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

MUFI HANNEMANN
MAYOR

DAVID K. TANOUE
DIRECTOR

ROBERT M. SUMITOMO
DEPUTY DIRECTOR

2006/ED-3(AA)

June 8, 2010

The Honorable Katherine Puana Kealoha, Director
Office of Environmental Quality Control
State of Hawaii
State Office Tower, Room 702
235 South Beretania Street
Honolulu, Hawaii 96813

Dear Ms. Kealoha:

Subject: Chapter 343, Hawaii Revised Statutes
Environmental Assessment (EA)/Determination
Finding of No Significant Impact

Applicant/Owner:	WF Coastal Properties, LLC
Agent:	PlanPacific, Inc.
Location:	4433, 4423 and 4415 Kahala Avenue - Kahala
Tax Map Key:	3-5-3: 8, 9 and 10
Request:	Shoreline Setback Variance
Proposal:	Various alterations within the shoreline setback, including: 1) Build support structures for existing seawalls on Parcels 8, 9 and 10, and install an open metal fence atop the seawalls; 2) install open metal fencing along the sides of properties (one on Parcel 8 and one on Parcel 10); 3) remove stairs within existing seawall on Parcel 9; and 4) apply moss rock veneer to the existing seawall on Parcel 8.
Determination:	A Finding of No Significant Impact is Issued

Attached and incorporated by reference is the Final EA prepared by the applicant for the project. Based on the significance criteria outlined in Title 11, Chapter 200, Hawaii Administrative Rules, we have determined that preparation of an Environmental Impact Statement is not required.

We have enclosed a completed OEQC Bulletin Publication Form, one hard copy, and a compact disk (PDF format) of the Final EA. If you have any questions, please contact Ann Asaumi of our staff at 768-8020.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:cs
Encls.

FINAL ENVIRONMENTAL ASSESSMENT
and Application for a Shoreline Setback Variance & Minor Shoreline Structure Permit

TMKs
3-5-003:008
3-5-003:009
3-5-003:010

Kahala, O'ahu

Prepared for: WF Coastal Properties
Prepared by: PlanPacific, Inc.

May 2010

This document is prepared pursuant to:
The Hawaii Environmental Policy Act, Chapter 343, Hawaii Revised Statutes and
Title 11, Chapter 200, Hawaii Department of Health Administrative Rules.

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Appendices

1.0 Project Summary

Proposed Action:

Build support structures for the existing adjacent nonconforming seawalls on parcels 8, 9, and 10, install open metal fence along the top of the existing seawalls; install open metal fence walls along sides of property (one on parcel 8 and one on parcel 10), remove stairs within the existing seawall on parcel 9, apply moss rock veneer to the existing seawall on parcel 8, and make various other improvements on parcels 8, 9 & 10. The proposed actions would occur within the shoreline setback area.

Property:

TMK	Street No.	Area
3-5-003:008	4433 Kahala Ave	41,376 sq.ft.
3-5-003:009	4423 Kahala Ave	41,730 sq.ft.
3-5-003:010	4415 Kahala Ave	37,213 sq.ft.

Owner/Applicant:

WF Coastal Properties, LLC ("WF Coastal Properties")
1360 Mokulua Drive
Kailua, HI 96734
808-262-4446

Authorized Agent:

PlanPacific, Inc.
345 Queen Street, Suite 802
Honolulu, HI 96813
Contact: Lisa L. Imata, 521-9418

Planning & Zoning:
(all parcels)

State Land Use - Urban District
Primary Urban Center Development Plan - Lower-Density Residential
Zoning District - R-7.5 Residential

Special Management Area:

All three parcels are located within the SMA.

Shoreline Setback:

All three parcels are subject to the 40-foot shoreline setback.

Permitting Agency:

City & County of Honolulu, Department of Planning and Permitting

Consulted Agencies:	City & County of Honolulu Department of Planning and Permitting State of Hawai'i Dept. of Land and Natural Resources, Office of Conservation and Coastal Land Dept. of Land and Natural Resources, Historic Preservation Division Land Use Commission Office of Hawaiian Affairs Federal U.S. Army Engineer District, Honolulu
Required Permits:	Shoreline Setback Variance Minor Shoreline Structure Permit Grading Permit City & County of Honolulu Building Permits
HRS, Chapter 343 Action:	§343-5(3): Construction within the shoreline area as defined by Chapter 205A-41
Anticipated Determination:	Finding of No Significant Impact (FONSI)

2.0 Description of the Proposed Action

2.1 Site Description and Background

The project site consists of three contiguous shoreline lots located at 4433, 4423, and 4415 Kahala Avenue, Island of O'ahu; TMKs 3-5-003:008, 009, and 010 respectively. See Figures 1 and 2. All three lots are zoned R-7.5 Residential and are all currently owned by WF Coastal Properties. In 2006, when the Draft Environmental Assessment (EA) was published, the owner of the lots at the time was Barham Trust. Barham Trust sold the lots to WF Coastal Properties during that same year.

The total area of the project site is 120,319 square feet (sq. ft.), according to a topographic survey. The survey maps indicate the areas for lots 24, 25, and 26 (parcels 8, 9, and 10) as 41,376 sq. ft., 41,730 sq. ft., and 37,213 sq. ft., see table below. The shoreline setback area within the project site slopes down from roughly 9 feet MSL at the east edge, to roughly between 6-7 feet MSL at the west edge. See Appendix A.

Parcel Number	Lot Number	Street Address	Area in Sq. Ft.
3-5-3: 8	24	4433 Kahala Avenue	41,376
3-5-3: 9	25	4423 Kahala Avenue	41,730
3-5-3: 10	26	4415 Kahala Avenue	37,213

The project site was previously developed individually as three residential properties. The site is currently vacant. In 2008, a joint development permit was approved for parcels 8 and 9.

The current owner-applicant plans to construct a new single-family residence on the project site and is already in the process of acquiring building permits. The proposed residential structure will not be located in the shoreline setback area and thus is not subject to Chapter 343, Hawaii Revised Statutes (HRS) or Chapter 23 of the Revised Ordinances of Honolulu (ROH).

