BMPs are sufficient to prevent pollution resulting from a 10-year, 1-hour, rain event. An NPDES permit would be required.

3.3 STATE WATER QUALITY CERTIFICATION

The CWA is the key legislation governing surface water quality protection in the U.S. Sections 401, 402, and 404 of the Act require permits for actions that involve wastewater discharges or discharge of dredged of fill material into waters of the United States. In Hawai'i, the U.S. Environmental Protection Agency (EPA) has delegated responsibility for implementing the Act to the DOH-CWB. Actions that may constitute fill into waters of the U.S. include:

- Removal of sand from the sand source areas;
- Placement of sand seaward of the shoreline and below the MHHW line; and
- Construction of sand retaining structures.

The Water Quality Certification (WQC) will require submission of an Applicable Monitoring and Assessment Plan (AMAP) to the DOH-CWB, which will detail the water quality sampling and testing necessary during construction and BMPs that will be used to prevent contamination of coastal waters. A WQC will be obtained for the project.

3.4 STATE COASTAL ZONE MANAGEMENT CONSISTENCY

In 1978, Hawai'i enacted the CZM Act, Hawai'i Revised Statutes (HRS) 205A which adopted the Federal Coastal Zone Management Act of 1972 (CZM, 1977). Section 307 of the federal CZM law requires that activities and development projects affecting any coastal use or resource are to be undertaken in a manner that is consistent with the state's CZM program and its enforceable policies. This can include privately funded activities that require a federal permit or federal license that affects coastal uses and resources. This is achieved by making a CZM consistency determination. In Hawai'i, the State Office of Planning (OP) CZM Program is responsible for making CZM consistency determinations. When the CZM consistency application is determined to be complete by OP, a public notice will be published in *The Environmental Notice* distributed by the DOH Office of Environmental Quality Control (OEQC) and the public will be provided the opportunity to review and comment on the proposal. A CZM consistency determination application would be submitted to the State CZM program at OP after completion of the required permits, supporting documents, including an environmental review.

3.5 STATE CONSERVATION DISTRICT

The Board of Land and Natural Resources (BLNR) regulates land uses in the State Conservation District. HRS, Chapter 183C governs land use in the Conservation District and Hawai'i Administrative Rules (HAR), Title 13 details the administration procedures for those land uses. The identified land use for the project is P-16 Beach Restoration. For sand placement in excess of 10,000 cy, such as the 50,000-100,000 cy proposed, a Conservation District Use Permit (CDUP) approved by the BLNR (i.e., Board), is required. As specified in HAR §13-5-24(c)(4), the proposed use is permissible in the Resource subzone. As part of the CDUP application process, an informational hearing is required to be held on the island upon which the action or use is proposed. The BLNR hearing and decision making that occur on O'ahu are publicly noticed to encourage public input and comment. A CDUP would be required for the proposed project.

3.6 COUNTY SPECIAL MANAGEMENT AREA

The proposed action, or parts thereof, are anticipated to occur landward of the shoreline and thus within the SMA of Maui County (Figure 4-4). The proposed action is anticipated to be subject to the SMA Rules, §12-202 et. seq. of the Maui Planning Commission. Any "Development" within the SMA that exceeds $500,000 in cost would need an SMA Major Use Permit approved by the Maui Planning Commission during a public hearing. A notice of application for an SMA major use permit is reported in the local newspaper. Thereafter, neighbors within 500 ft of the project would be notified of the time, date and location of the public hearing on the matter. The notice provides contact information for submitting testimony or comments on the permit application. The public hearing notice is also placed in the local newspaper. A County SMA Major Use approval would required for the proposed action.

3.7 COUNTY SHORELINE SETBACK AREA / VARIANCE

The proposed action, or portions thereof, that would occur within the shoreline setback area are under the jurisdiction on Maui County. The proposed action also involves multiple shoreline properties.

Structures or activities within the shoreline setback area require either a Shoreline Setback Variance (SSV) or Shoreline Setback Approval (SSA) pursuant to HRS 205-41 and the Shoreline Rules § 12-303 et. seq. of the Maui Planning Commission. The applicant would obtain County shoreline authorization prior to implementing the proposed action.

3.8 HAWAIʻI ENVIRONMENTAL IMPACT STATEMENT REQUIREMENTS

The purpose of HRS Chapter 343 and its rules for implementation (HAR §11-200) is to establish a system of environmental review to ensure that environmental concerns are given appropriate consideration in decision-making along with economic and technical considerations.

Within the law are seven 'triggers' or uses that necessitate environmental review. Environmental review is required for any program or project that contains specified land uses or administrative acts, including use of State or County lands or funds other than for feasibility studies, the use of any land classified as Conservation District by State law, and the use of the shoreline setback area, among others.

The proposed action is subject to review under HRS Chapter 343-5(a) (1), (2) and (3) because:

- The project area includes State-owned land;
- The project area includes uses within the Conservation District; and
- The project may include activities in the shoreline setback area.

Accordingly, HAR §11-200-6 requires that an Environmental Assessment (EA) be prepared that assesses the significance of the potential impacts of the proposed action on the existing environment. Act 172 in 2012 amended HRS 343 by providing a mechanism to bypass the preparation of an EA for various actions that in the experience of the accepting agency would clearly require the preparation of an EIS. In this case, the approving agency for the environmental document is the DLNR OCCL because they are the agency with authority for uses within the Conservation District.

The agency must submit its determination that an EIS is required for the proposed action to the DOH OEQC. The EIS determination should be accompanied by a completed OEQC publication form detailing the specifics of the action and an EISPN. The EISPN would be published in the *Environmental Notice* and the public has 30 days to request to become a consulted party and/or make written comments on the proposed action. In addition, the public (including the Applicant) has 60 days from the publication of the EISPN in the *Environmental Notice* to ask a court to not require the preparation of an EIS.

After receiving comments on the EISPN, the applicant would prepare a DEIS. The content requirements of the DEIS would contain an explanation of the environmental consequences of the proposed action including the direct, indirect and cumulative impacts and their mitigation measures. The DEIS will also respond to comments received from the EISPN. The public has 45 days from the first publication date in the *Environmental Notice* to comment on the DEIS.

After considering all public comments filed during the DEIS, the applicant would prepare a Final EIS (FEIS). The FEIS would respond in a point-by-point manner to all comments from the DEIS and would include these comments and responses in the FEIS. After publication of the FEIS, the approving agency is authorized to accept the FEIS. If the FEIS is accepted by the approving agency,

it is published in the *Environmental Notice*. The public has 60 days from the date of publication in the *Environmental Notice* to ask a court to vacate the acceptance of the FEIS. In the event that the agency publishes its non-acceptance of the FEIS, the applicant may appeal the decision to the Environmental Council.

Importantly, the outcome of the environmental review process (EA or EIS) is not a permit in the context of a government approval of a specific project or proposed action. Rather, the agency decision of FEIS acceptability is a review of whether the information provided is sufficient to make an informed decision relative to the proposed action and its effects on regulated or protected resources.

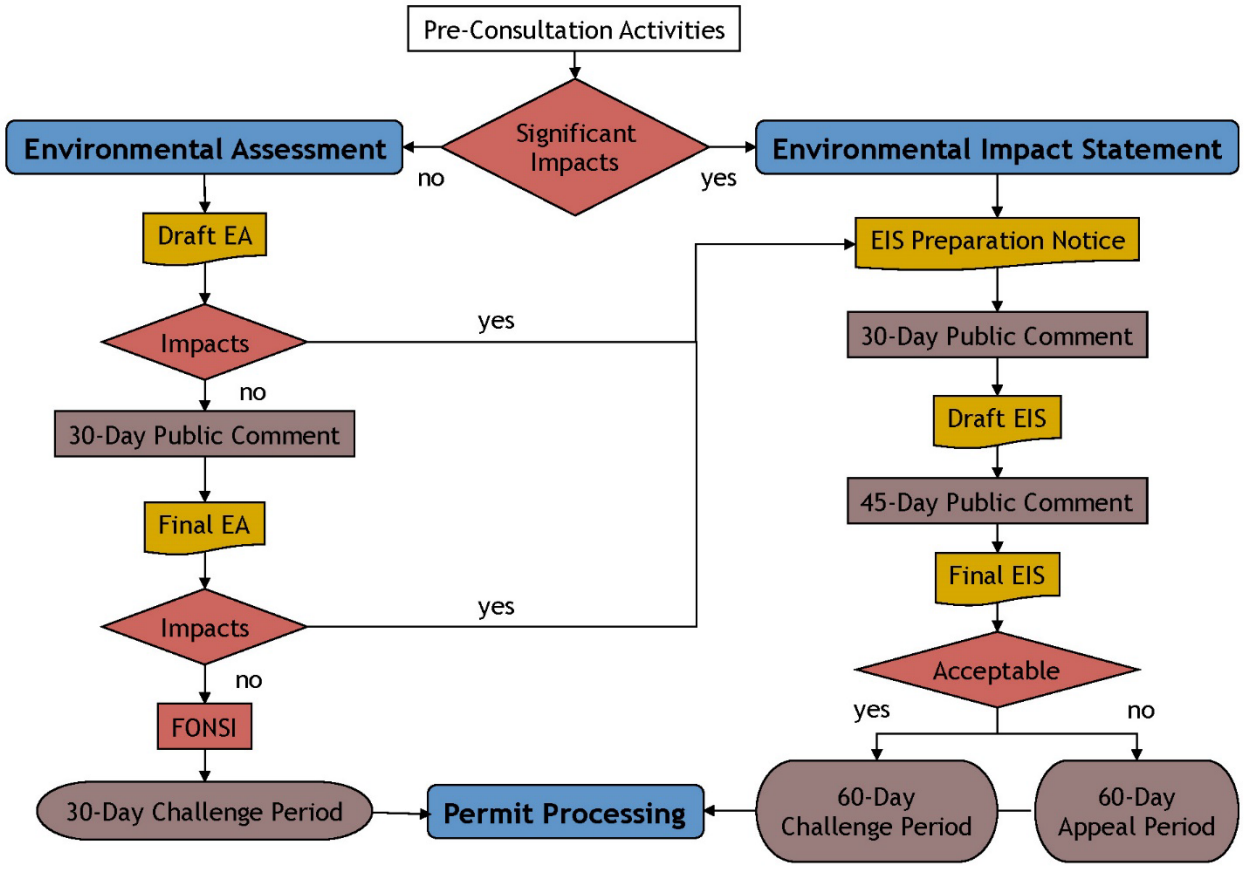

Figure 3-1: Chapter 343, HRS EA/EIS Process

The environmental law and its associated rules for implementation provide succinct significance criteria upon which to evaluate a proposed action. These significance criteria are described in Section 12 of HAR, Title 11, Chapter 200 EIS Rules. The level of significance of the proposed action's potential to impact a resource would be determined based on the evaluative criteria provided in the rules (HAR 11-200 et. seq.). The outcome of the evaluation is that the potential impact of the proposed action is anticipated to be "not significant", "less than significant", "mitigated to less than significant", or "significant".

The DEIS would include an analysis of the proposed action relation to each of the thirteen criteria provided below:

1. No irrevocable commitment to loss or destruction of any natural or cultural resource would occur as a result of the proposed action;
2. The proposed action would not curtail the range of beneficial uses of the environment;
3. The proposed action does not conflict with the State's long-term environmental policies or goals or guidelines as expressed in Chapter 344, HRS;
4. The economic or social welfare of the community or state would not be substantially affected;
5. The proposed action does not affect public health;
6. No substantial secondary impacts, such as population changes or effects on public facilities are anticipated;
7. No substantial degradation of environmental quality is anticipated;
8. The proposed action does not involve a commitment to larger actions, nor would cumulative impacts result in considerable effects on the environment;
9. No rare, threatened or endangered species or their habitats would be adversely affected by the proposed action;
10. Air quality, water quality or ambient noise levels would not be detrimentally affected by the proposed project;
11. The proposed project would not affect environmentally sensitive areas, such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, estuaries, fresh waters, or coastal waters;
12. The proposed action would not substantially affect scenic vistas and view planes identified in County or State plans or studies; and
13. The proposed action would not require substantial energy consumption.

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4 EXISTING ENVIRONMENTAL SETTING, POTENTIAL IMPACTS, AND MITIGATION MEASURES

4.1 PHYSICAL ENVIRONMENT

4.1.1 Land Use

Existing Conditions

The beach area at Kahana Bay is designated as Open Space (OS) in the West Maui Community Plan (1996). Open space is intended to be free of obstructions such as buildings or walls more than four feet in height (Maui County Council, 1996). Adjacent uses include resorts, condominiums, and residential. The state land use (SLUD) designation is "Urban and Conservation" (Figure 4-1), and the project area is zoned as "Hotel (H-2)", "Residential (R-3)", and "Apartment (A-2), (A-1)" under the County of Maui Zoning (Figure 4-2), and as "Hotel (H)", "Multi-Family Residential (MF)", Public/Quasi-Public (P), "Open Space (OS)" and "Business/Commercial (B)"under the West Maui Community Designation (Figure 4-3). The properties are also located within the SMA (Figure 4-4).

The condominiums located along the shoreline from north to south are: Kahana Village, Kahana Outrigger, Kahana Reef, Pohailani, Hololani, Royal Kahana, Valley Isle Resort, Sands of Kahana, and the Kahana Beach Resort (Figure 1-2). A single Kuleana residence is located between the Kahana Outrigger and the Kahana Reef condominiums. Land across the street from these condominiums is primarily used for multifamily, residential, and commercial purposes. Pohaku "S-Turns" park bounds the southern end of the project site, and there are two additional public beach access paths within the project area.

Potential Impacts and Proposed Mitigation Measures

The proposed action is intended to restore the beach fronting the properties and includes the construction of permanent beach stabilization structures that will be elevated slightly above the water level and visible from the land and ocean. In the short term, construction activities may prevent normal land and recreational use in the area, but no change in long term use is expected. Restoring the beach will help retain its primary use for recreational activities. The proposed project is anticipated to have a negligible impact on surrounding land use and is expected to enhance recreational use in the area in the long term with the restoration of the sandy beach.

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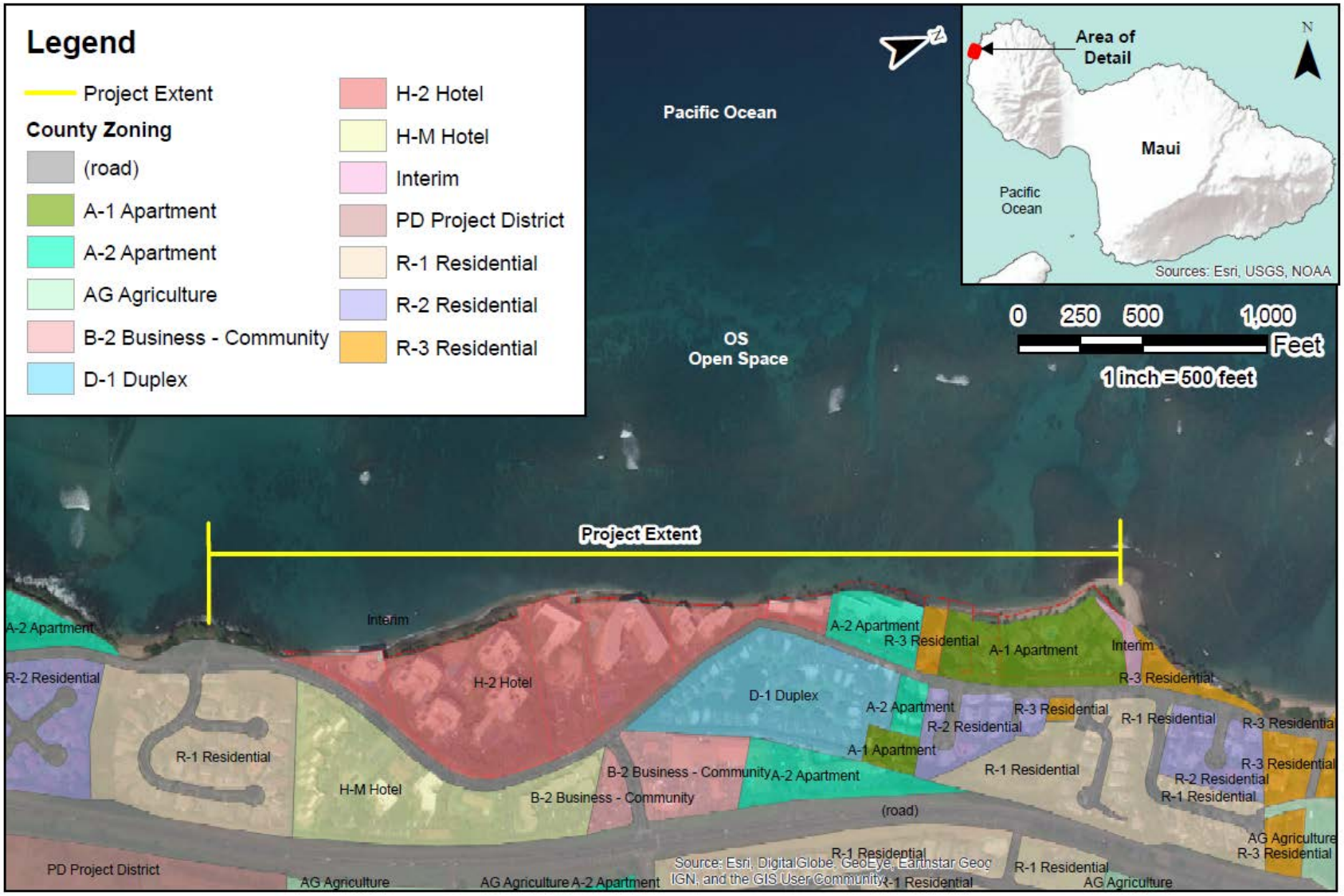
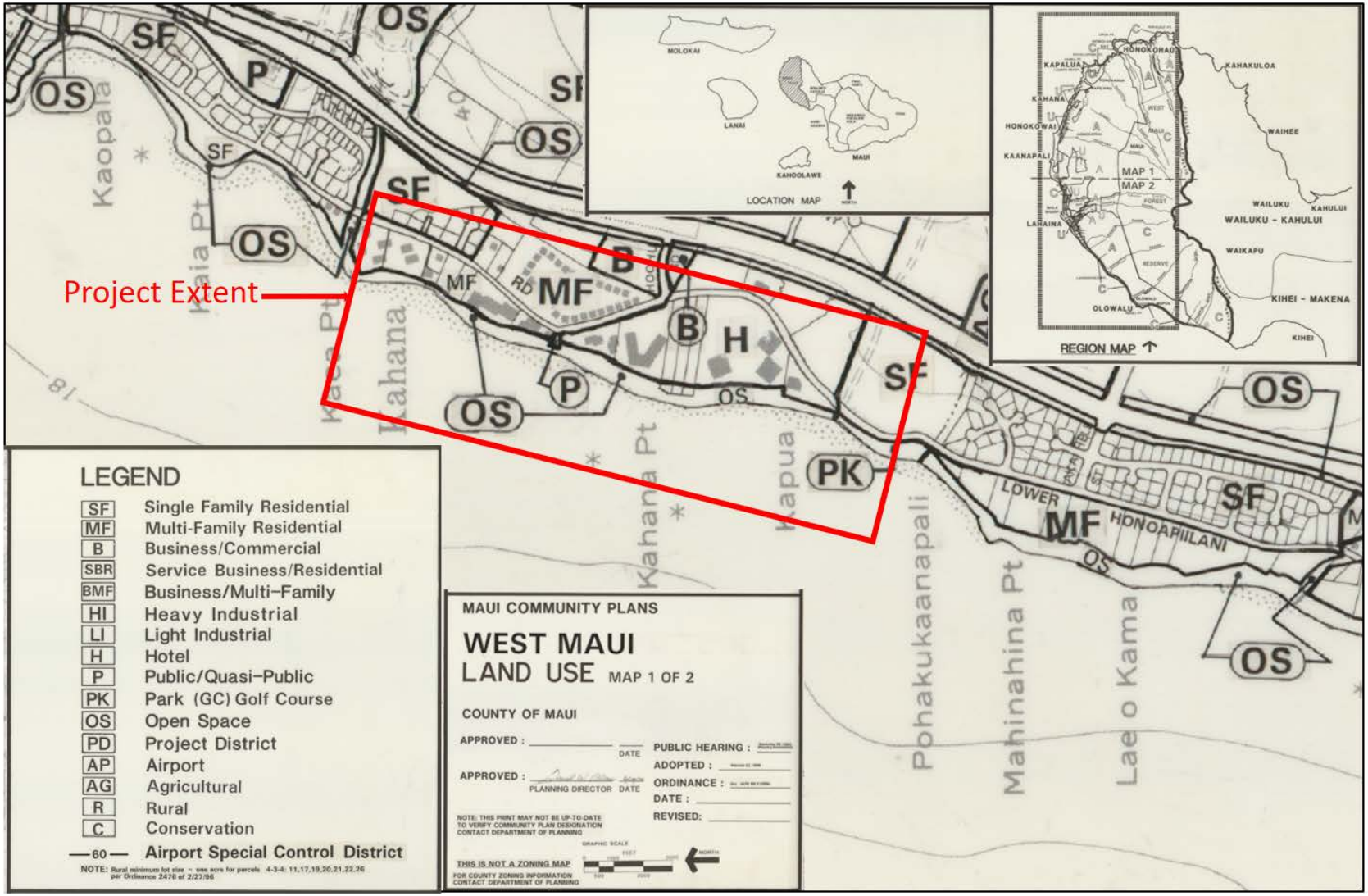
Figure 4-1: State Land Use Districts Map