Within the shoreline setback area, the project site contains three nonconforming seawalls. A current shoreline certification for all three parcels was approved this year by the Department of Land and Natural Resources (DLNR). The seawalls appear to have been constructed independently of each other, probably each to protect a residence. The City Department of Planning and Permitting (DPP) confirmed that the seawalls are non-conforming under the Shoreline Setback regulations (letter dated August 25, 2005; #2005/ELOG-1968(AM)).

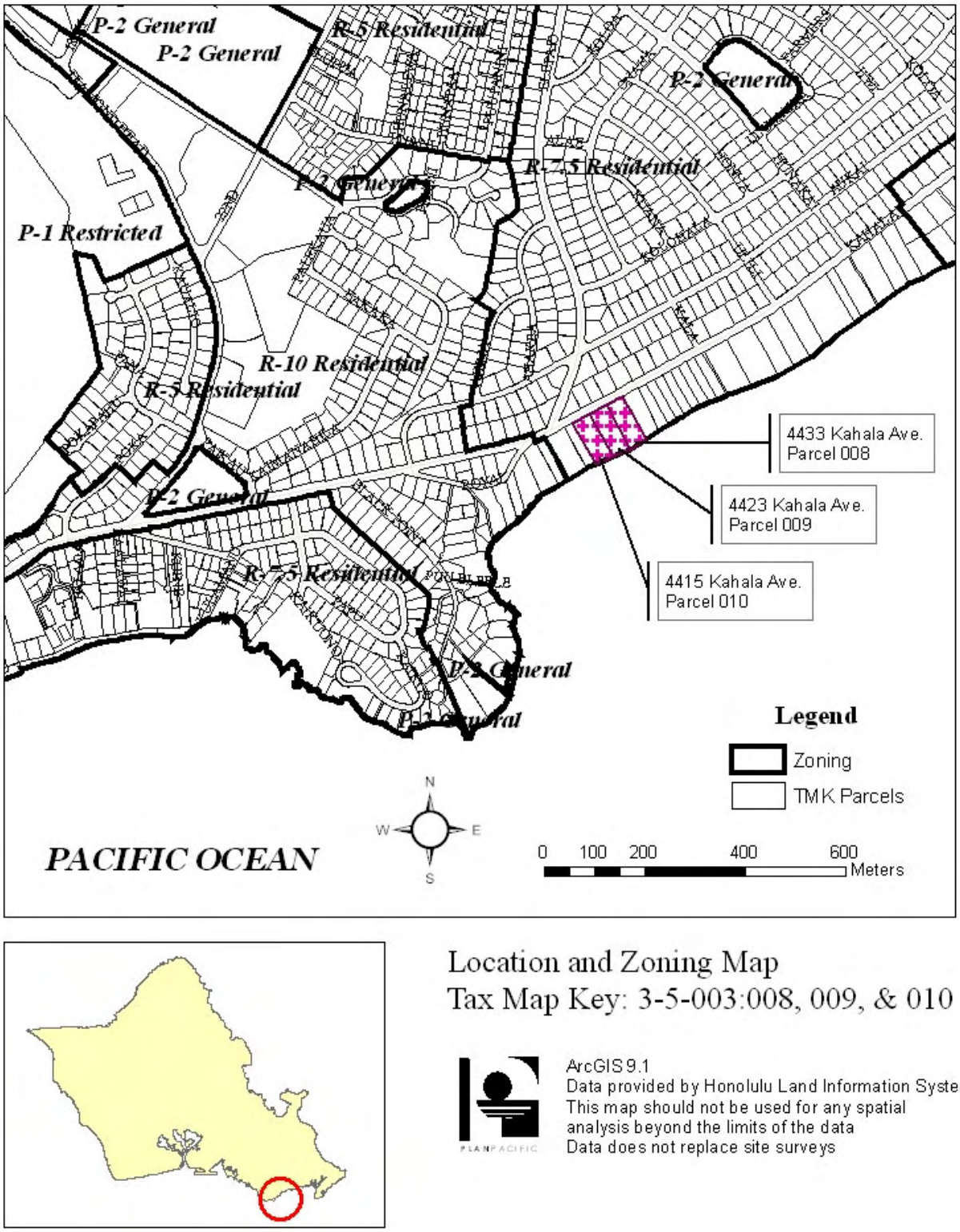


Figure 1: Location and Zoning

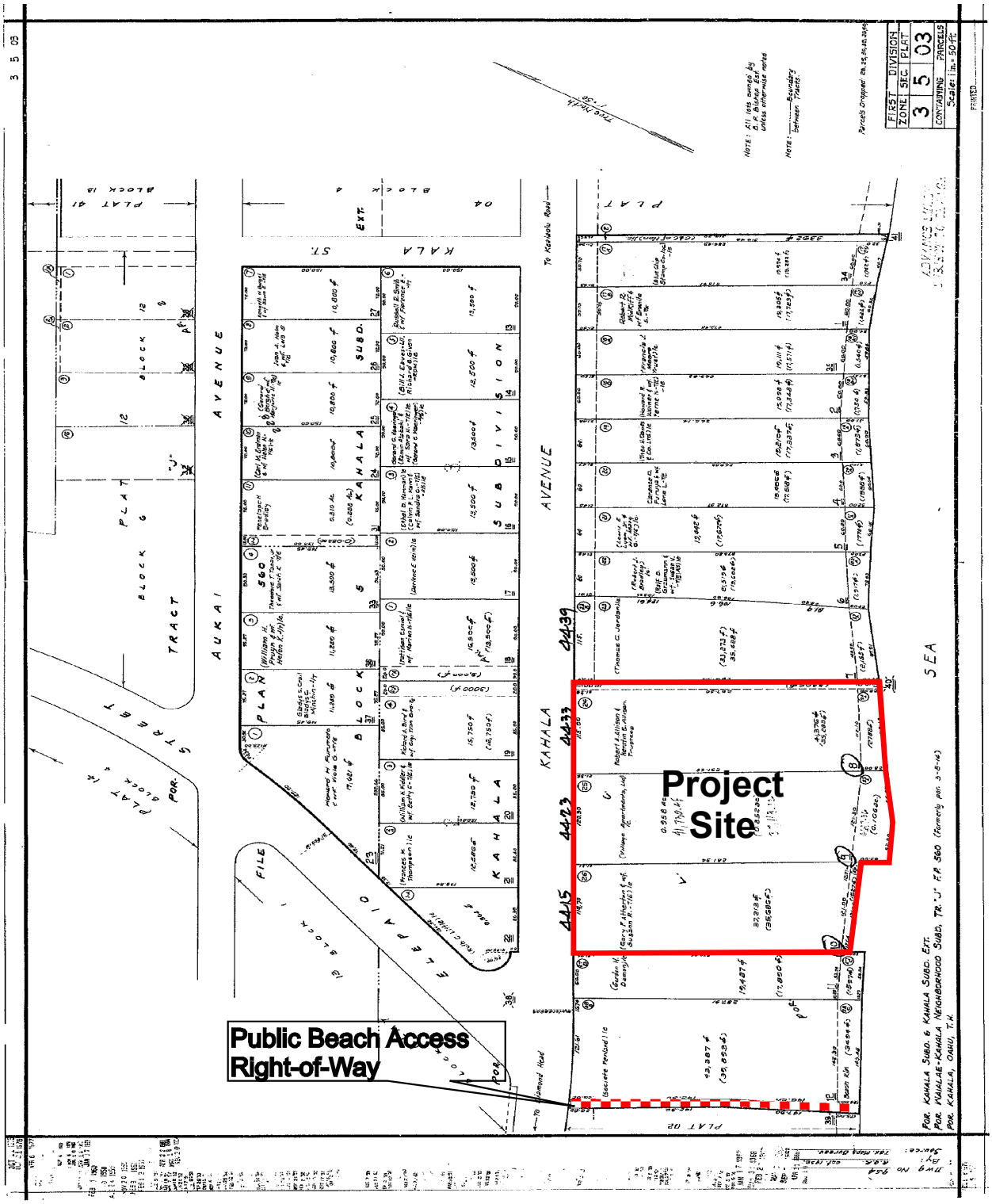


Figure 2: Tax Map Key and Nearest Public Beach Access Right-of-Way

Source: http://www.bing.com/maps/

Figure 3: Aerial Photo, Low-Angle Oblique

The seawall on parcel 10 was the chief subject of the Draft EA as it was most prone to undermining, but a more recent study prepared by IMH Engineering, Inc. recommends reinforcement of all three walls. The applicant proposes to reinforce and repair the seawalls with a range of masonry work as described in the following section 2.2.1 and Appendix B.

Portions of the existing footing of the seawall on parcel 10, totaling approximately 297 sq. ft., extend past the face of the seawall, i.e. the property line, and encroach upon State owned lands. The encroachment was resolved on November 18, 2005, when the State Board of Land and Natural Resources granted the owner applicant a 55-year term, non-exclusive easement for the encroaching portions of the seawall.

In addition to the seawalls, there are various minor structures within the shoreline setback area of all three parcels. They include a concrete tile block landing, two concrete pads, two short concrete walkways, two observation decks and a side wall. All structures are remnants of previous dwellings that no longer exist. See Appendix A:

Topographic Survey. The applicant proposes to demolish and remove most of the remaining existing structures. See Figures 4A-4C Site Plans. Whereas the previous owner-applicant proposed the construction of side walls along the property boundaries and some expansion of structures, the current owner-applicant envisions less hardened structures within the setback area.

A listing and comparison of proposed improvements between the 2006 proposal (reflected in the Draft EA), and the current proposal are shown on the table below.