Source: County of Maui Department of Planning, 2018

Figure 4-2: County of Maui Zoning Map



Source: County of Maui Department of Planning, 1996

Figure 4-3: West Maui Community Plan Designations Map

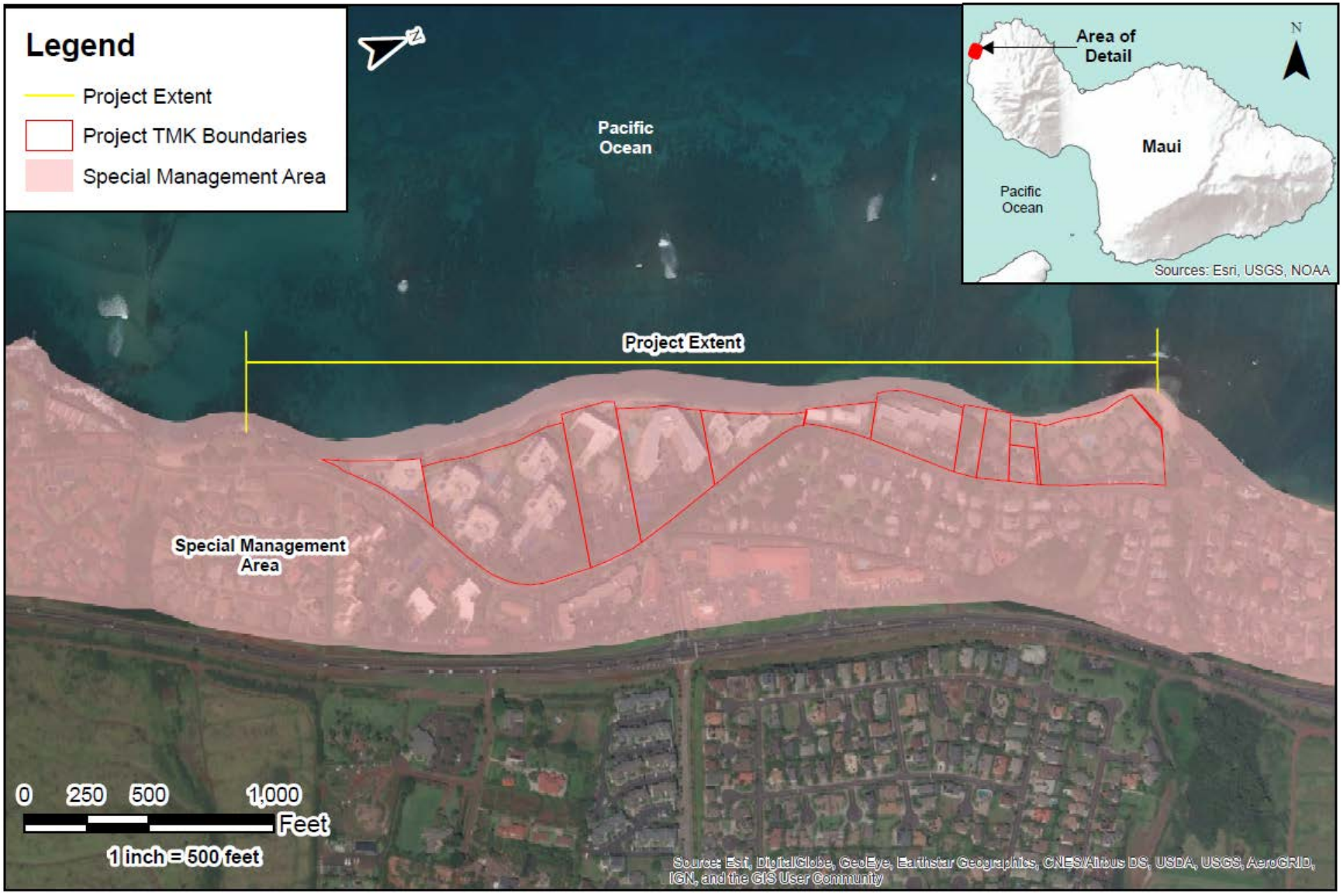


Figure 4-4: Special Management Area Map

4.1.2 Climate

Existing Conditions

The main Hawaiian Island chain is located in the Pacific Ocean and is the most remote landform on Earth. A large eastern Pacific semi-permanent high pressure cell to the north of the islands dictates much of air circulation patterns and climate in the region. This high-pressure cell produces northeasterly winds called trade winds over the Hawaiian Islands. Average temperatures in Kahana are 71.1 degrees Fahrenheit (˚F) (January and February) and 78.6˚F (August), respectively (Giambelluca et al., 2014). The average annual rainfall in Kahana bis approximately 30 inches per year (Giambelluca et al., 2013, and humidity in Kahana about 70% on average (Giambelluca et al., 2014).

During the summer months, trade winds occur 80-95% of the time with average speeds of 10-20 miles per hour (mph). The West Maui Mountains in the Kahana area also influence wind patterns in the area. During the winter months, trade winds decrease to 50-60% of the time and are replaced by southerly or "Kona" winds that typically occur about 10% of the time Although infrequent, hurricanes can also affect the island chain with heavy rains and strong winds.

Potential Impacts and Proposed Mitigation Measures

The proposed action is not expected to have a significant impact on the climate in the Kahana area.

4.1.3 Topography

Existing Conditions

The project is located within Kahana Bay. The topography of the properties adjacent to the bay are generally flat, as would be found on a coastal plain. The topography rises from Lower Honoapiʻilani Road next to the properties up to the Honoapiʻilani Highway and continues to increase in elevation mauka of the highway up the slopes of the West Maui Mountains.

The shape of the beach profile can change throughout the year, depending on seasonal and current patterns. Sand generally moves north in the summer months and south in the winter months, provided sufficient sand reservoirs exist. Recent anecdotal observations have described less seasonal sand recovery and greater chronic and episodic storm erosion, resulting in a smaller active beach along the Bay.

The dry beach width is the distance between the beach crest and vegetation line and varies between 0 ft fronting the Poholani and Kahana Reef Condominiums to 60 ft fronting the Sands of Kahana and Kahana Bay Resort. In contrast, beach width in 1988 and 1975 are estimated to have been 60 ft and 75 ft, respectively, based on aerial and archival photographic evidence (Fletcher et al., 2003; Appendix A).

Further details on the beach face and profile will be provided in the DEIS.

Potential Impacts and Proposed Mitigation Measures

The sand nourishment part of the proposed project is intended to alter the topography along Kahana Beach by widening the current dry beach to an average of 50 ft. The beach stabilization structures would likely mostly be submerged, but their crest would rise above the surface of the ocean. The actual dimensions and number of structures will be further refined in the DEIS. On the landward side and within the dry beach, the crest of the structures would be visible nearshore, but would be buried in the backshore area. The structures and sand used to restore the beach would extend the beach seaward and thus change the topography from its current state of seasonal erosional escarpments to a more stable beach face slope. Topography of the active beach area would change as the beach elevation would be raised by the beach nourishment.

4.1.4 Soils

Existing Conditions

Soils along the beach coast consist Pulehu clay loam, 0-3% slopes (PsA) on the northern half of the project site, and Jaucas sand, 0-15% slopes (JaC) and Lahaina silty clay, 3-7% slopes (LaB) on the southern half according to Web Soil Survey maps (NRCS, 2018). PsA soils are characterized as well-drained soils with low runoff, with origins from alluvium parent material derived from igneous rock. JaC soils are excessively drained soils with low runoff, from sand-sized coral and sea shells marine deposits derived from sedimentary rock. LaB soils are characterized as well-drained soils with moderate runoff (Figure 4-5).

Kahana Beach is composed primarily of carbonate sand with a small basalt component (less than 10% by mass) and minimal fine material. Native beach sand in Kahana is golden or tan in color (County of Maui, 2016). Sand used to replenish the beach must be of similar color, composition, and grain size and lack fine sediment that could pollute nearshore marine waters. A sand sampling study was previously performed to identify, quantify and evaluate the compatibility of the offshore sand sources to the native beach sand (see Section 1.7.2) (County of Maui, 2016).

Figure 4-5: Soils Map

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The nearshore conditions along Kahana Beach are typical of the region with fringing offshore reef and pockets of sand. The amount of sand on the beach is highly variable and depends on the local wave climate. Waves from the south during the summer tend to bring sand from the more southern reaches of Kahana Beach, while waves from the north and northeast tend to strip the sand away during the winter (DLNR, 2013).

During low tide or where beach sand has migrated away, the substrate is littered with stony plates ("shingle") of beach rock. Beach rock is formed by weakly cemented beach sand, and linear outcrops are often visible in many nearshore areas of West Maui. The presence of the beach rock fragments and the apparent onshore migration of these fragments during high surf conditions are indications of offshore sources. The substrate underlying the sand and beach rock is red clay, typical of Maui shorelines. The red clay is easily suspended in the water column when eroded by wave action, which can lead to significant turbidity issues in the water (Figure 1-4).

Potential Impacts and Proposed Mitigation Measures

The proposed action would place 50,000-100,000 cy of offshore sand onto Kahana Beach as part of the regional erosion control response. A critical component of beach restoration projects is a suitable sand source. Placed sand should closely match the grain size distribution, color, composition, and density of the native beach sand. Deviation from these characteristics may result in unpredictable behavior of the sand fill material and could jeopardize the success of the beach restoration project. Given its large size, the beach restoration project would be required to meet DOH-CWB and DLNR OCCL guidelines for the quality of sand fill used. The project would adhere to DLNR Small Scale Beach Nourishment (SSBN) guidelines which specify that the fill material must meet the specific requirements listed below.

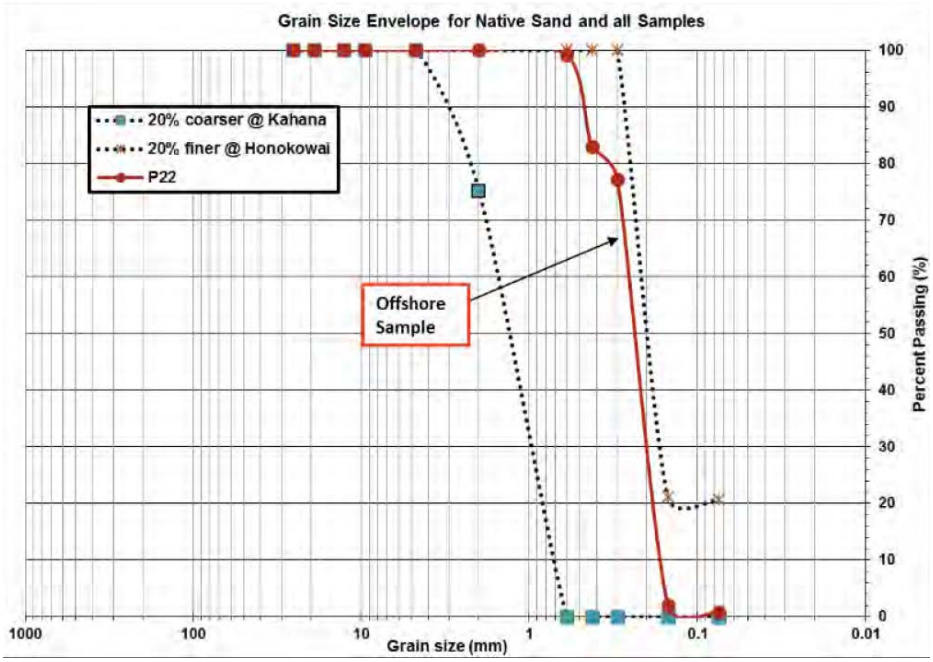
- The sand shall contain no more than six (6) % silt material (sand grain size smaller than 0.074 millimeters [mm]);
- The sand shall contain no more than ten (10) % coarse material (sand grain size greater than 4.76 mm);
- The grain size distribution would fall within 20% of the existing beach grain size distribution;
- The overfill ratio of the fill sand to existing sand shall not exceed 1.5;
- The sand would be free of contaminants such as silt, clay, sludge, organic matter, turbidity, grease, pollutants, and others; and
- The sand would be primarily composed of naturally occurring carbonate beach or dune sand.

The 2016 Feasibility Study analyzed and compared offshore sand from the sand source to the native beach sand on Kahana Beach and found both to be compatible based on the DLNR SSBN guidelines (Figures 4-6; 4-7) (County of Maui, 2016). A sand field investigation was conducted in 2018 and verified color and compatibility results from the Feasibility Study (See Section 1.7.2).

Testing and the quality of the sand from the borrow sites would be reported as part of the EIS and the State's permitting process. A more robust discussion of soils, sediments, and the type of sand to be used for beach restoration will be provided in the DEIS.

Source: County of Maui, 2016

Figure 4-6: Comparison of Offshore Borrow Area 19 and Native Beach Sand



Source: County of Maui, 2016

Figure 4-7: Grain Size Envelope for Native and Sand Deposit 22 Source Sand Samples

4.1.5 Air Quality

Existing Conditions

The EPA has national ambient air quality standards (NAAQS) for ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), 2.5-micron and 10-micron particulate matter (PM) ($PM_{2.5}$ and PM_{10}), and airborne lead. These ambient air quality standards establish the maximum concentrations of pollution considered acceptable for public health and welfare. The State of Hawai'i also has ambient air quality standards for some pollutants. At present, the State has set standards for five of the six criteria pollutants (excluding $PM_{2.5}$) in addition to hydrogen sulfide, which is not included in NAAQS (DOH, 2016).

The project site is located in EPA attainment zones for CO, NO_2, O_3, $PM_{2.5}$, PM_{10}, SO_2, and lead (EPA, 2014). In 2015, Hawai'i was in attainment with NAAQS annual averages of PM_{10}, $PM_{2.5}$, O_3, CO, and SO_2, based upon three-year averages of annual mean values from 12 air quality stations (four on O'ahu, three on Maui, six on the Island of Hawai'i, and one on Kaua'i) that represent the State of Hawai'i. The air quality station closest to the project site is located approximately 15 miles to the southeast and on the opposite side of the West Maui mountain range in Kahalui. The station is located only measures $PM_{2.5}$. The annual averages from this air quality station from 2013-2015 indicated that annual average of $PM_{2.5}$ levels in ambient air were well below their federal (40 Code of Federal Regulations [CFR] Part 50) Standards (DOH, 2016). There are no current Hawai'i State Standards for $PM_{2.5}$.

During winter months when trade winds are absent and "Kona" winds blow form the southeast, vog from the Island of Hawai'i can bring increased levels of SO_2 and $PM_{2.5}$. Hawai'i's advisories for volcanic SO_2 and $PM_{2.5}$ have been customized for local conditions. Air monitoring stations in communities near Kīlauea Volcano on the Island of Hawai'i often exceed the NAAQS for SO_2 and occasionally the NAAQS for $PM_{2.5}$. The EPA considers activities from the volcano a natural, uncontrollable event, and therefore the state requests exclusion from these NAAQS exceedances for attainment/non-attainment determination (DOH, 2016). Shorter exposure time intervals have also been adopted due to variable wind conditions, which can cause volcanic gas concentrations to change rapidly.

DOH regulates fugitive dust, which can be released during earth-moving activities including removal of earth, excavation and fill, debris clearing, and vegetation grubbing. Maui County also regulates dust through its grading ordinance (Chapter 20.08) and requires the implementation of specific BMPs during ground altering activities to ensure that dust, dirt, and debris do not enter the ocean, waterways, neighboring properties or create airborne pollution.

Potential Impacts and Proposed Mitigation Measures

Potential sources of air pollution as a result of the project would occur mostly in the short term during the construction phase and when sand is being placed or moved along the coastline. Temporary degradation in air quality in the immediate project area may also occur because of emissions from construction equipment and personal vehicles. A site-specific BMP plan will be written for the project and construction BMPs will be employed throughout the project. BMPs implemented during construction activities will include:

- Properly tune and maintain construction equipment and vehicles;
- Limit size and extent of exposed areas;
- Cover mounds of soil or fill;
- Water work areas and unpaved work roads;
- Use of wind screens;
- Establish of routine road cleaning and/or tire washing program; and
- Monitor dust at the project boundary if significant dust generation is anticipated.

Upon completion of the project, the proposed action is expected to have negligible long-term air emissions or impact on air quality.

4.1.6 Water Quality

Existing Conditions

The DOH Water Quality Standards (WQS) classify the waters off of Kahana Bay area as Marine Class A waters (DOH, 2014). Class A waters are defined by their objective that "their use for recreational purposes an aesthetic enjoyment be protected. Other uses are permitted as long as they are compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and out on these waters" (HAR §11-54-3).

Nearshore waters may not be degraded by the addition of a specific point source of water pollution, such as an outfall pipe, without obtaining NPDES permit. Overall, the purpose of the NPDES is to ensure that anthropogenic inputs do not exceed the natural assimilative capacity of the environment.

Water quality field data were collected from the area in August 2010 as part of the EA for the Hololani Resort Condominium, located in the middle of the Kahana shoreline. Water samples were collected from seven (7) locations along a transect extending from 300 meters (m) into the open ocean from the Hololani Resort shoreline. Sampling was concentrated in the nearshore zone because this area receives the majority of groundwater discharge. Water quality parameters evaluated total dissolved nitrogen (TDN), nitrate (NO_3) and nitrite (NO_2), ammonium (NH_4), total dissolved phosphorus (TDP), chlorophyll a (chl a), turbidity, temperature, pH, and salinity. In addition, silica (Si) and phosphorus (PO_4^{3-}) were also reported to represent indicators of biological activity and the degree of groundwater mixing. From these parameters, it was concluded that a small component of groundwater enters the shoreline but is rapidly mixed to background coastal oceanic values through wave action. Turbidity of the water column peaked at the shoreline and decreased steadily with distance from shore.