2006 Proposed Improvements Described in the Draft EA	**2010 Proposed Improvements**
Parcel 10	
Create a new subterranean support structure for the existing seawall to prevent further undermining and eventual failure of the wall (See Wall Retrofit—Type I)	Same
Re-vegetation of the soil as soon as construction is completed	Same
Removal of 5 palm trees to enable construction of the proposed seawall improvement	Same
Removal of a concrete tile block landing	Same
Removal of a concrete pad	Same
Construction of a sidewall	Modified to open sideyard fence
Repair existing stairs incorporated into seawall	Same
Fortify existing deteriorating seawall	Same (See Appendix B, Wall Retrofit—Type II)
Parcel 9	
Removal of the stairs incorporated into the seawall. Fill opening to complete the seawall	Same (See Appendix B, Wall Retrofit—Type V)
--	Create a new subterranean support structure for the existing seawall to prevent further undermining and eventual failure of the wall (See Appendix B, Wall Retrofit—Type I)
--	Fortify existing deteriorating seawall (See Appendix B, Wall Retrofit—Type II)

2006 Proposed Improvements Described in the Draft EA	2010 Proposed Improvements
Parcel 8	
Removal of a large concrete-like surface	Same
Removal of 2 observation decks and associated walkways	Same
Application of a moss rock veneer to the existing sidewall	Deleted. Existing fence/walls in the setback area will be demolished and replaced with a new sideyard fence
Installation of a footbath and shower pole	Deleted
Expansion of a concrete pad at top of seawall stairs	Deleted
Repair existing stairs incorporated into seawall	Same
--	Create a new subterranean support structure for the existing seawall to prevent further undermining and eventual failure of the wall (See Appendix B, Wall Retrofit—Type I)
--	Fortify existing deteriorating seawall (See Appendix B, Wall Retrofit—Type II)
--	Application of moss rock veneer to the existing seawall (See Appendix B, Wall Retrofit—Type IV)
All 3 Parcels	
Grading to improve drainage and flood hazard characteristics	Grading and excavation
Add 2 drywells at the corner of parcels 8 and 10 to capture draining storm water	Deleted (drywells relocated to outside of the setback area)
--	Patch holes and fill cracks on existing seawalls
--	Install new open fence along the top of the seawalls
--	Wall Cap Repair (See Appendix B, Wall Retrofit—Type III)

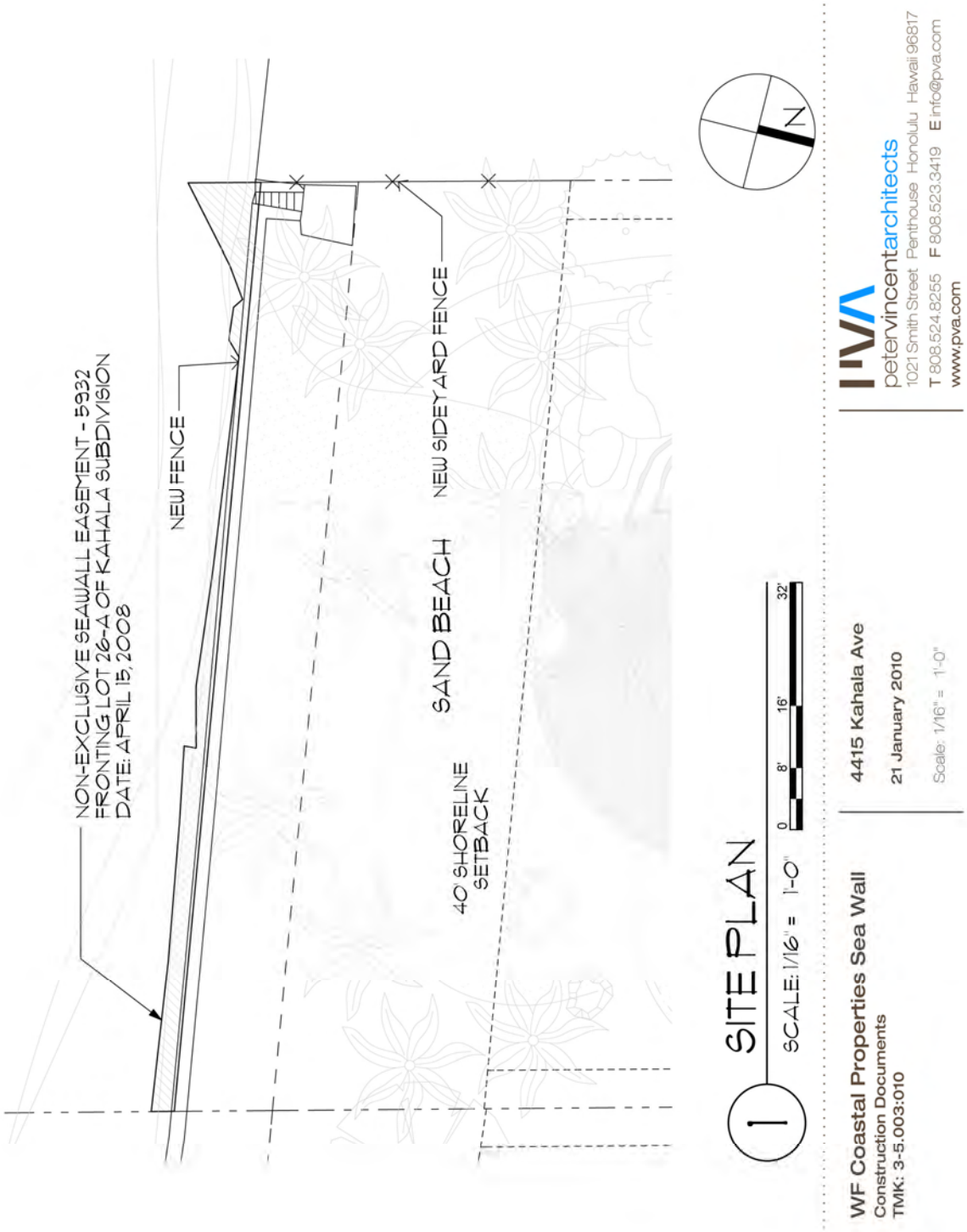


Figure 4A: Site Plan, Parcel 10

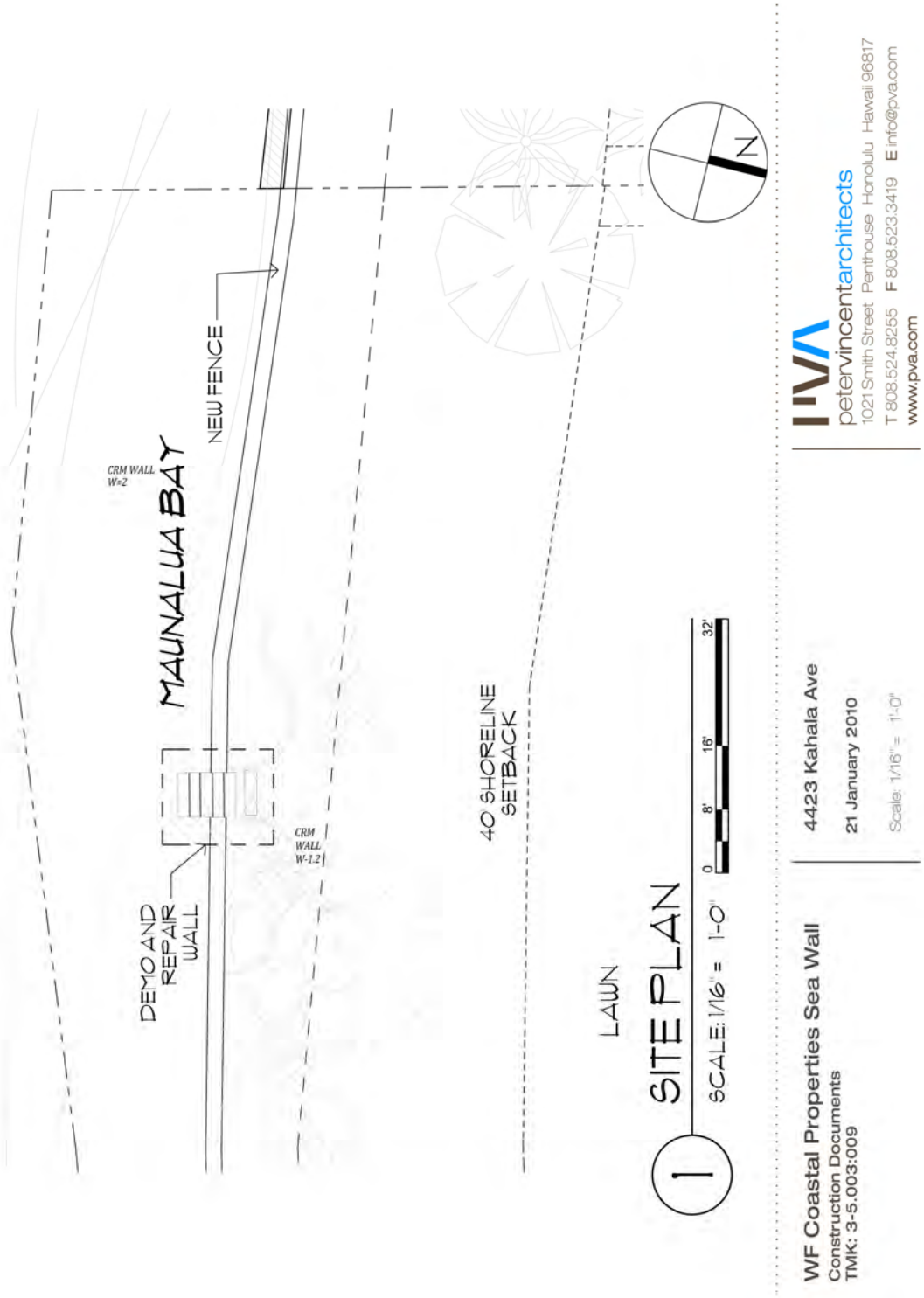


Figure 4B: Site Plan, Parcel 9

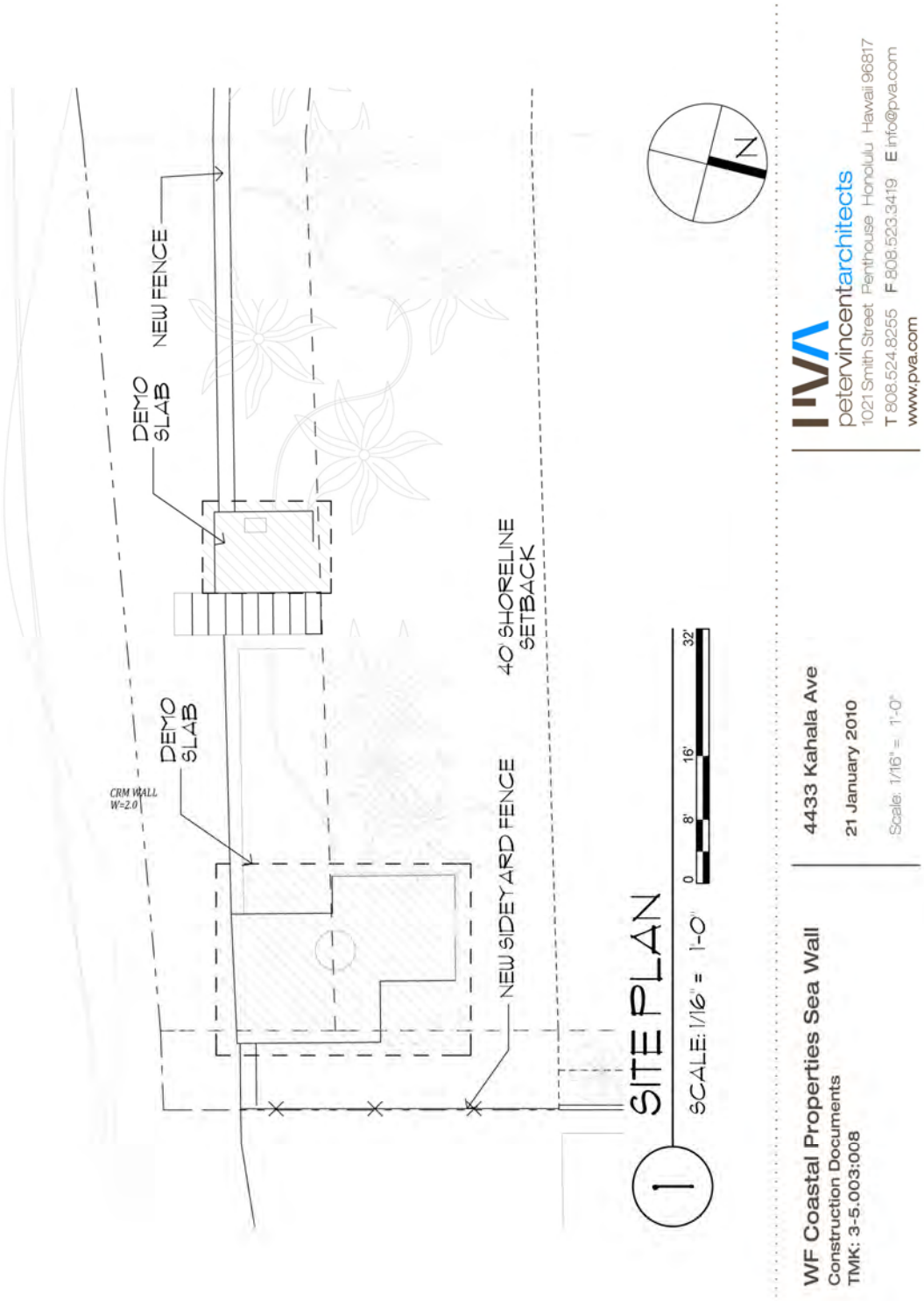


Figure 4C: Site Plan, Parcel 8

A Minor Shoreline Structure Permit is requested for the proposed replacement of an existing chain-link sideyard fence on parcel 10 with an open metal fence, and the replacement of a portion of an existing hollow tile wall on parcel 8 with an open metal sideyard fence. See Section 2.2.2.