There are several discharge locations from streams and drainage outlets in the project area. Several drainage outlets that drain water from Lower Honoapi'ilani Road are maintained by the Maui County Department of Public Works. Runoff from these drainage outlets may impact water quality during times of heavy rain. Kahana Stream discharges at the northern border of the project site. Water quality impacts and elevated turbidity may be evident around the mouth of the stream, especially after upcountry rainstorms, where the stream discharges into a naturally cut channel offshore of the stream.

Potential Impacts and Proposed Mitigation Measures

In the short term, total suspended solids (TSS) and turbidity are expected to temporarily increase during dredging, dewatering, sand placement, and construction activities and highest in close proximity to active construction areas. As part of the WQC process, AMAP and BMP plans approved by DOH will be required. Silt curtains, containment barriers, temporary erosion controls, and other BMPs will be deployed to contain TSS and turbidity during periods of in-water construction. The AMAP will include regular measurement of water quality parameters pre-, during, and post-construction. BMPs would be designed to be adaptive to the circumstance. For instance, if monitoring detected increased turbidity, sediment control and capture methods would be adjusted and contingencies would be implemented to prevent water pollution.

Offshore turbidity is also expected at the dredge site(s). The methods of sediment control would require DOH approval before dredging would be authorized. Turbidity from dredging can be reduced by using an environmental clamshell bucket in mechanical dredging, which is an industry best practice and has been used to minimize turbidity during dredging of harbor channels in Hawai'i. Environmental clamshell buckets typically have tighter seals and overlapping sides and are designed to minimize sediment loss from within the bucket, re-suspension at the dredge site, and water entrainment with each grab.

In the longer term, periodic turbidity associated with equilibration of the beach profile may occur as sand moves along the beach and cross-shore. Larger sand size grains are currently stable along the coastline and make up the existing beach face; however, finer material will likely remain suspended until it has moved offshore. Average fine sediment content in the proposed nourishment sand is required by DLNR OCCL to be less than (<)6%. This is equivalent to a maximum 3,000-6,000 cy of fine sediment placed within the beach enhancement area. Though periodic turbidity is expected during high wave and water level events, the proposed action is anticipated to reduce turbidity from the release of clay and sediment from bank erosion into the nearshore environment. Additional details of the AMAP and BMP and water quality parameters will be described in the DEIS.

4.1.7 Noise

Existing Conditions

Existing ambient noise levels include vehicle traffic, aircraft, ongoing maintenance, construction equipment, surf, boats, and wind. In the vicinity of significant construction activity, noise levels can intermittently reach 80 decibels (dBA). The DOH regulates noise per HAR §11-46, "Community Noise Control" which establishes maximum permissible sound levels (Table 4-1). The rules provide for the prevention, control, and abatement of noise pollution from stationary noise sources and from equipment related to agricultural, construction, and industrial activities. The standards are intended to protect public health and welfare, and to prevent the significant degradation of the environment and quality of life. DOH establishes acceptable levels of noise based on the ambient conditions (Class A-C) that would be anticipated in differing land uses situations (i.e., Zoning Districts) ranging from residential, business / resort, to industrial conditions.

The project site is in a Class B zoning district, as defined by HAR §11-46. HAR §11-46-7 grants the Director of the DOH the authority to issue permits to operate a noise source which emits sound in excess of the maximum permissible levels specified in Table 4-1 if it is in the public interest and subject to any reasonable conditions. Those conditions can include requirements to employ the best available noise control technology.

Table 4-1: Maximum Permssible Sound Levels in dBA

Zoning Districts	Daytime (7am – 10pm)	Nighttime (10pm-7am)
Class A	55	45
Class B	60	50
Class C	70	70

Notes:
1) Class A zoning districts include all areas equivalent to lands zoned residential, conservation, preservation, public space, open space, or similar type.
2) Class B zoning districts include all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type.
3) Class C zoning districts include all areas equivalent to lands zoned agriculture, country, industrial, or similar type.
4) The maximum permissible sound levels apply to any excessive noise source emanating within the specified zoning district, and at any point at or beyond (past) the property line of the premises. Noise levels may exceed the limit up to 10% of the time within any 20-minute period. Higher noise levels are allowed only by permit or variance issued under HAR §11-46-7 and §11-46-8.
5) For mixed zoning districts, the primary land use designation is used to determine the applicable zoning district class and the maximum permissible sound level.
6) The maximum permissible sound level for impulsive noise is 10 dBA (as measured by the "Fast" meter response) above the maximum permissible sound levels shown.

Potential Impacts and Proposed Mitigation Measures

Short-term noise impacts would occur during construction and sand placement activities. Project activities would involve excavation, grading, sand pushing, sand slurry pumping and other typical construction activities. To mitigate noise emissions from construction activities, BMPs such as the following will be employed:

- Equipment operation on the shoreline will be limited between 7:00 AM and 7:00 PM;
- Broadband noise backup alarms in lieu of higher frequency beepers will be required for construction vehicle equipment;
- Equipment substitution will be used to ensure that the quietest locally available equipment is used (e.g, high insertion loss mufflers, fully enclosed engines, and rubber-tired equipment if possible);
- The use of horns will be prohibited; and
- The nearby community will be informed about construction occurrences and activities for any noise disruptions that may be associated with the project.

Furthermore, the existing condominium buildings would tend to dampen and screen project noise from the neighboring community as most project activities would be on the seaward side of the buildings. Upon completion, the beach restoration project is not anticipated to have any additional or long-term noise impacts on the surrounding community. A DOH-approved Community Noise permit would be obtained, if applicable.

4.1.8 Artificial Lights

Existing Conditions

Decorative lights, tiki torches and other forms of artificial lighting exist along the shoreline of most of the condominiums along Kahana Bay.

Potential Impacts and Mitigation Measures

No artificial light from floodlights, up-lights, or spotlights would be used during construction activities as construction is anticipated to occur during daylight hours except if lighting is necessary for public safety purposes in compliance with HRS 205A-71. If used, the lights would be downturned and shielded to prevent disorientation of marine animals, and all lighting would be removed at the completion of construction. Consequently, no adverse impacts are anticipated. Additional discussion of lighting in relation to the proposed action will be provided in the DEIS.

4.2 COASTAL HAZARDS

According to the 2012 U.S. Geological Survey (USGS) National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands, the beaches of Kauaʻi, Oʻahu, and Maui are eroding at an average long-term rate of -0.11 m (0.36 ft) per year. Maui had the highest percentage of beach loss at 11%. Beach management plans have been prepared to combat coastal hazards, because the retreat of Hawaiʻi's beaches will impact the residents' quality of life and the visitor industry.

4.2.1 Coastal Processes

Existing Conditions

The project site is located along the west coast of Maui. Average wave heights and currents change throughout the year, with the winter season generating large waves along the north shore. Generally during the summer, waves from the south tend to push sand north to accrete sand on the beach. Contrastingly in the winter, waves and strong trade wind waves from the north tend to transport the sand south and remove sand from the beach (DLNR, 2013).

The wave climate at Kahana Bay may be reasonably approximated from a wave modeling study performed by Marc M. Siah & Associates, Inc. (2011) and from the design conditions stated in the Hololani EA (DLNR, 2013). The wave modeling study simulates nearshore wave climate at Kahana Sunset, a condominium association located a mile north of the project site that is fronted by a nearshore reef extending 2,000 ft offshore, which experiences erosion patterns similar to those at Kahana Bay.

The wave modeling study found that waves from the north refract and break over the reef, well offshore of the entrance to the Kahana Sunset embayment. This phenomenon may also be present at Kahana Bay, as aerial imagery shows waves breaking primarily at the outer extent of the reef. At the entrance of the Kahana Sunset embayment, which is located 500 ft offshore (and therefore landward of the reef edge), wave heights range from 1.5 to 3 ft under extreme swells. These results, "not only indicate breaking of larger waves over the reef as they enter the embayment and approach the coastline, [they] also show dissipation of some wave energy due to the effects of nearshore bathymetry and topography" (Marc M. Siah & Associates, Inc., 2011). Due to Kahana Bay's proximity to Kahana Sunset and similar bathymetry of the areas, Kahana Bay's wave heights may be similar to the wave heights at Kahana Sunset.

Three differences exist between the conditions at the current project site in Kahana Bay and the conditions simulated in this study. First, the inlet to the Kahana Sunset embayment is much narrower

than the inlet to Kahana Bay, providing additional protection from incoming swells. Second, the Kahana Sunset embayment is sheltered from south swells, which significantly affects sediment transport at Kahana Bay. Third, the previous study omits SLR, and therefore may not adequately characterize future wave conditions (County of Maui, 2016).

Ocean water levels at Kahana Bay are primarily influenced by tides, storm surge, and SLR. Tides are semi-diurnal and the tidal range is 2.25 ft between Mean Higher-High Water (MHHW) and Mean Lower-Low Water (MLLW). Tidal datums are based on the National Oceanic and Atmospheric Administration (NOAA) buoy located at Kahului Harbor, Maui (NOAA, 2016). These datums, based on the present tidal epoch (1983-2011), can be seen in Table 4-2. The highest observed water level at this site was 2.37 ft mean sea level (MSL) observed on December 20, 1968.

Table 4-2: Tidal Datums for Maui

Datum	Value (ft MSL)
Mean Higher-High Water	1.13
Mean High Water	0.78
Mean Tide Level	-0.01
Mean Sea Level	0
Mean Diurnal Tide Level	0.01
Mean Low Water	-0.79
Mean Lower-Low Water	-1.12

Source: NOAA, 2016

Maui's shorelines are highly dynamic and frequently shift through time, particularly on sandy shores. Coastal erosion is a natural process whereby the shoreline retreats inland over long periods of time as a result of wind, waves, prevailing currents, and storms. Erosion can be exacerbated when sand supplies are confined, sand transport hindered, or sand reservoirs are depleted. For example, seawalls that trap beach quality sand behind them can deprive the beach of a sand reservoir, cause scouring or down drift flanking erosion. In contrast, sand dunes in the back shore can help replenish the beach after a large storm thereby slowing shoreline retreat. Shoreline retreat may also occur rapidly as a result of acute or episodic erosion events associated with large surf, storm events and seasonal changes in wave regime (i.e., winter/summer).

The majority of Maui's beaches are experiencing chronic coastal erosion with an average of 1.1 ft of shoreline retreat per year (Fletcher, et. al., 2003). The island has approximately 35 miles of sandy shoreline that are eroding. Since 1950, beach width has decreased 19% with 5 miles of beach lost and nearly three miles of highway threatened by coastal erosion (Fletcher et. al., 2003). The shoreline retreat along Kahana Bay is primarily the result of a culmination of chronic long-term erosion and several episodic erosion events over the past few winters.

Potential Impacts and Proposed Mitigation Measures

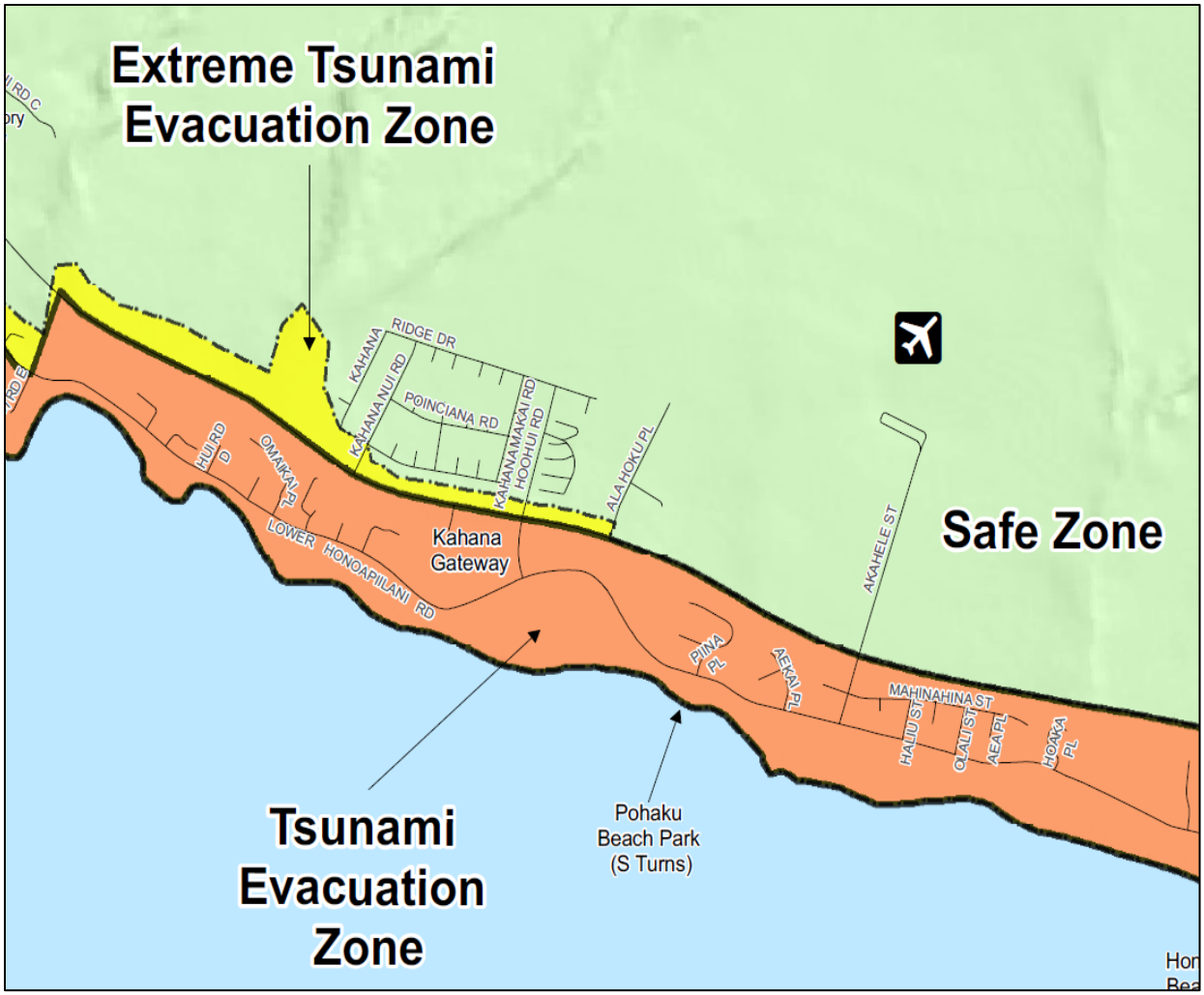
The proposed action is expected to have significant impacts to coastal processes along Kahana Bay, as its intention is to mitigate coastal erosion and offshore sand transport. The beach stabilization structures that will be in place to retain the sand will likely impact current and wave directions in the area. Furthermore, the proposed excavation of 50,000-100,000 cy of sand from the borrow areas would create a submarine excavation pit that will result in sand from the adjacent seafloor to naturally

fill in the pit. Wave and current modeling and analyses will be conducted as part of the DEIS to quantify the impact that the proposed action would have on the current conditions. Results from these studies will be used to optimize beach stabilization structure design. Additional discussion of the proposed action in relation to coastal processes will be provided in the DEIS.

4.2.2 Tsunami Hazard

Existing Conditions

The project is located within a tsunami evacuation zone (Figure 4-8). Occupants within a tsunami evacuation zone are required to evacuate and move to a safe zone in the event of a tsunami warning.



Source: County of Maui, 2015

Figure 4-8: Tsunami Evacuation Map

Potential Impacts and Proposed Mitigation Measures

The proposed action would not change the condominiums' exposure to tsunamis.

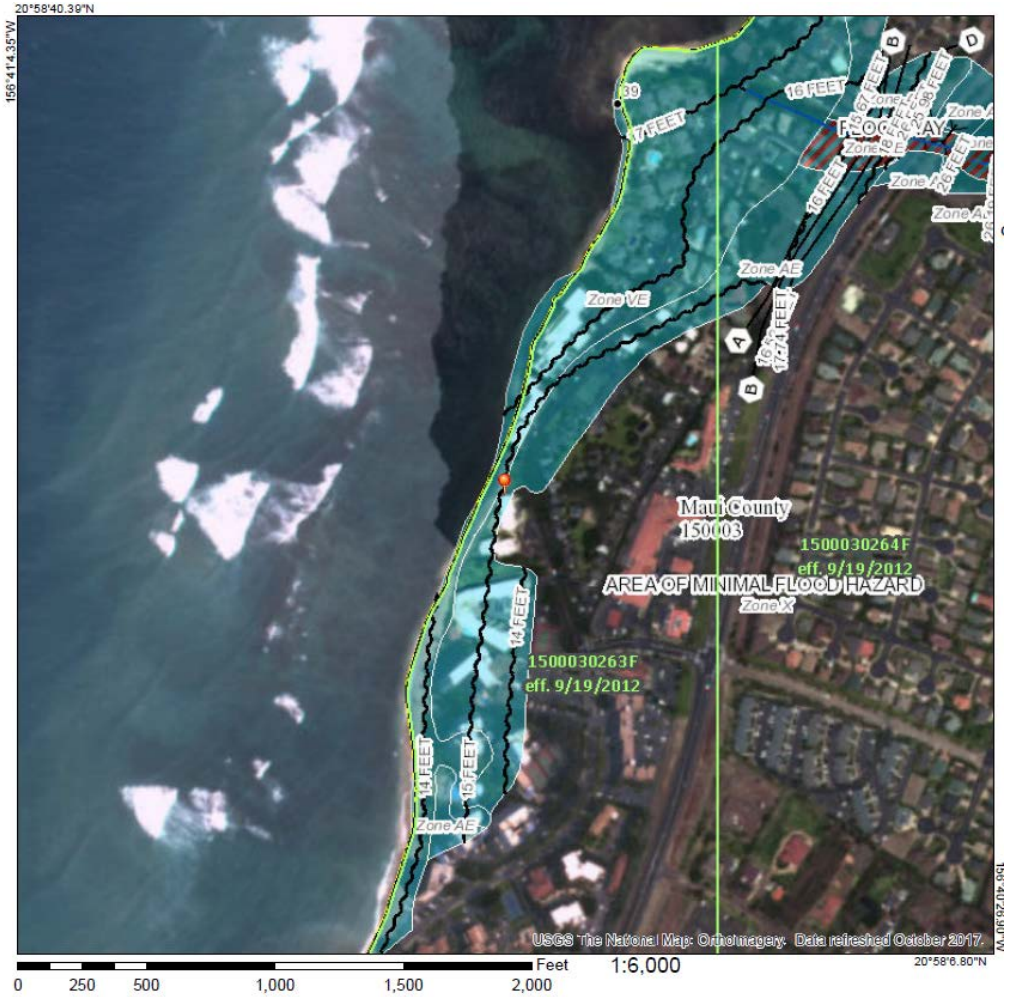
4.2.3 Flood Hazard

Existing Conditions

Flood hazards for the portion of Kahana in which the project is located is depicted on Flood Insurance Rate Map (FIRM) panel number 1500030263F (effective date September 19, 2012). The project area is within a Special Flood Hazard Area that is subject to inundation by the 1% annual chance flood. This equates to a 1% probability in any given year that a flood will equal or exceed the base flood elevation. Mandatory flood insurance applies to these areas. The project site is in Zones VE (hazards due to storm-induced velocity wave action) and AE (hazards due to rising waters) (FEMA, 2017) (Figure 4-9). The base flood elevation varies between 14-17 ft above MSL.

Potential Impacts and Proposed Mitigation Measures

The proposed action will extend the shoreline seaward, increasing the area between the ocean and the infrastructure on land. The beach restoration and stabilization structures will dissipate incoming wave energy and the extent of wave run up. The proposed action is designed to have a long-term impact to reduce flooding along the backshore of the project area.



Source: FEMA, 2017

Figure 4-9: Flood Zone Map

4.2.4 Erosion Hazard

Existing Conditions

Severe coastal erosion has plagued the Kahana Bay for several decades. The ongoing erosion has resulted in the majority of the current shoreline along Kahana Beach being either armored with permanent seawalls, temporary sand-fill geotextile structures, restored dune, or exposed shoreline (Figure 4-10). The annual erosion rates at Kahana Bay are estimated between 0.5 - 1.9 ft/year (Fletcher et al., 2003; County of Maui, 2016). Prior to 1949, the average rate of erosion was 0.9 ft/yr; this likely represents the rate of erosion for a wide, naturally behaving, unhindered beach and littoral cell. Following shoreline development, the average erosion rate was 1.9 ft/yr (County of Maui, 2016) (Figures 1-3; Table 1-1). Refer to Section 1.4 for further information about historical erosion hazards.

Potential Impacts and Proposed Mitigation Measures

The proposed action will extend the shoreline seaward, increasing the area between the ocean and the terrestrial infrastructure. The beach restoration and stabilization structures would dissipate incoming wave energy and subsequently reduce the extent of the wave run up. The proposed action is designed to reduce coastal erosion and reduce flooding along the backshore area of the project area in the long-term.

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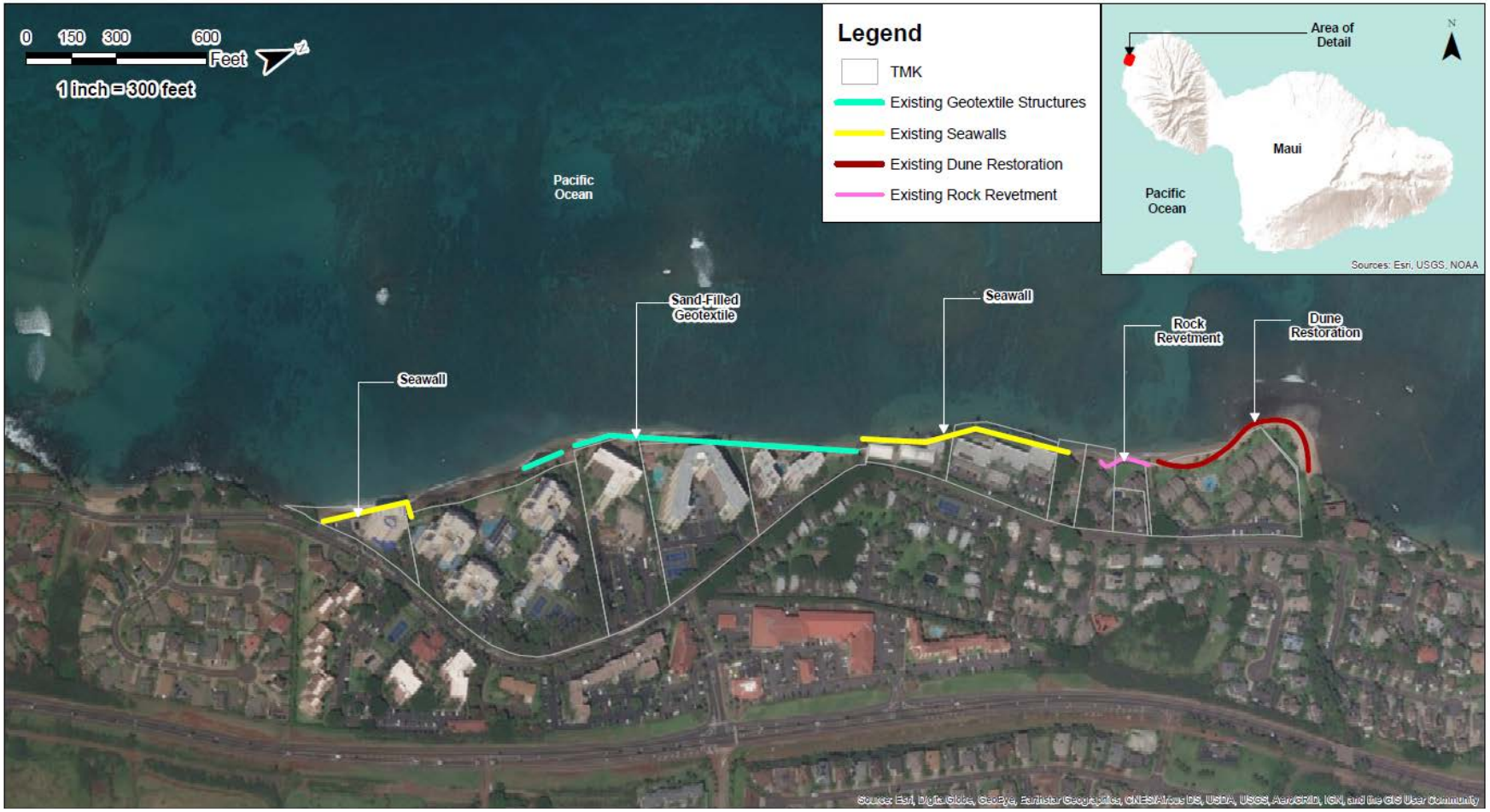

Figure 4-10: Existing Armoring Structures

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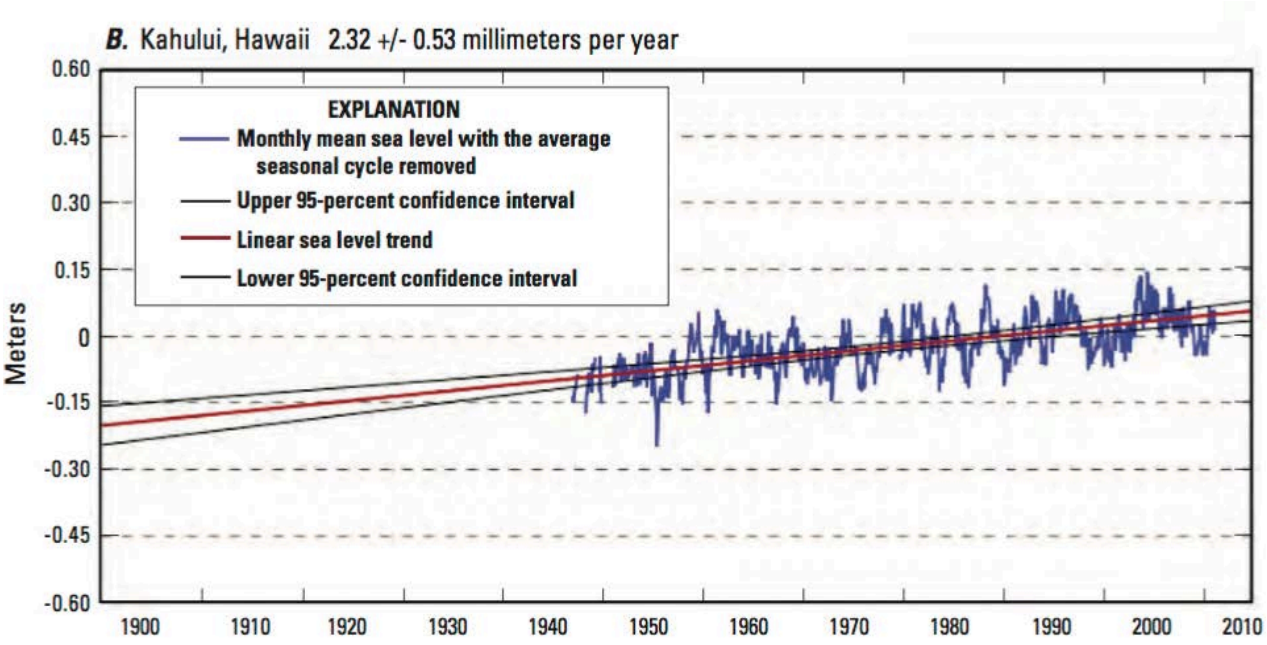
4.2.5 Sea Level Rise

Existing Conditions

The Intergovernmental Panel on Climate Change (IPCC) predicts that the worldwide sea level could rise 1.5 ft or more by the year 2100 and has outlined numerous impacts from this rise on coastal communities including beach erosion, inundation of land, increased flood and storm damage, saltwater intrusion into the freshwater lens aquifer, changes in precipitation, increased levels of land-based pollutants to coastal waters including sediments, nutrients and contaminants, and more frequent, longer, and more powerful El Niño and La Niña events (IPCC, 2014).

Tide gauge measurements provide a historic record of the ocean's level. Tide gauges at Hawai'i's major harbors, including Kahului Harbor, show an upward trend in sea level (Figure 4-11). This trend is primarily caused by the thermal expansion of seawater as it increases in temperature.



Source: Fletcher et al., 2012
Figure 4-11: Mean Sea Level Trends at Kahului Harbor, Maui, 1947-2000

The average global SLR over the last century was approximately 1.88 mm (0.074 inches) per year, with studies indicating that this rate may accelerate in the coming decades. UH climate researchers predict that rising sea levels caused by climate change will affect coastal locations around the State of Hawai'i. UH SOEST provides a SLR scenario for Honolulu projecting a one-foot increase in sea level by mid-century, and about three feet by the end of the century (SOEST, 2018).

According to the State of Hawai'i SLR Report (Hawai'i Climate Change Mitigation and Adaptation Commission, 2017), Kahana Beach is anticipated to undergo significant erosion as sea levels rise. Various scenarios in SLR exposure area (SLR-XA), which includes passive flooding, annual high wave flooding, and coastal erosion, are shown in Figure 4-12.

Potential Impacts and Proposed Mitigation Measures

The proposed action will help to buffer the effects of known SLR, as the beach nourishment would act as a natural solution to raising the elevation of the sandy beach above the MHHW line and protecting the beach and structures along the shoreline.

Source: PacIOOS Sea Level Rise viewer (PacIOOS, 2018)

Figure 4-12: Sea Level Rise Exposure Area (SLR-XA)

4.3 ECOLOGICAL RESOURCES

4.3.1 Terrestrial Biological Resources

Existing Conditions

Flora and fauna at the site are typical of West Maui developed resort and condominium areas. The existing yards consist of grassy lawns, manicured gardens and hedgerows, palms and shade trees. Most of the vegetated areas are regularly maintained by professional landscape services. Plant species on the properties are often cultivated and include non-native, ornamental, and introduced species such as seashore paspalum grass, plumeria trees, various palms, and bougainvillea and hibiscus shrubs among others. The vegetation adjacent to and inland of the active beach is composed of typical coastal vegetation, including *naupaka* (*Scaevola sericea*), *aki aki* grass, and beach morning glory (*Ipomoea spp.*). This transient vegetation has the tendency to grow out onto the beach area when it is not inundated and recede but not die off when temporarily inundated by seawater.

Fauna found at the site are typical of the West Maui coastal region and include such introduced species as mongoose, rats, mynahs, spotted doves, cardinals, sparrows, java finch, bridled white-eye, and francolins. Native bird species can be occasionally observed, such as shorebirds, but are less common given the area is urbanized and does not exhibit ideal or preferred habitat for such species. Other commonly observed marine oriented species include crabs, crustaceans, and occasionally turtles. Green sea turtles and Hawaiian monk seals have occasionally been observed resting on the intermittently sandy beach at the southern end of Pohaku Park.

Potential Impacts and Proposed Mitigation Measures

Placed sand for beach nourishment and landward portions of the structures constructed seaward may cover small amounts of transient vegetation such as *naupaka*, *aki aki* grass, seashore paspalum grass, and morning glory. Depending on their construction materials and design, the structures could provide microhabitats for invertebrates and fishing posts for pole fisherman.

Further discussion of impacts to flora and fauna will be included in the DEIS.

4.3.2 Streams

Existing Conditions

The mouth of the Kahana Stream lies at the northern boundary. The stream appears to have contributed to the formation of Kaea Point, a sand fringed headland at the north end of the project area (Hawai'i Watershed Atlas, 2008). The stream extends 17 miles inland and has confluences with the Kahoma and Halona Streams. Kahana Stream is a perennial stream with a terminal stream order of 3. The area of the watershed is 5.2 square miles (13.5 square kilometers), with maximum elevation of 4,475 ft (1364 m). About 29% of the watershed is in the conservation land use district, approximately 65% is in the agricultural district, and 6% in the urban district. Since the late 1800s, the Kahana and Kahoma streams have been diverted for irrigation and potable water uses. The last portion of Kahana Stream is channelized, where it flows under a bridge along Lower Honoapi'ilani Road. Within this backshore area, standing or stagnant water often collects and ponds in the channel until a large enough flow from upstream moves the sediment that has plugged the channel's exit to

the ocean. Several other large drainage channels along Kahana Bay have lined culverts or corrugated pipes in order to manage stormwater flows.

Potential Impacts and Proposed Mitigation Measures

The proposed action is anticipated to have negligible impact on the stream's water quality and ecological processes. All discharge associated with the project is expected to be along the shore, downstream from the mouth of the Kahana Stream; however, the added sand from the beach restoration may get transported north under seasonal conditions, which could potentially alter Kahana Stream's path into the ocean. In its current state, the channelized portion of the stream's outlet is often plugged with accreted sand and sediment, causing ponding in the channel. To mitigate the movement of sand placed on the beach, the type of sand used from the source would be comprised primarily of large, quality sand grains that are more resistant to wave transport.

4.3.3 Rare, Threatened, and Endangered (RTE) Species

Existing Conditions

No rare, threatened, and endangered (RTE) species (plant or animal) have been encountered on the subject properties, as they are highly developed and not preferred habitat for these species. Transient protected species such as humpback whales are frequently observed offshore of the project area. Humpback whales (*Megaptera novaeangliae*; kohola) normally frequent Hawaiian waters annually from November to May with the peak in February and March and that may be offshore of the project area during this time (NOAA, 2018). The endangered green sea turtle, or honu (*Chelonia mydas*) is frequently seen near the shore along Kahana Bay and sometimes haul out to rest on sandy sections of the shore.

Monk seals (*Monachus schauinslandi*) have occasionally been sighted resting on the intermittently sandy beach at the southern end of Pohaku Park. The beaches and coastline of Maui are used by the endangered Hawaiian monk seal for hauling out, pupping, and nursing. In 2015, the Main Hawaiian Islands and the remote Northwestern Hawaiian Islands were designated as critical habitat for this species (50 CFR 226), as published in the NOAA Final Rule (FR) (80 FR 50925). The marine environment from 200 m below sea level to the shoreline, and the terrestrial environment to 5 m inland of the shoreline are considered Hawaiian monk seal critical habitat, and thus includes the entire project site.

There is little habitat for Hawaiian Stilts, or ae'o (*Himantopus mexicanus knudseni*) or wedge-tailed shearwaters, *'ua'u kani* (*Puffinus pacificus)*, in the project area. Most of the Kahana Bay coastline does not exhibit preferred habitat for these protected avian species.

Potential Impacts and Proposed Mitigation Measures

The addition of relatively sheltered coastline resulting from the proposed action would create more sandy areas for sea turtles and monk seals to haul out on the beach. As a precautionary measure and in the event RTE species are observed in the vicinity of the project operations, such as monk seals fronting the shoreline, work would cease until the individual leaves on its own accord. Exterior lighting should be monitored to ensure it is not directed to illuminate the beach, shoreline, or ocean as this can disorient marine and/or wildlife (DAR, 2005). An assessment of the potential impact to

RTE species from the proposed action will be carried out as part of the environmental review process and will be included in the DEIS.

4.3.4 Marine Biological Resources

A survey of the nearshore marine environment in the Kahana Bay was conducted in 2010 as part of an EA performed for the Hololani Resort (DLNR, 2013), which is included in the KBSC; however, the survey only covered a portion of the project area. An updated marine impact study including updated marine organism inventories will be performed as part of the DEIS; however, for the purposes of this EISPN, the 2010 Hololani marine survey will be described. Major benthic biological cover types in the project and surrounding area are depicted in Figure 4-13.

The 2010 marine survey separated the coral reef community structure into three zones: the "nearshore algae" zone, "mid-reef algal-coral" zone, and "outer-reef coral" zone. The seaward boundary of the outer-reef coral zone was defined by the termination of the limestone reef platform, beyond which bottom composition consists of a flat, gently sloping sand plain. A sub-survey was performed for each of these zones and the results are described below.

Nearshore Algae Zone

The nearshore algae zone consisted of a pitted and eroded limestone platform covered with calcareous sand and rubble. This zone stretches approximately 50 ft from the shoreline and ranges from one to five ft in depth. The limestone is devoid of living corals but is inhabited primarily by the invasive red alga *Acanthophora specifera*. Several other species of red alga such as *Hypnea musciformis* and *Halymenia formosa* were also noted in this zone (DLNR, 2013).

Mid-reef Algal-coral Zone

The mid-reef algal coral zone increases in depth and distance from the shore and has dense algal coverage along its bottom. Isolated living coral heads were observed primarily on the upper surfaces of rocky projections elevated above the limestone platform. The predominant coral species observed in this zone were *Porites lobata* and *Montipora patula*. Motile macrobenthos, such as sea urchins, were extremely scarce along the nearshore and mid-reef zones (DLNR, 2013).

Outer-reef Coral Zone

The outer reef coral zone extends across the reef platform from a distance of approximately 200 ft from shore to the seaward edge of the reef platform, and its depth ranges between 10 to 25 ft. The primary coral species in the outer reef zone were *Pocillopora meandrina* (cauliflower coral), *Porites lobata*, (lobe coral), and *Porites compressa* (finger coral). Many of these colonies were up to several feet in diameter, indicating that they are very old.

The outer reef zone terminates at approximately 25 ft in a margin, where the limestone platform transitions into a flat, gently sloping sand plain. In many areas of West Maui, the sand plains beyond the reef platform are colonized with vast pastures of the calcareous green alga *Halimeda*; however, no pastures of *Halimeda* were observed during the 2010 study offshore of theHololani.

Macro-invertebrates observed on the surface of the outer reef included several species of sea urchins (*Echinometra matheai*, *Echinothrix diadema, Tripneustes gratilla,* and *Heterocentrotus mammilatus*), inhabiting the bare limestone reef platform rather than living corals. In addition, reef fish were low in abundance throughout the study area. The most common fish observed were mixed-species of the family Acanthuridae (surgeonfish) occupying mid-water near the outer margin of the reef platform. Green sea turtles (*Chelonia mydas*) are commonly observed within the nearshore areas of West Maui, although none were observed during the study (DLNR, 2013).

Potential Impacts and Proposed Mitigation Measures

Existing benthic resources within the footprints of the beach stabilization structures may be negatively impacted; however, BMPs such as coral colony avoidance or relocation may be employed to minimize impacts. The new structures will provide additional habitat for fish, marine crustaceans and other organisms, which may be a positive project impact over time. A benthic survey will be conducted for the project area to assess the potential impact to marine biotic communities from the proposed action as part of the environmental review process and the DEIS.

During dredging activities, avoidance of reef, and sensitive habitat are among the most effective BMPs and care would be taken to identify reefs, breaks, and habitat in the vicinity prior to undertaking any work in the project area. Additional BMPs would include designated observers for RTE species, careful location of spuds and anchors to avoid sensitive habitat, water quality monitoring, and turbidity curtains. Project-specific BMP and AMAP Plans will be submitted and approved by DOH-CWB prior to the commencement of construction activities.