2.2 Technical Characteristics

2.2.1 Proposed Seawall Support and Repairs

The applicant is proposing to reinforce and repair the existing seawalls in a variety of ways, see table below and Appendix B.

PROPOSED SEAWALL REPAIRS	
Wall Retrofit Type	**Description of Action**
I	Construct new support structure to reinforce footing
II	Repair cracks
III	Repair cap
IV	Repair face
V	Remove stairs and fill

The most significant work involves the construction of a new support structure inland of the existing seawalls to stabilize the walls and prevent undermining and failure (referred to as Wall Retrofit Type I). The existing wall on parcel 10 will require this type of work. It is constructed of concrete rubble masonry (CRM). It spans the shoreline property boundary measuring 6.25-feet above Mean Sea Level (MSL) and 121.04 feet long. See Appendix H, Figure 1-4. Only portions of the wall extend down to the solid coral ledge, making it susceptible to undermining by high surf and tidal events. Soil erosion mauka of the seawall gives evidence of previous undermining. The eroded area has been filled with course gravel. Lot elevations range from six to eight feet MSL. The seawall extends the length of the seaward property boundary. A set of stairs providing beach access from the property is incorporated in the west end of the wall.

To reinforce the wall and prevent further subsidence, the applicant is proposing to excavate behind the seawall and install a support wall and footing made of lean concrete and reinforced by steel bars. The new support will extend to the coral ledge, thereby filling any gaps and preventing further undermining, see Appendix B, Detail A. Granular fill would be placed behind the new footing, and finally the existing grade would be reestablished. The new structure will be entirely subterranean.

The seawall on parcel 9 is also constructed of CRM, but appears less damaged. Excavations will be done to determine if a support wall and/or solid footing will need to be constructed to maintain the wall's structural integrity. The seawall on parcel 9 has concrete steps crossing through that lead from the property to the adjacent beach. The applicant is proposing to remove these steps and fill the gap to complete the wall (Wall Retrofit Type V). The gap would be filled with CRM to match the existing wall, see Appendix B, Detail E.

The seawall on parcel 8 appears constructed of CRM and coated with concrete. It appears to require the least amount of repair and reinforcement of the three seawalls. There is one stairway that passes through and two concrete landings connected on the landward side. The stairs are to remain, but the landings will be removed. See Figure 4C.

All walls will also be repaired, as needed, to mend cracks on the surface and through the walls (Wall Retrofit Types II, III, and IV). See Appendix B, Details B, C, and D.

Heavy equipment would be used for excavation, operated entirely landward of the seawall. Because construction would proceed in sections, the project would require only limited dewatering. Wastewater would be retained onsite and would not be discharged into State waters.

2.2.2 Various Improvements (Parcels 8, 9, & 10)

In conjunction with reinforcement and repairs of the seawalls, the applicant is also proposing various other improvements within the shoreline setback across the three lots. These are shown in the site plans and described below.

The topography of the property overall is generally flat with little to no rise in elevation from the seaward property line to the street. Minimal grading is proposed in the shoreline setback to provide more efficient drainage across the property and to minimize flood hazards. Within the shoreline setback area, the grading will establish an 8.5-foot MSL elevation at the east edge of parcel 8 and slowly taper down to an 8-foot elevation near the west edge of parcel 9. From there, the elevation will slope down to 5 feet MSL, then remain level until the very edge of the project site where it rises up to 6 feet MSL at the western boundary. The dry wells have been relocated outside of the shoreline setback area.

Minimal grubbing is also proposed for the project site. Most of the existing vegetation along the seawalls will be uprooted during excavation and during construction of the seawall support structures.

As mentioned previously, the applicant proposes to construct a new open metal continuous fence along the top of the seawalls. The fence will be bronze in color and

extend roughly 2 feet in height above the seawalls, see Figure 5. The purpose of the new fence is to provide safety at the top of the walls.

The two new sideyard fences, one on parcel 8 and one on parcel 10, see Figures 4A and 4C are proposed to be made of the same material and color as the seawall fence – open metal bronze. These fences will be 6 feet in height, begin at the landward edges of the seawalls, and have metal posts at every 4 feet. The new fence on parcel 8 will be replacing an existing hollow tile wall and the new fence on parcel 10 will be replacing an existing chain link fence. The purpose of the sideyard fences are to provide security at the property's perimeter.

Demolition and removal of existing concrete slabs and walkways within the shoreline setback area are being proposed as part of the project. On parcel 10, the applicant intends to demolish and remove a concrete slab and a concrete block landing located at the southwest corner. The applicant also proposes to repair a small stairwell incorporated into the seawall. On parcel 8, the applicant is proposing to remove existing concrete pads, sidewalks, and planters, as well as repair the existing stairs.

Landscaping is being proposed for the entire project site. A preliminary landscape plan is included in Appendix D.

2.3 Economic and Social Characteristics

The proposed project would not create any new employment or increase the resident population of the area. It would provide short-term construction employment and related State tax revenues.

2.4 Cultural and Historic Characteristics

The residential properties are not currently used for cultural or religious practices. Public access to the shoreline from the public road would not be infringed upon by the proposed project.

2.5 Environmental Characteristics

The shoreline of the three lots has been protected with seawalls since the 1960s. They were built in response to coastal erosion. Since then, the coastline of this particular area has experienced continual beach loss. Currently, the majority of the Kahala coastline is hardened by shoreline armoring.

Because of the beach loss, lateral access along the shoreline is limited or restricted during high tide. The presence of seawalls does not foreclose the possibility of future restoration or nourishment activities.

The property does not contain threatened or endangered species of plants or animals.