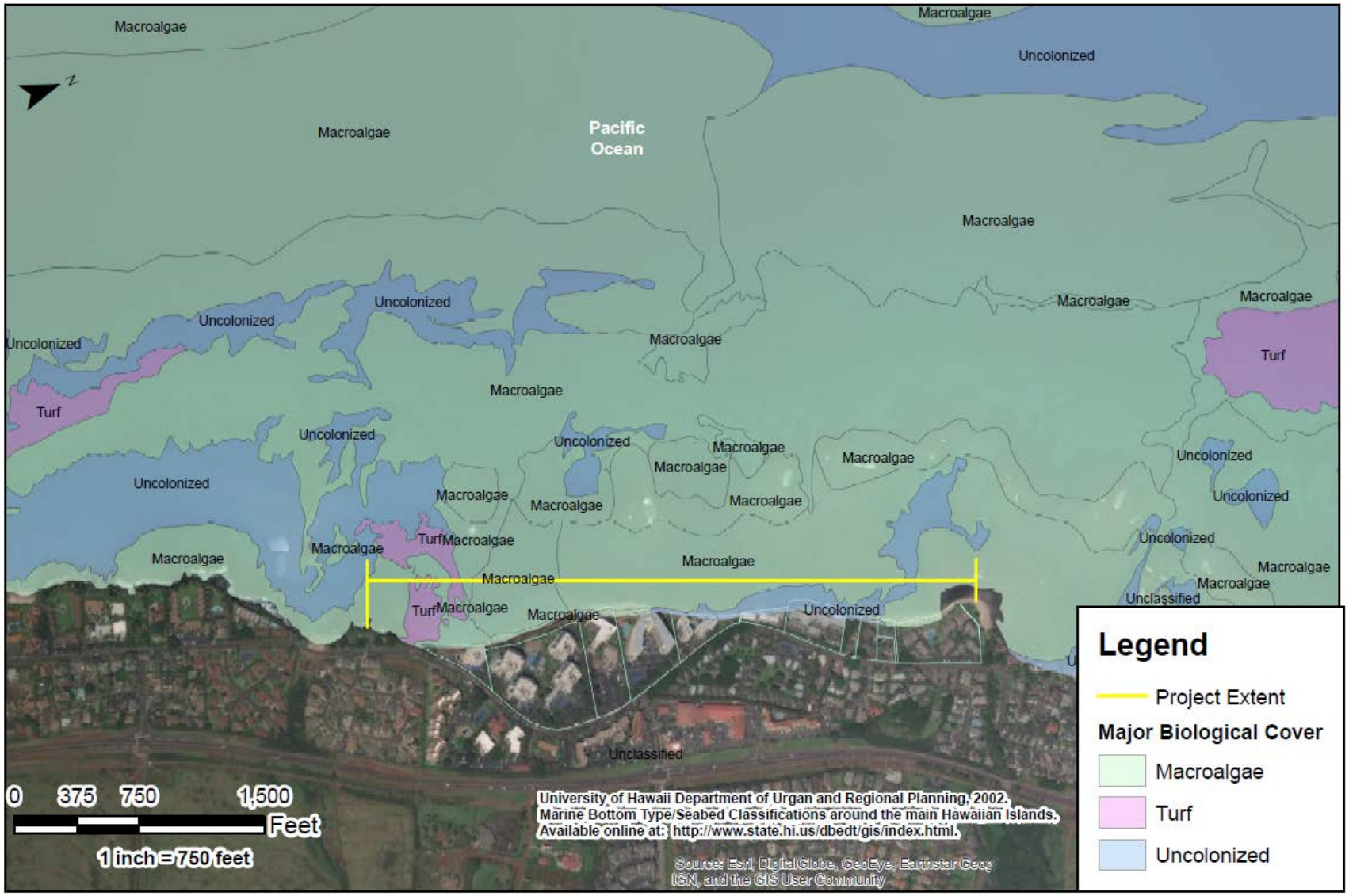


Figure 4-13: Benthic Major Biological Cover

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4.3.5 Nearshore Marine Environment / Benthic

Existing Conditions

A survey of nearshore marine environment in the Kahana Bay was conducted in 2010 as part of an EA performed for the Hololani Resort (DLNR, 2013). The shallow nearshore region in from one to five feet below MSL is comprised of an eroded limestone reef platform covered with calcareous sand and rubble. This area is devoid of living corals but covered with an invasive red alga. The limestone reef platform extends offshore for about 300 ft to about 25 ft in depth, and then transitions to a sandy plain beyond the reef. A bathymetric map is included in Figure 4-14.

The nearshore conditions near Kahana Beach are typical of the region with fringing offshore reef and pockets of sand. The amount of sand on the beach is highly variable and depends on the local wave climate. Waves from the south during the summer tend to bring sand from the more southern reaches of Kahana Beach, while waves from the north and northeast tend to strip the sand away during the winter (DLNR, 2013).

During low tide or where beach sand has migrated away, the substrate is littered with stony plates ("shingle") of beach rock. Beach rock is formed by weakly cemented beach sand, and linear outcrops are often visible in many nearshore areas of West Maui. The presence of the beach rock fragments and the apparent onshore migration of these fragments during high surf conditions are indications of offshore sources. The substrate underlying the sand and beach rock is red clay, typical of Maui shorelines. The red clay is easily suspended in the water column when eroded by wave action, which can lead to significant turbidity issues in the water (Figure 1-4).

Potential Impacts and Proposed Mitigation Measures

The proposed action is expected to have significant impacts to the nearshore marine environment. An in-depth assessment to the nearshore marine environment and marine biotic communities will be carried out as part of the environmental review process and included in the DEIS.

4.3.6 Fish Habitat

Existing Conditions

A survey of the nearshore marine environment in the Kahana Bay was conducted in 2010 as part of an EA performed for the Hololani Resort (DLNR, 2013), which is included in the KBSC; however, the survey only covered a portion of the project area.

Potential Impacts and Proposed Mitigation Measures

An updated benthic and marine impact study including updated fish assemblages, abundance, species diversity, and habitat will be performed as part of the DEIS. The benthic survey will be conducted for the project area with an assessment of the potential impact to fish habitat from the proposed action as part of the environmental review process and the DEIS.

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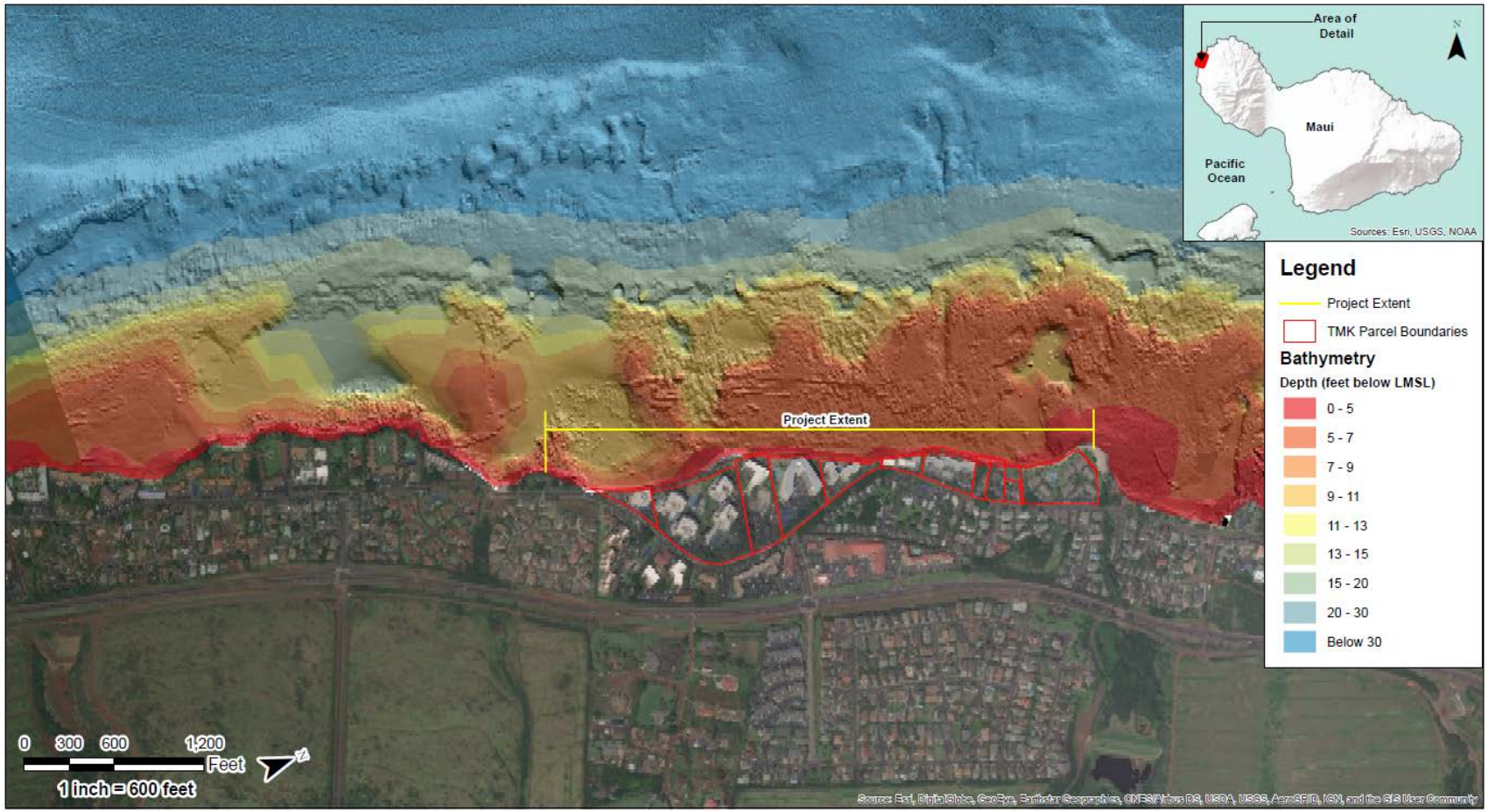

Figure 4-14: Bathymetric Map

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4.4 SOCIOECONOMIC AND CULTURAL RESOURCES

4.4.1 Economy

Existing Conditions

The main economic driver of the Kahana Bay area is tourism due to its shoreline location and accessible sandy beach area. Beaches are the leading tourist destination in the U.S. (approximately 2.2 billion day visits per year) (Houston, 2013). Tourism is a leading provider of jobs in Hawai'i's economy, and condominiums and timeshares are popular in West Maui. The proposed project is being privately funded by the nine condominium associations with property along Kahana Bay.

Potential Impacts and Proposed Mitigation Measures

Construction of the proposed action is expected to create temporary construction and some local construction-related jobs. In the long-term, the proposed action will create a wider, more stable beach that could be used by visitors and residents for years to come. The proposed action is expected to strongly support the tourism economy and tourism-related jobs in the Kahana Bay area as well as maintain or increase property values in the area. Impacts to the economy, property values, and the labor force will further be discussed in the DEIS.

4.4.2 Population and Demographics

Existing Conditions

As the project area is a popular tourist destination, there is a large percentage of visitors at any time during the year. Historically however, the population of Maui has been growing rapidly; the population of Maui is expected to reach nearly 195,000 residents by 2030. Trends of significant population and job growth are expected through 2030. In West Maui, condominiums, timeshares and other vacation rentals have an impact on job opportunities and their distribution across the island (County of Maui Department of Planning, 2012).

The project area is part of the Napili-Honokowai census designated place (CDP). According to the 2010 census, the total population of Napili-Honokowai CDP was 7,261 and the median age was 38.3. 20.7% of the population is under 18 years old and 9.0% of the population over 65 years old. The Napili-Honokowai CDP contains approximately 10.6% of the total County of Maui population (U.S. Census Bureau, 2018).

The median household income for the Napili-Honokowai CDP is estimated at $54,871 for the years 2012-2016, which is lower compared to the median household annual income for the County of Maui ($68,777) and the State of Hawai'i ($71,977) (U.S. Census Bureau, 2018).

Potential Impacts and Proposed Mitigation Measures

The proposed project is not anticipated to have any impacts on the size of the population or their demographics within the Napili-Honokowai CDP or the surrounding neighborhood area. In the long term, it will preserve tourism in the area. A more complete discussion would be provided in the DEIS.

4.4.3 Scenic and Open Space Resources

Existing Conditions

The oceanfront viewplane of West Maui is an iconic attraction for visitors and permanent residents alike. The scenery includes views of the islands of Molokaʻi and Lanaʻi, and the Pailolo Channel offshore of the beach. During the winter season, views of humpback whale activity are common.

The ongoing erosion at Kahana Bay has impacted the aesthetics of the shoreline. Emergency shore protection such as geotextile sandbags and geotextile fabric have been or are currently deployed to protect property, buildings, and amenities from erosion. Emergency and permanent shore protection, active erosion scarps, salt-damaged vegetation, collapsed trees, exposed roots and root balls, and caution tape are very unsightly compared to the once pristine sandy beaches that fringed Kahana Bay. Red and brown plumes and high levels of turbidity in nearshore waters from exposed banks and escarpments are observed often following storm events (Figure 1-4).

Potential Impacts and Proposed Mitigation Measures

Construction equipment could intrude on coastal views for a short period of time during dredging, sand placement and construction activities. This may include barges, dredge equipment, cranes, dump trucks, excavators, or loaders that could be present on the beach or offshore throughout the duration of the project.

Visible turbidity during construction may impact the waters offshore of Kahana Bay; however, BMPs would be implemented to mitigate adverse impacts. Water quality and turbidity are further discussed in Section 4.1.6. Turbidity from soil erosion and embankment collapse will decrease with the implementation of the proposed project. The reduction in the number and extent of sediment plumes in nearshore waters as a result of a wider beach should create more favorable aesthetic conditions.

An observer standing on the shoreline looking seaward (*makai*) may see the permanent beach stabilization structures extending from the shoreline into the ocean, limiting the unobstructed oceanic view of the horizon from the shore and impacting views along the shoreline. Restoration of the sandy beach to replace emergency shore protection will result in a much more natural and consistent view when looking landward (*mauka*) or along the shore. Other visual, aesthetic, scenic and view plane resources, impacts, visualizations, mitigation measures and resource protections would be further discussed and presented in the DEIS.

4.4.4 Archaeological Resources

Existing Conditions

Land use in the coastal area of West Maui in pre-contact and early historic times involved the use of coastal resources, cultivation of *loʻi* and small gardening plots. Industrial agriculture began with sugarcane cultivation in 1859 with the formation of the Lahaina Sugar Company. The Pioneer Mill Company bought Lahaina Sugar Company in 1863 and initiated the Pioneer Railroad line in 1882, which was extended to Kahana in 1919. Commercial and residential development of the coastline along Lower Honoapiʻilani Road began in the 1970s. The extensive agricultural, and later commercial

real estate development catering to multi-family and resort uses likely destroyed or severely degraded archaeological sites along the coast.

A study conducted by Xamanek Researches (1999) as part of an EA for a County of Maui roadway improvement project near the project area found no archeological sites in the vicinity of the project site. Three sites, two previously known and one found by the authors on the shoreline, were found north of Kaea Point (mouth of the Kahana Stream). Archaeological surveys were generally concentrated on the incised gulch areas cut by streams according to the study.

Offshore sand borrow areas are highly unlikely to contain *in situ* archaeological resources or *kapuna iwi*, as these areas would be subject to volatile environmental forces, such as wave scour, that would destroy archaeological resources if they had been present. The likelihood of encountering cultural artifacts along the beach and nearshore area is not considered high given its alteration, both from natural and man-made forces, over the past half-century.

Potential Impacts and Proposed Mitigation Measures

The full extent of monitoring will be determined during development of an Archaeological Monitoring Plan (AMP), which will be reviewed and approved by the State Historic Preservation Division (SHPD) before project construction begins. A Cultural Impact Assessment (CIA) and an Archaeological Inventory Study (AIS) are anticipated as part of the project.

No historical, cultural, or archaeological sites have been identified in the specific vicinity of the project area. The proposed project includes no subaerial excavation; therefore, no disturbance to archaeological resources is anticipated. The proposed sand placement area is located where there presently is no soft substrate necessary for a burial. The offshore sand deposits consist of submerged marine sands, and therefore *iwi kapuna* are not expected to be found within these deposits.

Nonetheless, any excavation that would result in ground altering activity will be monitored by a qualified archaeologist. If either a historic property or *iwi kapuna* are inadvertently encountered during construction, all work in the surrounding area will immediately cease, and SHPD will be promptly notified. Additional discussion of the CIA and AIS would be incorporated into the DEIS.

4.4.5 Cultural Impact Assessment

Existing Conditions

A variety of culturally relevant activities occur along the Kahana Bay coastline, such as net, pole, and spear fishing, collecting limu, and spiritual and recreational activities. Surfing, outrigger canoeing, and free diving occur off of Kahana Bay's shoreline but are not necessarily "customary and traditional practices" performed by Native Hawaiians that are protected by law. Such protected practices are not believed to currently occur on the shores of Kahana Bay; however additional studies and research to identify such practices are anticipated as part of the DEIS process.

Potential Impacts and Proposed Mitigation Measures

A CIA will be prepared for the project. Public meetings will be held, and the local community will be consulted to solicit community feedback concerning cultural impacts of construction activity during the DEIS. Interviews and/or discussions with stakeholders, long-term residents, kapuna, and other individuals with historic or cultural knowledge of the area would be consulted as part of the DEIS and CIA process.

Although customary and traditional Hawaiian cultural practices are not known to take place at Kahana Beach; if cultural practices are found to be performed within the project site, all effort to minimize and mitigate project impacts will be taken.

4.5 PUBLIC SERVICES

4.5.1 Solid Waste Disposal

Existing Conditions

The County of Maui provides solid waste collection service to West Maui. Construction waste is accepted at the Pohakulepo Concrete Recycling Facility (i.e., Hawaiian Cement) and the Central Landfill located in Pu‘unene. The County also has several recycling centers where plastic bottles, aluminum cans, cardboard, glass and other recyclables can be dropped off. A small state recycling service for beverage containers is located on Lahainaluna Road in Lahaina. In addition, the Olowalu Recycling and Refuse Convenience Center is a larger center located on Honoapi‘ilani Highway at Olowalu Village Road, three miles south of Lahaina.

Potential Impacts and Proposed Mitigation Measures

The proposed project is anticipated to have negligible impact on solid waste disposal. Minimal construction waste is anticipated to be generated from the proposed project. Any construction waste generated will be collected and disposed of in accordance with all state and county regulations.

4.5.2 Medical Services

Existing Conditions

The only hospital on island is Maui Memorial Medical Center in Kahului, located approximately 30 miles away in central Maui and approximately 45 minutes away given traffic. Ambulance service is operated under a state contract with American Medical Response (AMR). Two units operate in West Maui: one out of the Napili Fire Station and the other out of the Lahaina Comprehensive Health Center. Other health services in West Maui include the Doctors on Call Urgent Care Center, Urgent Care West Maui, Kaiser Permanente’s Lahaina Clinic, and other small private practices. The West Maui Hospital and Medical Center is expected to open in late 2019 or 2020 in Ka‘anapali.

Potential Impacts and Proposed Mitigation Measures

The proposed project is anticipated to have negligible impact on medical facilities in West Maui.

4.5.3 Police and Fire Protection

Existing Conditions

The Kahana area is served by the Maui Police Department's Lahaina patrol district. The Lahaina Police Station is located approximately five miles away at the Lahaina Civic Center. There is also a police sub-station in Napili.

Fire protection in West Maui is provided by the County of Maui Department of Fire and Public Safety. Two fire stations are located in West Maui: the Lahaina Fire Station located at the Lahaina Civic Center, and the Napili Fire Station located on Honoapi'ilani Highway in Napili. The Napili station is closest to Kahana, located 1.7 miles from the project site. The Lahaina station includes a ladder company and has a boat for ocean rescues. Fire hydrants are spaced at appropriate intervals along Lower Honoapi'ilani Road and provide water for fire suppression.

Potential Impacts and Proposed Mitigation Measures

The proposed project is anticipated to have negligible impact on police and fire protection.

4.5.4 Schools & Education

Existing Conditions

The State of Hawai'i Department of Education (DOE) operates four public schools in West Maui. Additionally, two private schools and the UH Maui College Lahaina Education Center, are located within the area. West Maui schools and educational facilities are listed in Table 4-3.