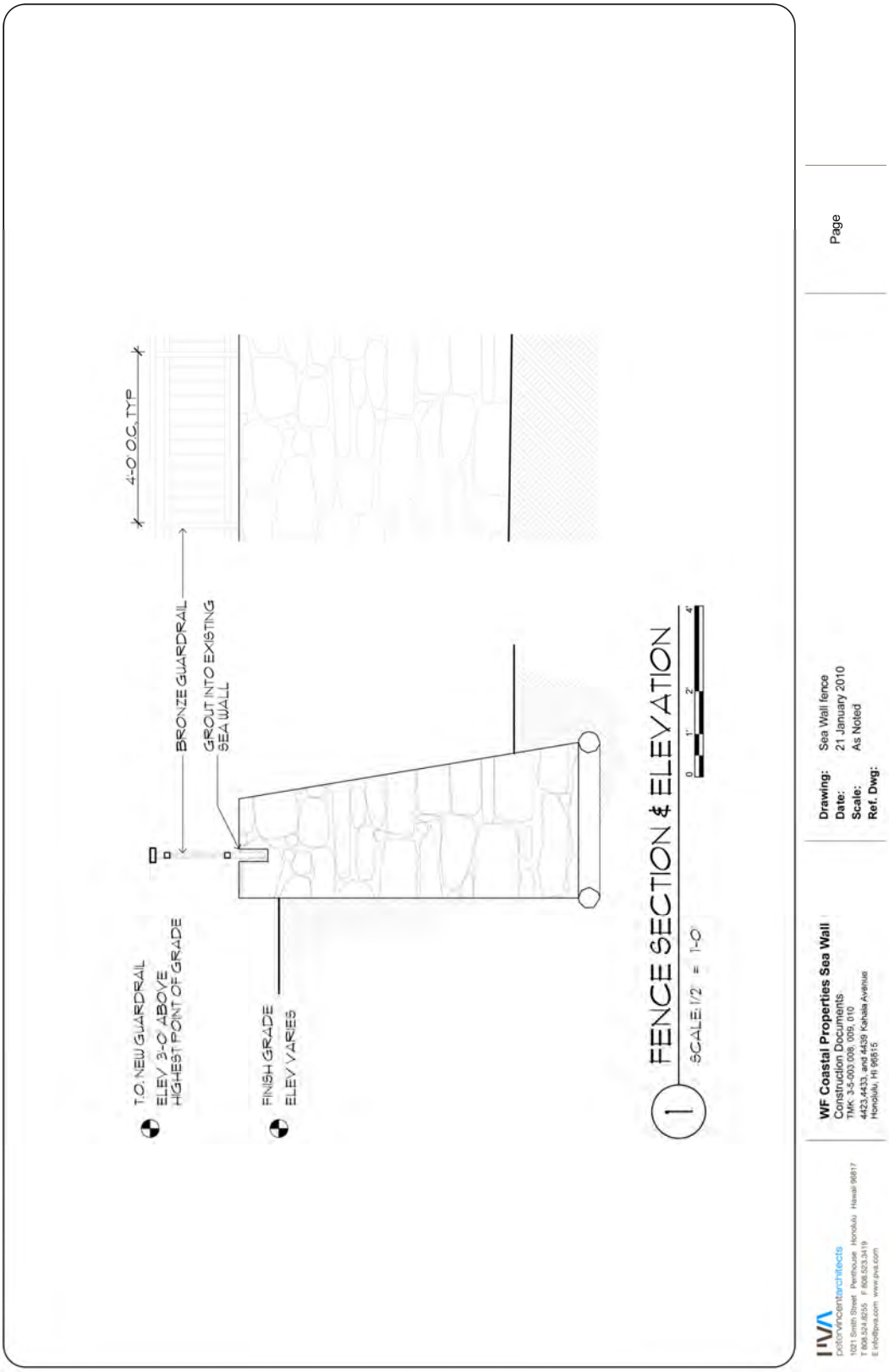


Figure 5: Fence Detail, Seawall

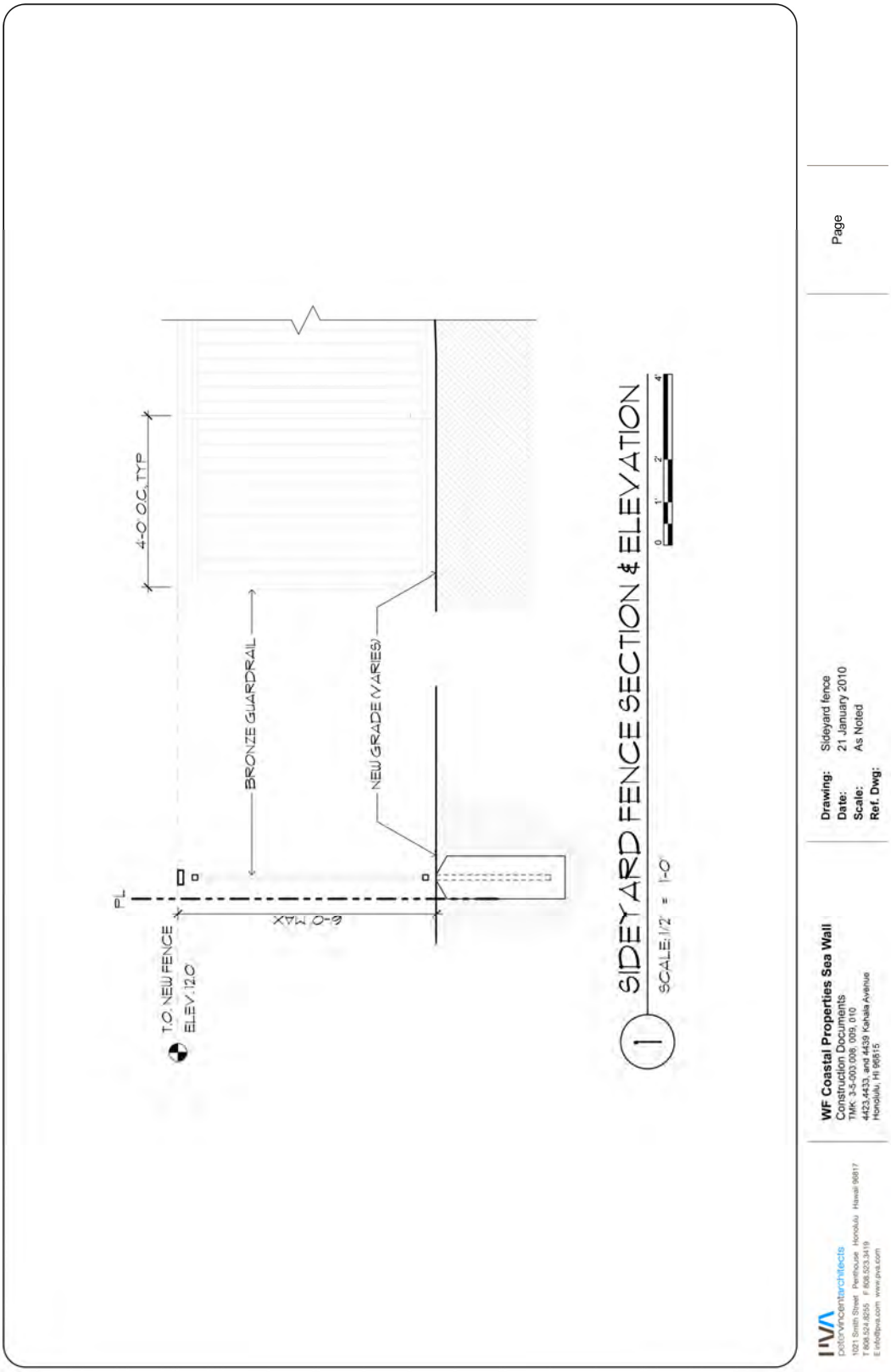


Figure 6: Fence Detail, Sideyards

3.0 Description of the Affected Environment, Impacts, and Mitigation

3.1 Surrounding Area

Kahala is a fully-developed residential community located east of the Diamond Head State Monument. Zoned R-7.5 Residential, the area is subdivided into residential lots that are developed with single family residences. The area is characterized by warm temperatures and an average annual rainfall of approximately 23.62 inches.

The properties are bounded to the north by Kahala Avenue, to the east and west by neighboring residential properties, and to the south by the shoreline. The adjacent properties to the east and west both have nonconforming seawalls built at approximately the same time as the seawalls on the subject lots. The proposed activities will be confined to the subject properties and will have no effect on the surrounding area.

3.2 Shoreline and Coastal Processes

According to a coastal engineering evaluation report done in 2006 by Sea Engineering, Inc., the shoreline fronting the project site is characterized by a wide fringing limestone reef flat over 850 feet in width. The shoreline is hardened by protective seawalls for a distance of at least 1000 feet on either side of the project site. Very little sand has accumulated along the shore in this area, existing as small pockets that are mostly covered during higher tide levels. The shore is prone to erosion as evidenced by the wide area protected by seawalls. The beach itself is characterized by near vertical seawalls. Basalt boulders and cobbles exist intermittently in this area – probably derived from the lava flow that forms the headland at Black Point.

Because of its location on the south shore of Oahu, the project area is most affected by southern swell waves and Kona storm waves. Southern swell waves are generated by mid-latitude storms in the southern hemisphere, while Kona storm waves are generated by local storm systems. The wide fringing reef at Kahala typically forces large waves to break far off shore, preventing them from reaching the shoreline. Larger waves reach the shoreline only in high water level conditions.

Seasonal conditions, episodic coastal storms, wind speed and direction, and other natural processes affect the shoreline. The west end of Kahala Beach has been eroding for at least several decades and property owners have hardened the shoreline to prevent further loss. The hardening fixes the location of the shoreline, preventing further retreat, but may also further inhibit the accumulation of sand. Persistent erosion pressures against hardened shorelines typically results in the loss of the sand beach. Overall, seawalls have a direct impact on natural beach processes over the long-term, but seawalls also serve to protect property along the shoreline and reduce