Table 4-3: West Maui Schools and Educational Facilities

School	Type	Location
Kamehameha III	Elementary	Lahaina
Princess Nahienaena	Elementary	Lahaina
Lahaina	Intermediate	Lahaina
Lahainaluna	High School	Lahaina
UH Maui College (Lahaina Education Center)	Higher Education	Lahaina
Maui Preparatory Academy	Private (PK-12)	Napili
Sacred Hearts School & Early Learning Center	Private (PK-8)	Lahaina

Potential Impacts and Proposed Mitigation Measures

The proposed project is anticipated to have negligible impact on schools and education facilities.

4.5.5 Parks

Existing Conditions

Pohaku Park (S-Turns) is located at the southern extent of the project area. The long-linear park is approximately one acre and offers access to leisure activities, swimming, surfing and ocean recreation. The park has approximately 35 parking spaces, two portable toilets, three picnic tables, two barbeque grills, trash receptacles, and one outdoor shower. It is a popular meeting and socializing place, particularly on weekends, and there is a good seasonal surf break offshore that adds to the site's popularity. The park has a gate that is closed during nighttime hours. Recreation at the park includes swimming, sunbathing, boogie boarding, with limited staging for hand carried watercraft such as kayaks, SUP, and small outrigger canoes.

Kauhale Mahina Park is approximately 0.7 miles south of Pohaku Park. Kauhale Mahina Park is a small open *mauka* area adjacent to a drainage canal located where Hoaka Place intersects with Lower Honoapi'ilani Road. The park has several paved parking stalls, picnic tables and has a wide grassy lawn for lounging and exercising pets.

Honokawai Beach Park is located one mile south of Pohaku Park and offers 27 paved angled parking stalls, picnic areas, restrooms, showers, and outdoor playground equipment for children. The 4.6-acre park offers grassy lawns for leisure activities and is Americans with Disabilities Act (ADA) accessible.

Kahanaiki Park is located adjacent to Kahana Stream just north of where the stream flows under Lower Honoapi'ilani Road. The park and its grassy lawn extend mauka of the roadway along Omaikai Place, a residential cul-de-sac. There are approximately 15 parallel parking stalls along Omaikai Place next to the park.

Further to the north of Kahana Bay is Napili Park. It is a large inland park at Maiha Street and Honoapi'ilani Highway. The park is 8.4 acres with sports areas, picnic tables, a little league baseball field, tennis courts, ADA access, comfort facilities, and 67 parking stalls.

Potential Impacts and Proposed Mitigation Measures

County parks in the area should not be adversely impacted by the proposed action. Impacts to Pohaku Park would be dependent on the scale of the beach restoration project and the location and means of de-watering. For instance, if the drainage basin on the *mauka* upland side of Lower Honoapi'ilani Road is used as a settling basin for nourishment sand, Pohaku Park may have to be temporarily closed during dredging operations for safety purposes; however at this time, no project activities are envisioned within the boundaries of the County park.

An enlargement of the sandy beach along Kahana Bay could attract more users wanting to enjoy the improved coastal resources. This in turn, could result in increased numbers of visitors to Pohaku Park and increased use of its facilities and amenities. An increase in park users could increase the number of times portable toilets would need to be pumped and cleaned, limit the availability of parking given higher rates of visitation, and increase the demand for, and use of, picnic tables and barbeque grills. In general, the existence of an enhanced public beach along Kahana Bay could serve as a growth pole that could lead to greater use of Pohaku Park given its proximity to the project area. A full discussion of potential impacts on parks and recreation will be further discussed in the DEIS.

4.5.6 Recreation Activities

Existing Conditions

Many of the condominium units in Kahana Bay are resort destinations for visitors and permanent homes for many of the owners. Ocean-based recreation in the area includes swimming, sunbathing, beach combing, leisure, and walking activities typical of most beach and coastal areas. The outer reef areas are good for snorkeling and diving with corals, turtles, and reef fish. Fishing for both subsistence and recreation includes a variety of methods such as pole, net, and spear. Taco fishing (octopus by spear) and *limu* gathering (a form of algae) are probably not as plentiful as in the past, but this and other forms of gathering are important cultural and inter-generational activities.

Strong trade winds through the Pailolo Channel create favorable conditions for wind and kite surfing. Small watercraft such as kayaks are launched off Kahana Beach and offer quick access to the offshore reefs for snorkelers. While the use of small catamarans such as a Hobie Cat, are not often used, SUP, single-person outrigger canoes, and boogie boarding are popular along the shore and mostly inside the reef. The popular "S-Turns" surf site is located at the south end of Kahana Beach offshore of Pohaku Park.

Potential Impacts and Proposed Mitigation Measures

In the short term, the proposed action will constrain beach access and some recreational activities in active operations areas during construction as safety BMPs will be employed to keep recreational users out of danger. Construction BMPs and temporary erosion control measures will be strictly implemented to reduce water pollution in nearby recreational areas.

The project will have overall long-term positive impacts on recreational use in the vicinity. Larger and wider sandy beach areas will greatly improve recreational experiences in the area. In addition, use of nearshore waters (swimming, diving, surfing) will be enhanced from improved water quality due to reduced discharges of clay and yard soil erosion. Beach users should experience less crowding as there would physically be a larger expanse of sandy beach upon which to lay, spread out, or disperse on. Beach stabilization structures would likely be used by pole fisherman as fishing posts and may act as artificial reefs that provide additional habitat for fish and invertebrates. A full discussion of potential impacts to recreation, including existing surf breaks and wave patterns, as well measures to avoid, minimize and mitigate adverse impacts on coastal recreational activities would be provided in the DEIS.

4.5.7 Shoreline Access

The primary laws relating to public beach access in Hawai'i include HRS Chapter 115, Public Access to Coastal and Inland Recreational Areas and HRS 205A, CZM program. In its absence, HRS 115-2 allows the Counties to acquire access for public rights-of-way to the shoreline, to the sea, and to inland recreation areas for public transit corridors where topography is such that safe transit does not exist. The development and maintenance of public transit corridors or rights-of-way are generally the responsibility of the county (HRS 115-7).

While access ***along*** the shoreline is protected, there is a common misconception that ***access to*** the shoreline is a public right. When property is subdivided, Maui County requires dedicated access to

the shoreline at 1500-ft intervals, provided it is safe to do so (no cliffs, high embankments, safety hazards, etc.). There is no guaranteed access ***to*** the shoreline except for those Native Hawaiian that have customary and traditional rights to access areas of cultural, spiritual, subsistence, or gathering importance. Access to, or along, the shoreline can, and frequently is, required as a condition of a permit or land use entitlement approval. For instance, oceanfront resort developments often have conditions to provide some form of access to the shoreline, such as a walking path, parking area, shower or comfort station, or other form of access amenity; however, at a resort or large property, an access path to the shore may be programmatic rather than a specific location.

In contrast, *all citizens* are entitled to pedestrian access *along the shoreline*, providing it is safe to do so. In the event that lateral access is hindered by a man-made impediment, such as a seawall or revetment, the owner or beneficiary of the armoring may be required by the State of Hawai'i to compensate for this loss by purchasing a limited term easement from the State or through another approved mitigation measure.

There are three dedicated County shoreline access points within the vicinity of the project, Shoreline Access #28, #29, and #216, the former two being listed in the Maui County's Shoreline Access Report (2005).

Shoreline Access #28, Pohaku Park, is located at the southern end of the project's extent and has ~27 paved parking stalls, picnic tables, barbeque grills, trash receptacles, an outdoor shower, and two portable toilets. The park and parking area are closed at night.

Between the Kahana Beach Resort and the Sands of Kahana is Shoreline Access #29. It has a paved 9-stall public parking lot and a paved walkway to the beach. The paved pathway is adjacent to a lined storm drain and the parking lot is accessible from Lower Honoapi'ilani Road.

To the north, of the T-intersection of Ho'ohui Street and Lower Honoapi'ilani Road is an open, unlined drainage-way on the northern end of the Hololani Condominium property. It is commonly used as defacto access to the shore. The drainage extends from a curve on Lower Honoapiilani Road a short distance to the ocean and presently contains remnants of utility infrastructure that has succumbed to coastal erosion. There are no parking stalls or sidewalks in this area.

Shoreline Access #216 is located between the Kahana Outrigger and Kahana Beach condominiums near the northern extent of the project area. The wide unimproved dirt and sand pathway leads to a sandy beach fronting the condominiums. There are approximately five paved parallel parking stalls along the mauka side of the roadway facing northbound. Cars have also been observed parking southbound on the roadway's unimproved makai shoulder next to the access path.

Potential Impacts and Proposed Mitigation Measures

The proposed action could temporarily interrupt or hinder access to or along the shoreline in the short term during construction activities. These interruptions would be temporary to ensure public safety. Full access would be restored upon completion of the project, if not earlier, as restoration work along Kahana Beach is anticipated to occur in stepwise, sequential fashion from south to north. The project is anticipated to have a positive effect on access along the shoreline by creating a wider beach.

Although the proposed action does not include any specific actions that would add, expand, or dedicate access to the shoreline, it would vastly improve access along the shoreline by expanding the width of the beach to 50 ft on average. By adding clean sand fill to the shore, a larger buffer would exist between the built environment and the ocean that would remain open, undeveloped space for public use, including recreation, leisure and pedestrian access along the shoreline. If warranted, additional discussion of shoreline access and access points would be provided in the DEIS.

4.6 PUBLIC INFRASTRUCTURE

4.6.1 Roadways, Sidewalks, and Public Parking

Existing Conditions

The Honoapiʻilani Highway (Hawaiʻi Route 30) follows the coastline from Maʻalaea in central Maui to Puamana, Lahaina, Kaʼanapali, and Kapalua, respectively, in West Maui. It is the only highway that provides vehicle access between West Maui and Kahului. The Kapalua/West Maui Airport, which is located approximately one mile southwest and *mauka* of the project site, is accessible from the highway.

Access to the condominiums along Kahana Bay is provided by Lower Honoapiʻilani Road, a two-lane County-owned road that runs just inland of the oceanfront condominium developments. The Lower Honoapiʻilani Roadway meets the highway at Honokawai to the south and at Kapalua to the north of the project area.

There are a number connecting roads between the highway and lower roadway, with the nearest being Hoʻohui Road in the midst of the stretch of condominiums. Hoʻohui Road is an approximately 500 ft-long section of the road that connects Upper Honoapiʻilani Road to Lower Honoapiʻilani Road (Figure 1-1).

Lower Honoapiʻilani Road does not have sidewalk or street side parking to the north of Hoʻohui Road. The shoulder of the road is mostly unpaved until it reaches Kepola Place, a *mauka* residential neighborhood access road across from the Kahana Village. The area has a paved sidewalk, paved shoulder, and unmarked parking stalls along the *mauka* side of the Lower Honoapiʻilani Road extending north to nearly the Kahana Stream, which marks the northern extent of the project area.

To the south of Hoʻohui Road, sidewalks exist on both the *mauka* and *makai* portions of Lower Honoapiʻilani Road. The sidewalk on the *makai* side of the road ends at the parking lot entrance to the Sands of Kahana Resort and does not extend all the way to Pohaku Park. This side of the road has a striped, paved shoulder and guard rail. There is also a foot trail from the end of the resort's parking lot to the beach and to the park.

The *mauka* side of Hoʻohui Road has a sidewalk that extends south to Kapua Village across from Pohaku Park at Piina Place. There is a striped pedestrian crosswalk at Piina Place that crosses the road and connects pedestrians to Pohaku Park. The sidewalk continues on the *mauka* side of the road and connects with neighborhoods to the south of the project site.

South of Hoʻohui Road, there are approximately 18 marked public parallel parking stalls located along Lower Honoapiʻilani Road. The majority of street parking stalls are located on the *mauka* side of the

road fronting the Kahana Manor, which has a small grocery convenience store, pub and restaurant, and the Kahana Falls condominium.

Potential Impacts and Proposed Mitigation Measures

Harmful long-term impacts to West Maui roadways are not anticipated. The proposed action will help to protect Lower Honoapiʻilani Road from long-term coastal erosion where it is very close to the shoreline in several locations at Kahana Bay, particularly at the drainage outfall between the Pohailani and Hololani resorts.

The proposed action does not include adding, altering, or expanding public parking or sidewalks. In the long-term, the existence of a wider, more attractive sandy beach could reasonably result in more demand for public parking. Increased pedestrian use of the area could compel an extension of the sidewalk on the makai side of Lower Honoapiʻilani Road that connects the Sands of Kahana Resort to Pohaku Park. Additional discussion regarding parking would be provided in the DEIS.

4.6.2 Water System

Existing Conditions

The County of Maui, Department of Water Supply supplies potable water to the Kahana area from the Kanaha Stream and wells. Water treatment and storage takes place at the Lahaina Water Treatment Facility, which has an average daily production of 1.6 million gallons per day (mgd).

Potential Impacts and Proposed Mitigation Measures

The proposed action is anticipated to have negligible impact on the water system in West Maui.

4.6.3 Wastewater System

Existing Conditions

The condominiums in the project area are all connected to the County's centralized sewer collection line that follows along Lower Honoapiʻilani Road. The Lahaina Wastewater Reclamation Facility (WRF) currently treats an average dry weather flow of approximately 5 mgd. The plant is capable of treating approximately 5.5 mgd (County of Maui, 2018). The Lahaina WRF provides preliminary, secondary, tertiary, and disinfection facilities.

Potential Impacts and Proposed Mitigation Measures

The proposed action is anticipated to have negligible impact on the public wastewater treatment and/or collection system or the capacity of the Lahaina WRF to treat wastewater effluent.

4.6.4 Drainage System

Existing Conditions

Several large drainage channels along Kahana Bay have lined culverts or corrugated pipes that carry upland flows to the ocean. In some cases, standing or stagnant water collects and ponds in backshore areas until a large enough flow pushes out the sediment that is plugging the channel to the ocean. The most notable of these is located at the outlet of the Kahana Stream north of the Kahana Village and Outrigger resorts and a lined culvert along the southern boundaries of the Valley Isle condominium. Stormwater collection and discharge pipes and/or channels are also present between the Hololani and Pohailani condominiums and at the Sands of Kahana where a signed, public shoreline access path is located.

Along the more urbanized segment of the project area south of Hoʻohui Road, curbs and gutters are used to direct stormwater from parking lots, sidewalks, and roadways into storm gutters that ultimately discharge to the ocean. In areas without sidewalks, grated drywells located along the side of the road, such as those *mauka* of the Hololani and Kahana Reef condominiums, are connected to underground stormwater pipes that discharge to the ocean.

A concrete-lined drainage swale at Pohaku Park extends under Lower Honoapiʻilani Road through a box culvert, and there is a large settling basin and stormwater flood control weir on the mauka/upland side of the road. Although not technically part of the park, the drainage infrastructure is designed to be accessible for maintenance. Large rocks and boulders form a revetment on both the northern and southern ends of the park and shore protection is present adjacent to the drainage swale's headwall. The wall and revetment also protect Lower Honoapiʻilani Road, which has a dip in the roadway as it crosses the box culvert and is located very close to the shoreline at this location.

Potential Impacts and Proposed Mitigation Measures

The proposed action is not anticipated to increase stormwater discharge. No alterations to existing drainages are proposed. Where drainage pipes or culverts lead to the ocean, placed sand may act as a filter and stabilize stormwater flows or enhance their percolation into subsurface flows.

A full discussion of potential impacts to drainage systems along Kahana Bay will be provided in the DEIS.

4.6.5 Electrical, Telephone, and Cable Television Services

Existing Conditions

Electrical service is provided by Maui Electric Company. Poles and overhead lines run on the side of the Lower Honoapiʻilani Roadway. The overhead lines cross the street at various locations, such as from the *makai* side of the road at Pohaku Park to the *mauka* side at the Sands of Kahana to the intersection of Honoapiʻilani Highway and Hoʻohui Road. Power lines are mostly on the *makai* side of the road to the north. The utility poles accommodate telephone, cable television, internet, and electrical lines.

Potential Impacts and Proposed Mitigation Measures

Care would be taken by the contractor and equipment operators to ensure that safe clearance under utility lines is provided at all times. Large trucks, cranes, heavy equipment would take precautionary measures before lifting beds or operating overhead equipment so as to avoid entanglement with utility lines. No interruptions in service are anticipated and the proposed action is not expected to have any significant impacts to electrical, telephone, or cable television services.

5 RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

5.1 STATE LAND USE DISTRICTS

Pursuant to HRS Chapter 205, all lands in the State have been divided and placed into one of four land use districts by the State Land Use Commission.

Mauka of the shoreline is within the Urban SLUD for all nine condominium properties and the single Kuleana parcel. These properties are situated *mauka* of the shoreline, and thus within County jurisdiction and regulated by Maui County Code (MCC).

In contrast to the Urban District, areas *makai* of the shoreline are within the Conservation District (Figure 4-1). Portions of privately owned coastal property that have eroded and submerged lands become part of the Conservation District. These areas fall under the jurisdiction of the State DLNR OCCL, where County zoning is superseded per HRS 205-5. The Conservation District is regulated pursuant to HRS-183C, and the rules are detailed in HAR Chapter 13-5. Within the Conservation District, there are five progressively more restrictive subzones: general, limited, protected, resource and special. Each subzone has different objectives and permissible activities based on its resource characteristics. All areas located *makai* of the state-certified shoreline and all submerged lands within the State of Hawai'i are within the Resource subzone of the Conservation District. Permissible activities within each subzone are progressively more restrictive and in turn necessitate progressively greater regulatory review in terms of government approval for proposed activities. Decision making and the granting of approvals by the agency range from simple Site Plan approvals to Department approvals to Board approvals conducted during a public hearing.

Consistency

Beach nourishment, de-watering of dredged sand, construction of retaining structures, and moving sand to widen the beach are all permissible activities within the Urban District per state land use restrictions and designations. These activities are also permissible activities within the Conservation District Resource Subzone.

HAR §13-5-22 identifies land uses, such as beach restoration and the associated permit requirements in the Protected subzone. Identified land uses beginning with the letter (D) require a board approved (BLNR) CDUP.

> *"§13-5-22: P-16 BEACH RESTORATION*
>
> *(D-1) Sand placement in excess of 10,000 cubic yards including structures necessary to retain sand, extraction of sand from submerged lands, and transportation or transmission of sand from an offshore extraction site to the replenishment site."*

The requirements listed for the Protected (P) subzone also apply to the less restrictive Resource (R) subzone. HAR Section 13-5-24 describes more intensive development activities, such as marine construction in the Resource subzone, that also require a CDUP approved by the BLNR.

"§13-5-24: R-5 MARINE CONSTRUCTION

(D-1) Dredging, filling, or construction on submerged lands, including construction of harbors, piers, marinas, and artificial reefs."

A CDUP can be authorized by the BLNR during a public hearing held on O'ahu. In support of and prior to the BLNR decision making, a public meeting would normally be held on Maui to solicit comment and input from the public.

Further discussion would be provided in the DEIS, as warranted.

5.2 STATE CERTIFIED SHORELINE

The shoreline delineates the highest wash of the waves from the highest tide of the year, excluding named storms such as hurricanes or tsunamis. The shoreline can be evidenced by the vegetation or debris lines and excludes artificially induced vegetation. A survey completed by a licensed surveyor is submitted to the DLNR and verified with a site visit by DLNR staff. A notice of the survey and its purpose is published in the OEQC Environmental Notice and offers the public an opportunity to comment. The DLNR Department of Accounting and General Services (DAGS) also posts pictures and copies of the survey on their website for review and comment. Based on public comments, physical geomorphology of the site, and evidence from coastal processes, including historical evidence, the State Surveyor and the DLNR OCCL make a recommendation to the BLNR.

The shoreline is certified by the BLNR during a public meeting on the matter and its certification is valid for one calendar year. Typically, a state-certified shoreline survey is conducted prior to initiation of project permitting. Since the certification expires after 12 months, a state-certified shoreline would likely need to be repeated for a complex project that has to obtain both discretionary (SMA, Shoreline, CDUP) and ministerial permits (building, grading or flood) permits.

The certification process ensures that any encroachments onto the public domain are resolved, determines what jurisdictions are involved, what permits may be necessary, and serves as the basis from which the County shoreline setback line is measured. An easement may be required for any sand retaining structures, or portion thereof, that extend seaward of the certified shoreline. Decisions on easement requests would be made by the BLNR during public hearings and can require a real estate appraisal, a survey delineating the encroachment, its dimensions, and a metes and bounds description.

Consistency

A certified shoreline is not enclosed in the EISPN but is anticipated to be conducted as part of the subsequent discretionary permits; such as the SMA, Shoreline and/or CDUP, if the EIS is accepted. The estimated location of the shoreline would be shown on project diagrams, site plans and applicable schematics and would be reviewed and commented on by the DLNR OCCL and DAGS during the DEIS.

Importantly, the shoreline cannot move seaward from its former position. Thus, if the beach is widened, the County shoreline setback area does not move seaward but rather remains in its present location. Additionally, the land created by a wider, sandy beach would automatically be within the

State Conservation District, under the jurisdiction of the DLNR OCCL, and cannot be developed for private commercial purposes by the abutting condominium properties.

A state-certified shoreline would be obtained prior to final approval and decision making of discretionary permits. Further discussion and the location of the shoreline is anticipated to be included in the DEIS.

5.3 CHAPTER 226, HAWAIʻI STATE PLAN

The Hawaiʻi State Plan is codified as Chapter 226, HRS and sets out broad goals and objectives for land use, development and conservation strategies in Hawaiʻi. For example, Section 226-11(b) states that to achieve land-based, shoreline and marine resources objectives, it is the policy of this State to:

> *"(3) Take into account the physical attributes of areas when planning and designing activities and facilities."*

In 2009, the UH Center for Island Climate Adaptation and Policy prepared the *Framework for Climate Change Adaptation in Hawai'i.* This climate change adaptation effort passed the 2012 Legislature and was signed by Governor Neil Abercrombie as Act 286. The Act is codified as HRS Section 226-109, so that it is integrated into Hawaiʻi's statewide planning and land use system. It encourages the development of BMPs and guidance that integrates HRS Section 226-109, *Climate Change Adaptation Priority Guidelines*, into county and state decision-making.

Section 226-109 establishes ten priority guidelines to prepare the State for the impacts of climate change. Those portions that are bolded below are particularly relevant to the proposed action.

> *"(1) Ensure that Hawai'i's people are educated, informed, and aware of the impacts climate change may have on their communities;*
>
> *(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;*
>
> *(3) Invest in continued monitoring and research of Hawai'i's climate and the impacts of climate change on the State;*
>
> *(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;*
>
> *(5)* ***Encourage the preservation and restoration of natural landscape features, such as*** *coral reefs,* ***beaches and dunes****, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;*
>
> *(6)* ***Explore adaptation strategies that moderate harm*** *or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;*
>
> *(7) Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;*

*(8) **Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities** and other nongovernmental entities, including nonprofit entities;*

(9) Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and

*(10) **Encourage planning and management of the natural and built environments that effectively integrate climate change policy**."*

Consistency

The consistency of the proposed project to the Hawai'i State Plan priorities noted above will be discussed in the DEIS.

5.4 OCEAN RESOURCE MANAGEMENT PLAN

The Hawai'i Ocean Resources Management Plan (ORMP) is a comprehensive state plan that provides a framework for ocean and coastal resource management in Hawai'i. It strives to achieve the delicate balance between economic, ecological, and cultural needs. The 2013 ORMP is the fourth in a series of updates dating back to 1985 and is intended to ensure that Hawai'i's coastal and marine resources are available for current and future generations. The ORMP recognizes that success requires a multi-jurisdictional, multi-disciplined approach and thus coordinates the actions of various county, state, and federal agencies and the input of interested communities. The OP is the designated lead for updating and tracking the plan's implementation. Items that are relevant to the proposed action in the 2013 ORMP are noted below.

"Management Priority # 1 Appropriate Coastal Development

Appropriate Coastal Development Goals:

- *Goal A: Adoption of county plans which specify guidance on coastal development.*
- *Goal B: Strengthen and integrate data management to ensure appropriate coastal development.*
- ***Goal C: Expand options to protect existing developments from further coastal erosion***

***Perspective 1: Connecting Land and Sea** – Careful and appropriate use of the land is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea. […]*

Background

*One of the goals of the CZM Program is to ensure that appropriate setbacks and protections are put into place to ensure appropriate development and structures along the coastal areas. Appropriate coastal development addresses the issues identified under the CZM Act, including coastal hazards (including sea- level rise), historic resources, coastal ecosystems, and Hawai'i's economy for current and future generations. **The most difficult issues to address are coastal development issues that stem from development that already exists.** While great strides have been made, there are many structures "grandfathered" under old codes, and continued pressure from landowners for legislative exemptions from regulatory review. This pressure can be very contentious and stressful for county and state permitting agencies.*

[…]

Target – Where we want to be

- *Manage Retreat. Develop long-term planning and strategies to support managed retreat, which would include location-specific adaptation strategies such as retreat zones, prohibition of shoreline armoring, and assessment of impacts on underground infrastructure and utilities. Public and private property owners may be encouraged to relocate structures inland, with incentives that may include tax-based incentives and third-party acquisition of threatened parcels in fee or by easement.*
- *Site Appropriately. Proposed projects/actions are evaluated during the land use entitlement process to determine the sufficiency of proposed adaptation measures and infrastructure durability over the lifetime of the project, taking into account individual and public economic impacts. This includes considering additional shoreline access, where appropriate.*
  […]
- *Enhance Natural Infrastructure to Build Coastal Resilience. Cost-effective beach nourishment is implemented and streamlined for offshore permitting.*

Example Actions to Accomplish the Appropriate Coastal Development Goals

- *OP continues to review projects during land use entitlement process to determine the sufficiency of proposed adaptation measures and infrastructure durability over the lifetime of the project, taking into account individual and public economic impacts.*
- *OP to support additional shoreline access in its land use reviews.*
  […]
- *Department of Land and Natural Resources Office of Coastal and Conservation Lands (DLNR- OCCL) works on ways to support appropriate coastal development on public and private projects. […]*

Metrics – Indicator Measures

Goal A:

- *Increase in number of additional shoreline access (OP-CZM)*
  […]

Goal B:

[…]

- *Number of projects reviewed by OP during land use entitlement process that include coastal impact risk assessments (OP-CZM)*
  […]"

Consistency

The consistency of the proposed project to the ORMP priorities noted above will be discussed in the DEIS.

5.5 BEACH MANAGEMENT PLAN

The Second Edition of the Beach Management Plan for the Island of Maui was written in 2008 and incorporated by reference into the Maui Island Plan (MIP) (County of Maui Planning Department, 2012). The beach management plan "seeks to promote beach preservation and sustainable development of the coastal zone".

Section 3 of the Beach Management Plan discusses SLR and cites the data brought forth by the Fourth Assessment Report of the IPCC as evidence of SLR. One of the objectives in response to SLR is to "Identify communities and developments at risk of sea-level rise inundation and develop long-term plans to address the associated issues of a rising water table including drainage and leach field failure, flooding, wetland formation and salt-water intrusion into aquifers, as well as coastal erosion and increased susceptibility to damage from storms, hurricanes, high surf and tsunami."

Section 4 of the Beach Management Plan addresses beach nourishment as a "favorable method of shore protection" if used in conjunction with structures such as groins to "simulate the effect of headlands". The Plan states that "Beach nourishment is the only management tool that protects coastal development without degrading the beach. Preserving or restoring a beach has direct, beneficial impacts on recreational opportunities and property values". Recommendations to enhance beach nourishment efforts related to the project include:

> *4.1e) Identify, map, and sample potential offshore borrow sites;*
>
> *4.1f) Establish a County fund for cost matching private beach nourishment projects;*
>
> *4.1h) Provide tax incentives for the community and commercial associations that participate in beach nourishment projects.*

Section 6 of the Beach Management Plan addresses preserving Water Quality and states that "Suspended materials such as sediment diminish light penetration and eventually settle out on the seafloor. […] Polluted runoff also transports nutrients, pesticides, and other pollutants to coastal waters compounding impacts on water quality" (County of Maui Department of Planning, 2008).

The Beach Management Plan supports Maui's efforts to build its capacity to tap offshore sand resources. Potential offshore borrow sites should be identified, mapped, and sampled. Local scientists and consulting firms have mapped offshore sand resources for O'ahu (Sea Engineering, 1993). Although a similar study was done for Maui and Moloka'i in 1971 (Campbell, et al., 1971), this study did not include extensive sampling and should be updated. Recent offshore sand studies identified three viable submerged sand sources offshore of Kahana Bay (County of Maui, 2016) (Figure 1-15).

Consistency

Preliminary analyses of the proposed action indicate that the proposed action is consistent with the Beach Management Plan. According to the Beach Management Plan, beach nourishment is the only management tool that protects coastal development without degrading the beach. Preserving or restoring a sandy beach has direct, beneficial impacts on recreational opportunities and property values. The demand for beach nourishment on Maui as well as statewide has grown in recent years and will likely continue to grow. The County of Maui has anticipated this growing demand and the County Planning Department CZM program took the initiative of supporting sand source study to identify sand availability for Kahana Bay.

The consistency of the proposed action to the Beach Management Plan will be further discussed in the DEIS.

5.6 COUNTY OF MAUI GENERAL PLAN

The General Plan for Maui County is a long-term plan for physical, economic, environmental development, and cultural identity of the county. The General Plan is comprised of several integrated plans that are discussed below.

5.6.1 Countywide Policy Plan

The Countywide Policy Plan (CPP) acts as an over-arching values statement and provides a policy framework for the MIP and Community Plans (County of Maui Department of Planning, 2010). The CPP was first adopted in 1980 and updated in 1990 as the General Plan. The CPP was adopted by ordinance 3732 on March 24, 2010 and sets forth over-reaching guidance for the County's growth to year 2030 (Maui County Planning Department, 2010). The CPP provides broad goals, objectives, policies, and implementing actions that portray the desired direction of the County's future over a twenty-year period.

The CPP includes:

1. A vision statement and core values for the County to the year 2030;
2. An explanation of the plan-making process;
3. A description and background information regarding Maui County today;
4. Identification of guiding principles; and
5. A list of countywide goals, objectives, policies, and implementing actions related to the following core themes.

Section IV of the CPP provides several county-wide goals, objectives, and policies, including those listed below given their relationship to the project.

"*Goal: Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity*

Objective 1: Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations […]

Policies:

c. Restore and protect forests, wetlands, watersheds, and stream flows, and guard against wildfires, flooding, and erosion;

e. Protect undeveloped beaches, dunes, and coastal ecosystems, and restore natural shoreline processes; […]

Objective 2: Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island:

Policies:

a. Protect and restore nearshore reef environments and water quality

c. Improve the connection between urban environments and the natural landscape, and incorporate natural features of the land into urban design.

d. Utilize land-conservation tools to ensure the permanence of valued open spaces.

f. Strengthen coastal-zone management, renaturalization of shorelines, where possible, and filtration or treatment or urban and agricultural runoff.

Objective 3: Improve the stewardship of the natural environment

b. Improve communication, coordination, and collaboration among government agencies, nonprofit organizations, communities, individuals, and land owners that work for the protection of the natural environment.

d. Improve efforts to mitigate and plan for the impact of natural disasters, human- influenced emergencies, and global warming.

h. Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.

l. For each shoreline community, identify and prioritize beach-conservation objectives, and develop action plans for their implementation."

Consistency

The relationship and consistency of the proposed project to the CPP will be further addressed in the DEIS.

5.6.2 Maui Island Plan

The MIP was adopted on December 28, 2012. The MIP provides direction for future growth, the economy, and social and environmental decisions on Maui through 2030. The MIP establishes a Directed Growth Strategy and identifies and addresses key environmental, housing, and economic development issues relevant to Maui's current and future generations. The MIP wis used as a policy foundation for day-to-day decision making as well as developing, implementing, and applying policies and regulations (e.g., zoning Community Plans, Project Districts, and other ordinances); and in determining the appropriateness of discretionary development proposals (District Boundary Amendments, Change in Zoning).

Chapter 2, Heritage Resources of the MIP, addresses shoreline protection policy in broad form. It notes that Maui's comprehensive CZM and regulatory framework is designed to protect the shoreline and abutting waters. Human activities contributing to nonpoint source pollution, shoreline hardening, increased development, and lack of beach access are among the major threats to the integrity and the public's use of the island's beaches and coastal waters. With the dynamic nature of Maui's coastal areas, the County will continue to face challenges in its resource management programs.

The MIP contains several objectives and corresponding policies, as well as implementing actions, that are relevant to the proposed action as listed below.

Shoreline Reef and Nearshore Waters:

Chapter 2, Heritage Resources of the MIP, addresses shoreline protection policy in broad form.

"*Objective: Improved reef health, coastal water quality, and marine life*

Policies: Strictly regulate shoreline armoring in accordance with adopted Shoreline Rules, with intent to protect the coastal and marine ecosystem.

Implementing Actions: Adopt coastal landscaping provisions that include standards such as setbacks, buffers, and other measures that promote the use of native plants and xeriscaping

Objective: Acquire additional shoreline lands and shoreline access rights.

Policies:
[….]

2.2.4.b Require the dedication of public beach and rocky shoreline accessways to and along the shoreline where it serves a practical public interest as a condition of development or subdivision approval; future subdivisions and developments shall be consistent with and effectuate, to the extent practicable, the Shoreline Access Inventory Update – Final Report, and its updates. […]"

Consistency

The proposed action would provide a buffer between existing erosion escarpments and the ocean by making a wider, sandy beach. The beach would prevent the erosion of clay and sediment from exposed embankments and rear yards into nearshore waters, which clouds the water column with red/brown plumes that deprive corals of sunlight and negatively affect reefs.

BMPs would be used during all project activities including dredging, de-watering, construction, and placement of sand fill. The BMPs would reduce adverse impacts to coral reefs, nearshore water quality, and marine life and therefore be consistent with the objectives of the MIP.

The use of native vegetation, such as *aki aki* grass and beach morning glories, would be encouraged in areas where plantings are necessary as part of the beach restoration project.

In addition, the proposed action would protect, preserve, restore and improve natural lateral access along the shoreline by widening the beach and the shoreline corridor. The widened beach automatically falls within the State's Conservation District and becomes *part of the public domain and creates a wider public beach*. As the project is financed entirely with private funds, it represents a novel funding mechanism to dedicate shoreline lands and shoreline access in West Maui to the public. The proposed action is consistent with this objective of the MIP.

Natural Hazards:

"Goal: Maui will be disaster resilient

Objective: Greater Protection of Life and Property

Policies: Encourage the use of construction techniques that reduce the potential for damage from natural hazards."

Consistency

The proposed action would help restore the beach by placing sand along the shore, which replicates nature's ability to absorb and dissipate wave energy and make the area more resilient to coastal perturbations. The relationship between the proposed action and the MIP will be further addressed in the DEIS, as warranted.

5.6.3 West Maui Community Plan

The West Maui Community Plan (WMCP) is one of nine community plans for the County of Maui. The community plans detail desired land use patterns and goals, objectives, policies, and implementing actions for various functional areas (County of Maui Department of Planning, 1996). Community plans are more specific to the area and less ubiquitous than County zoning, and a Community Plan designation has the same force of law as a County zoning designation. Currently, the WMCP is being updated by the Maui County Planning Department Long Range Division in conjunction with the community. As an ordinance that has the strength of law, the current land use designations as published in the West Maui Land Use Map one of two are relevant and will be used in the analysis of the proposed action in this document.

The project lies between the mouth of the Kahana Stream on the north end of the project's extent which is designated as Open Space (OS) and Pohaku Park on the south end of the project which is designated as Park (PK) in the WMCP. A drainageway between the Pohailani Condominium (north) and the Hololani Condominium (south) divides the string of condominiums into roughly two similarly sized community plan designations (Figure 4-3). North of the drainageway from the Pohailani to the Kahana Sands is designated as Multi-Family (MF) in the WMCP. South of the drainageway from the Hololani to the Sands of Kahana is designated as Hotel (H) in the WMCP. The area seaward of the condominium and resort developments is designated as Open Space (OS) in the WMCP.

The WMCP (1990) provides definitions of different land use categories, as follows:

Park (PK)

This designation applies to lands developed or to be developed for recreational use. This includes all public and private active and passive parks. Golf courses are further identified as "PK (GC)" on the land use map in order to differentiate golf courses and related accessory uses from other kinds of park uses.

Open Space (OS)

This use is intended to limit development on certain urban and non-urban designated lands which may be inappropriate for intensive development due to environmental, physical, or scenic constraints; this category would include, but not be limited to, shoreline buffer areas, landscape buffers, drainage ways, view planes, flood plains, anti-tsunami areas. Other appropriate urban and non-urban uses may be allowed on a permit basis."

Consistency

Re-nourishing, restoring, or creating a wider sandy beach, including retaining structures if needed, would be consistent with the WMCP designations of MF and Hotel. Except for some equipment and supply staging, the majority of the project would occur along the seaward portion of the coastline in what is mapped as Open Space on the WMCP Map #1 (Figure 4-3).

By definition, OS is intended to serve as a shoreline buffer area. Expanding the area's buffering capacity by widening it with clean, beach quality sand, would be consistent with the intent of the WMCP's land use designation.

Similarly, expanding options and opportunities for recreational use (i.e., PK or Park), by creating a wider beach for walking, sunbathing, launching hand powered water craft or water sports equipment, fishing and surfing would be consistent with developing land for public recreational use.

Further discussion of the relationship between the proposed project and consistency with the WMCP will be provided in the DEIS, as needed.

5.7 COUNTY OF MAUI ZONING

Areas *mauka* of the shoreline are within the County's jurisdiction and subject to County Zoning. Title 19 of MCC regulates land uses in various zoning districts. Starting at the Kahana Stream on the northern end of the project's extent and extending south, the Kahana Village resort and Kahana Outrigger's three properties are designated D-1 for Duplex use. The adjacent private property to the south is designated R-3 Residential and is used for such. The Kahana Reef just south of the residence is designated A-2 Apartment. The six properties to the south, including the abutting Pohailani Condominium all the way to the Sands of Kahana, at the southern end of the project area are zoned H-2 Hotel. The zoning designations are based on the County's digitized zoning map, page A1, that became effective on October 10th, 2018 per ordinance #4883.

Consistency

The zoning designations for each property would be confirmed by the Maui County Planning Department and reported in the DEIS. Additional discussion of the proposed action's consistency with the County's various zoning designations would be provided in the DEIS.

5.8 SPECIAL MANAGEMENT AREA

The United States Congress enacted the federal CZMA in 1972. To comply with the Act, the Hawai'i State Legislature passed Public Law 92-583: The CZMA of 1977. The State law, codified as HRS 205A, contains a number of wide-ranging objectives and policies. These are intended to guide the conservation and development of land and water resources within the coastal zone to regulate competing demands for limited and sensitive coastal resources. The CZMA regulates ten categories of coastal resources and provides objectives and policies to be considered when evaluating a proposed action.

Hawai'i's designated coastal zone includes all land areas of the state and extends seaward three miles to the limit of the state's jurisdiction. To enhance local decision-making and public participation, as well as respect "home rule", the authority to implement the CZMA in Maui County is delegated to each Island's Planning Commission for proposed actions within the SMA and the SSA of each island. The SMA extends from the shoreline at least 300 ft inland or to the nearest state roadway, whereas the SSA is specific to each parcel along the shoreline or adjacent to the ocean.

On Maui, the Maui Planning Commission delegates administration of the CZM program, such as certain permitting and enforcement functions, to the Maui County Planning Department and its Director. The Director may require an assessment of a proposed action within the SMA to determine if the action is "Development" and thus requires a permit or is "Not Development" and is therefore exempt. In contrast, an applicant may waive the Director's assessment and apply for an SMA (Major)

Use Permit. For proposed actions that are greater than $500,000 within the SMA that are determined to be development, the authority to grant approval is vested with the Maui Planning Commission through a public hearing and notification process.

For proposed actions that are "Development" but are valued at less than $500,000, the CZMA allows the Commission to delegate decision making for SMA Minor permit to the Director of the Planning Department. The Director may also approve proposed actions that are determined to be "Not Development" regardless of their valuation; however, the proposed action must meet certain criteria to be considered exempt from the SMA Rules and may only be granted an SMA Exemption after completing an assessment of the action's potential impacts on the SMA's ten regulated resources. In contrast to an SMA Minor or Major Use Permit, an SMA Exemption does not have conditions placed on the approval because the action is, in essence, not subject to the law and exempt. The CZMA provides definitions of what is, and is not, "development" (HRS § 205A-22) (Figure 5-1).

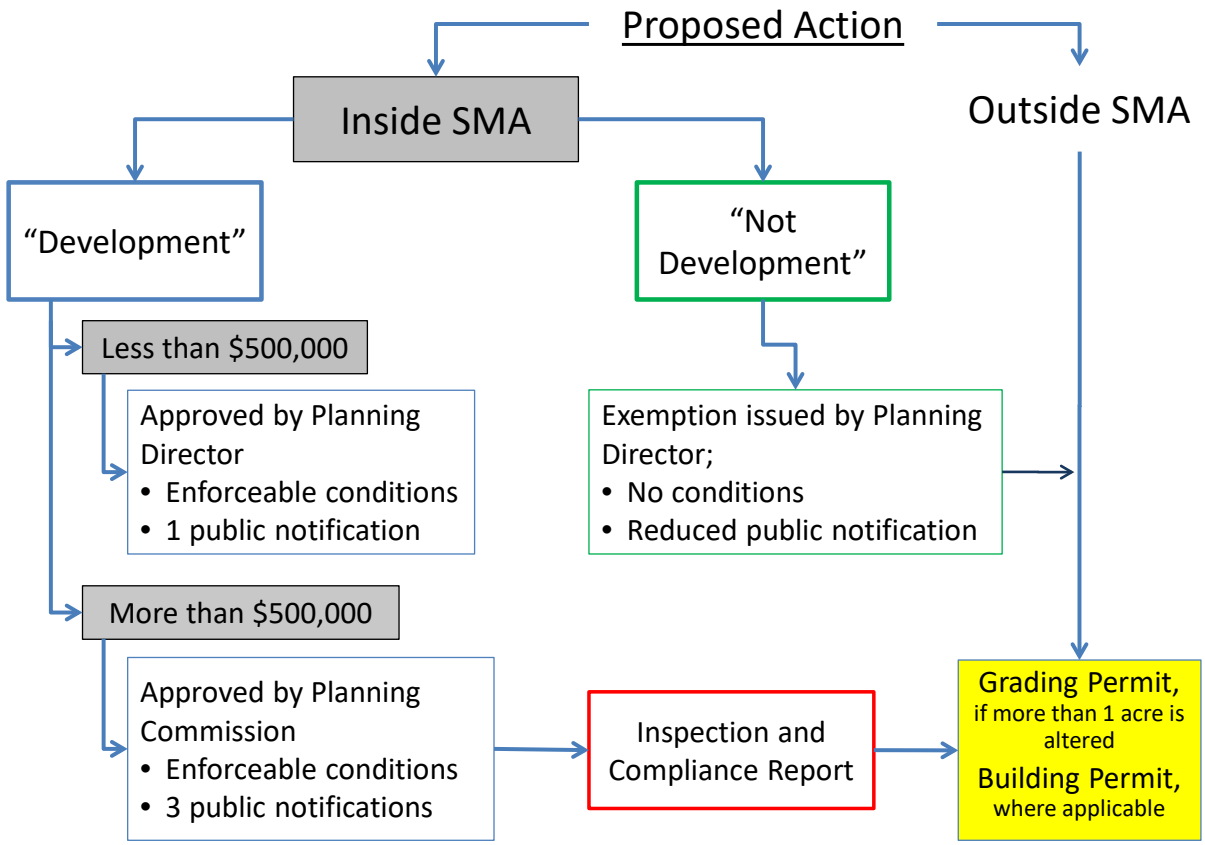

Figure 5-1: Special Management Area Approval Process

The project is located within an SMA (Figure 4-4), and thus the proposed project and the following CZM considerations will be further addressed in the DEIS:

- Recreational Resources;

- Historical/Open Space Resources;
- Coastal Ecosystem;
- Economic Use;
- Coastal Hazards;
- Managing Development;
- Public Participation;
- Beach Protection; and
- Marine Resources.

Consistency

The areas of the proposed action that occur landward of the shoreline and will be within the SMA of Maui County and involve multiple shoreline properties. The proposed action is anticipated to be subject to the SMA and Shoreline Rules, §12-202 and §12-203 et. seq. of the Maui Planning Commission. Any "Development" within the SMA that exceeds $500,000 in cost requires an SMA Major Use Permit approved by the Maui Planning Commission during a public hearing. Similarly, construction or activities within the shoreline setback area require an SSA or SSV approved by the Commission. An assessment of the proposed action's conformance and consistency with the CZMA objectives and policies and its effect on SMA resources will be provided in the DEIS.

5.9 SHORELINE SETBACK AREA

The proposed action areas that would occur within the shoreline setback area would also be part of the SMA addressed previously. Structures or activities within the shoreline setback area under the jurisdiction of Maui County would require either an SSV or SSA pursuant to HRS 205-41 and the Shoreline Rules §12-303 et. seq. of the Maui Planning Commission. The relationship between the proposed action and the Shoreline Rules will be further discussed in the DEIS.

5.10 OTHER REGULATORY REQUIREMENTS

The proposed action, or portions thereof, that would occur within the jurisdiction of Maui County would be required to obtain ministerial permits and plans review by the Department of Public Works. Any new structures within the County's domain would have to obtain a Building Permit, Flood Development Permit and/or Grading Permit. A dune delineation, or a statement indicating the absence of a sand dune, would need to be provided by a qualified coastal scientist as part of the grading permit review process. A list of BMPs to be implemented during construction, de-watering and sand placement would be on the site plans for the proposed action. Reviews for the above permits would ensure that the site plans and construction of the proposed improvements are in concert with MCC, Titles 16, 19.65, and 20.05, where applicable. The proposed action's compliance with MCC for ministerial permitting and plans review processes will be discussed in greater detail in the DEIS.

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6 CUMULATIVE AND SECONDARY IMPACTS

The DEIS is intended to be an informational document that describes existing resource conditions and the potential impacts on those resources as a result of implementing the proposed action. The DEIS is intended to provide a more detailed discussion than the EISPN after gaining further public input and site-specific information from studies, comments, stakeholder input, and investigation of alternatives to the preferred action proposed herein. The environmental documents would describe resources, their existing condition, and the potential for anticipated direct and indirect, short and long-term, and cumulative impacts to each resource as a result of implementing the proposed action.

6.1 DIRECT IMPACTS

This EISPN and the forthcoming DEIS serve as informational documents to discuss the proposed action on a resource by resource basis. The DEIS will compare impacts of the preferred action to the those of the no action alternative, as well as to alternative actions where appropriate.

Direct impacts or effects are caused by the action and generally occur at the same time and place. In many cases, adverse impacts may be negligible. In other cases, BMPs would be implemented to help avoid, minimize, reduce, and/or mitigate adverse impacts to coastal, environmental, natural and/or cultural resources. Still in other situations, resource-specific measures may be required to reduce the impact of the proposed action to less than significant, except where outweighed by a public benefit or interest. The DEIS will discuss these situations in further detail and discuss project specific mitigation measures to be taken. The DEIS will also describe unavoidable impacts on resources.

6.2 INDIRECT AND/OR SECONDARY IMPACTS

Indirect or secondary impacts are those which have the potential to occur later in time but are still reasonably foreseeable. They can be viewed as actions that are taken because of the presence of the project or that the action induced as a result of its implementation. For example, a proposed action that results in substantial population changes or significantly reduces the capacity of a facility to provide public services such as water or wastewater treatment may be considered a secondary impact. Indirect impacts or effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR § 1508.8). To this end, indirect and secondary impacts or effects are treated similarly and as synonymous.

Several indirect or secondary impacts could occur as a result of restoring or widening the beach at Kahana Bay. A larger, wider beach would likely attract more people. Beaches can often act as a natural asset that attracts certain services that cater to beach-goers and ocean recreation, such as food trucks, local markets, and recreation equipment rental businesses. Surf and SUP lessons and SCUBA diving certification may also be services that grow as a result of a restored beach asset.

The demand for trash and recycle bins, solid waste disposal, outdoor showers, drinking fountains, pedestrian access, ADA access, and restrooms or comfort facilities may also increase if the restored beach became popular. Traffic congestion and demand for public parking spaces could also increase, especially at Pohaku Park and along Lower Honoapiʻilani Road. Calls for lifeguards, ocean rescue,

and first responder services may also increase as more people use the beach and ocean for recreation along Kahana Bay. Indirect and secondary impacts as a consequence of implementing the proposed action will be discussed in further detail in the DEIS.

6.3 CUMULATIVE IMPACTS

Pursuant to the HAR, Chapter 200, Section 11-200-2, entitled EIS Rules, a cumulative impact means:

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Cumulative impacts may include the total of all impacts to a particular resource that have occurred, are occurring, and will likely occur as a result of an action, including the direct and reasonably foreseeable indirect impacts of the proposed activity. Cumulative impacts will be discussed in further detail in the DEIS.

6.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Should the proposed action be granted approval, certain resources, such as materials and labor, would be committed to the project and irretrievable. The resources used for dredging, de-watering, sand placement and beach stabilization structures would represent irreversible and irretrievable commitments of resources. The sand that would be placed as fill along the shore would not be considered irreversible as it could shift or move in relationship to wave action and wind; however, its use would be intended to widen the beach rather than covering submerged terrain or habitat. Further discussion of resource commitments that would be irreversible and irretrievable would be provided in the DEIS.

6.5 ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Environmental impacts associated with the proposed action would be thoroughly discussed in the DEIS. The document will analyze potential effects on the environment, infrastructure, land use, socio-economic, recreation, cultural resources, coastal hazards, and natural resources, among others.

Implementing beach nourishment and restoration could result in permanent changes to the visual aesthetic character of the Kahana Bay coastline. Excavating sand from offshore may change the bathymetry and underwater topography of the source area and borrow site. Dredging and removing sand from the borrow site could affect the area's ecology temporarily until the offshore area comes into equilibrium with its surrounding area. Other unavoidable environmental effects could be brought forth through public input and/or studies of the site during the EIS process.

The DEIS would evaluate the potential effects and outcomes of the proposed action and identify adverse effects that likely cannot be avoided as a result of implementing the proposed action.

7 SUMMARY OF UNAVOIDABLE ENVIRONMENTAL IMPACTS

The proposed action would be the first major restoration project of the shoreline at Kahana Bay since construction of the condominiums and their amenity structures. Emergency shore protection has been deployed during erosion events in the past; however, these installations were intended to be temporary and removed when a long-term solution was developed. Several properties have shore armoring that is periodically repaired and others have built or are currently building shore armoring to protect their properties.

Past beach nourishment projects in Hawai'i and in the continental U.S. provide insight on the type and kinds of impacts that can be expected. Adverse environmental effects which cannot be avoided include the following:

- 50,000-100,000 cy of sand would be removed from the offshore sand source, altering the bathymetry and disrupting the ecology of the dredged area until it recovers or normalizes;
- Sand recovered from the ocean, though highly compatible with the dry beach sand, could still have some fine content that would be sorted out and move offshore during the initial equilibration process and during beach erosion events;
- Dredging, transport, and placement of carbonate sand can also increase the percent of fines through mechanical abrasion of the friable grains;
- Rocks, stones, or other objects greater than one inch in diameter may be present in the placed sand;
- Compaction of the sand could occur in high traffic areas during sand delivery and placement operations, potentially forming a hardened berm area;
- When sand is recovered from anoxic environments, which may occur in some portions of the recovery site, it typically has a grey color and malodor;
- During sand recovery operations, minor turbidity may occur as sand is brought from the seafloor to the barge or dewatering area;
- Should anchor lines be used, they would be in place for the duration of the sand recovery and dredging operations and may be unsightly. Dredging and transport operations could disrupt ocean recreation in the area during this period of time;
- The machinery operating on the barge, if used and operating on the beach, would be run from the early morning until later in the afternoon each day, potentially creating background noise;
- All marine activities would take place in the nearshore waters and maytemporarily limit ocean recreation and access during project activities;
- Placement operations would require segments of the shoreline to be cordoned off during trucking and sand fill placement operations for public safety reasons. Access across the cordoned off areas will be blocked, limited or restricted to specific crossing points, with crossing guards where feasible; and

- The beach stabilization structures that may extend seaward from the shore could permanently change the view, alter current and flow patterns, and interrupt longshore drift and transport patterns along the beach.

8 LIST OF PERMITS AND APPROVALS

A summary of potential permitting requirements and government approvals for the proposed action are listed below.

County of Maui

- SMA;
- SSA/SSV;
- Flood Development Permit;
- Grading Permit; and
- Building Permit.

State of Hawai'i

- CDUP (DLNR-OCCL);
- Shoreline Certification (DLNR-Land Survey Division);
- Right-of-Entry (ROE) (DLNR-Land Division);
- Grant of Easement for Groins (BLNR and Land Division, if applicable);
- Archaeological Inventory Survey & Monitoring Plan (AIS/AMP) (DLNR-SHPD);
- Applicable Monitoring and Assessment Plan (AMAP) (DOH-CWB);
- National Pollutant Discharge Elimination System (NPDES) (DOH-CWB);
- Clean Water Act, Section 401 Water Quality Certification (WQC) (DOH-CWB); and
- Coastal Zone Management Consistency Determination (DBEDT, OP).

Federal

- Section 10, Work in Navigable Waters of the U.S. (USACE);
- Section 404, Clean Water Act, for Fill in Waters of the U.S. (USACE); and
- Other Federal laws that may affect the project, including:
    - Archaeological and Historic Preservation Act (16 USC § 469a-1);
    - National Historic Preservation Act (NHPA) of 1966 (16 USC § 470(f));
    - Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC § 3001);
    - Clean Air Act (42 USC § 7506(C));
    - Coastal Zone Management (CZM) Act (16 USC § 1456(C) (1));
    - Endangered Species Act (16 U.S.C. 1536(A) (2) and (4));
    - Fish and Wildlife Coordination Act (FWCA) of 1934, as amended (16 USC §§ 661-666[C] et seq.);
    - Magnuson-Stevens Fishery Conservation and Management Act (16 USC § 1801 et seq.);
    - Marine Mammal Protection Act (MMPA) of 1972, as amended (16 USC §§ 1361-1421(H) et seq.);
    - EO 13089, Coral Reef Protection (63 FR 32701); and
    - Migratory Bird Treaty Act of 1918, as amended (16 USC §§ 703-712).

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9 CONSULTATION

Early consultation has occurred with agencies and organizations in preparation for this EISPN between Oceanit, the KBSC, the Maui County Planning Department, and the DLNR-OCCL and have been ongoing. The DOH-CWB, USACE, and NOAA have also engaged in early, preliminary consultation. These consultations were intended, in part, to develop an erosion mitigation and beach restoration plan that reduces exposure of the built environment to coastal hazards while protecting and enhancing natural, marine, and shoreline resources.

The following agencies, organizations, and individuals will be notified of the DEIS and, where appropriate, correspondence with these entities will be included in the DEIS. Additional government agencies, non-government organizations, and individuals may be consulted in the preparation of the DEIS as a result of the EISPN.

Federal Agencies
Department of the Interior, USFWS
Department of Commerce, NMFS, Pacific Islands Office
DA, USACE Honolulu District
EPA
Hawaiian Islands Humpback Whale Sanctuary

Hawai'i State Agencies
DOH-CWB
DOH-CWB, Maui Office
DOH , Indoor Radiological Health
DOH , OEQC
DOH, Solid and Hazardous Waste Branch

DLNR, Division of Accounting and General Services
DLNR, Division of Aquatic Resources
DLNR, Division of Boating and Ocean Recreation
DLNR, Engineering Division
DLNR, Land Division
DLNR, Maui District Office
DLNR, OCCL
DLNR, SHPD
DLNR, State Parks

Department of Business Economic Development & Tourism, State Office of Planning
Office of Hawaiian Affairs

County of Maui Agencies
Department of Environmental Management
Department of Finance, Real Property Tax Division
Department of Parks and Recreation
Department of Planning, CZM Program
Department of Planning, Zoning Administration and Enforcement Division

Department of Public Works, Development Services Administration
Department of Public Works, Engineering Division
Office of the Mayor, Environmental Program
West Maui County Councilmember Tamara Paltin
Hawaii State Legislature Representative Angus McKelvey
Hawaii State Legislature State Senator Roz Baker

Public Libraries
Hawai'i State Public Library
Kahului Public Library
Lahaina Public Library

Media
Honolulu Star Advertiser
Lahiana News, Louisa Rocket
Maui News

Non-Profit Groups
Aha Moku O Maui – Kamaka Bancaco, and/or Kaipo Kapu
Hawai'i Alliance for Progressive Action - Tiarre Lawrence
Hawai'i Association for Marine Education and Research - Mark Deakos, Ph.D.
Maui Nui Makai Network, CMMA – Jay Carpio
Maui Nui Marine Resource Council – Robin Newbold, Chair, and Amy Hodges
Maui Tomorrow - Albert Perez, Executive Director
Na Papa'i Wawae 'Ula'Ula - Kai Nishiki
Napili Bay and Beach Foundation
Save Honolua Coalition - Tamara Paltin
Sierra Club Maui - Rob Weltman, Chapter President
Surfrider Foundation - Andrew O'Riordan, Chair, Maui Chapter
The Nature Conservancy – Emily Fielding and/or Renee Miller
Marine Program West Maui Community Managed Makai Area - Ekolu Lyndsey, Polanui Hui
West Maui Preservation Association - Sharyn J Martin
West Maui Ridge-to-Reef Initiative - Tova Callender
West Maui Taxpayer Association – Joseph Pluta, President

Concerned Citizens
Karen Chun
Christina Hemming
Lionel Ho'okano
Glenn Kamaka
Robin Knox
Janet Spreiter
Ananda Stone
Paul Hanada
Tina Wildberger

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Appendix A:
Historical Aerial Photos

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oceanit	**1949 Aerial Imagery** **Kahana Bay Erosion Mitigation** **Kahana Bay, Maui, Hawaii**	**Figure 1**

oceanit	**1975 Aerial Imagery** **Kahana Bay Erosion Mitigation** **Kahana Bay, Maui, Hawaii**	**Figure 2**

oceanit®	**1988 Aerial Imagery** **Kahana Bay Erosion Mitigation** **Kahana Bay, Maui, Hawaii**	**Figure 3**

oceanit	**1997 Aerial Imagery** **Kahana Bay Erosion Mitigation** **Kahana Bay, Maui, Hawaii**	**Figure 4**