human exposure to hazards. The seawalls on the subject property are not unique in the area.

3.3 Soil/Topography

The topography of the property is generally flat with little to no rise in elevation from the seaward property line landward. According to the soils report provided by Shinsato Engineering, Inc. (**Appendix C**), the soils in the subject area are Jaucas sand, 0 to 15 percent slopes (JaC). "The Jaucas series consists of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean." The JaC portion of the series is rapidly permeable making runoff very slow to slow. Subsurface borings ranging from 10 to 34.25 feet below existing grade show that the soils consist mostly of sand, gravel, and trace fines.

JaC soils are susceptible to water and wind erosion. Excavation of material on the landward side of the seawalls will increase the probability that soil will erode via wind or water into the adjacent beach and marine environments, especially during heavy rains and storm events. To mitigate soil erosion, exposed soils will be revegetated as soon as possible after construction has ended.

3.4 Water

All earth work is to take place landward of the shoreline. Thus, there will be no major impact to the adjacent marine environment. Precautionary measures, such as the installation of silt fencing prior to ground disturbance, in accordance with Best Management Practices (BMP) will be taken to prevent discharge of materials into ocean waters. The proposed activities to occur on the seaward side of the seawalls are shown as Wall Retrofit Types I, II, IV, and V in Appendix B. The contractor will comply with Hawaii Administrative Rules (HAR) regarding clean water and consult with the State Department of Health, Clean Water Branch to ensure acceptable methodology and materials, and secure permits, if required, prior to construction activities.

3.5 Air

Air quality impacts related to the proposed project would include exhaust emission and dust generated by short-term construction activities. These impacts would be minimal because of the relatively small scope of the project. Construction activities will be conducted in accordance with State air pollution control regulations as outlined in HAR, Chapter 11-60.1-33, Fugitive Dust.

3.6 Noise

The use of machinery and heavy equipment would produce a rise in the ambient noise levels of the area. To mitigate the impact of excess noise, work would be confined to normal daylight business hours and would last only to the completion of the project.

Construction activities would comply with Hawaii Chapter 11-56, Community Noise Control, as determined by the State of Hawaii, Department of Health.

3.7 Flood Hazard

The portions of the lots within the 40 foot shoreline setback area lie within Flood Zone A as determined by the Army Corps of Engineers. Zone A is defined as inundated with water by the 100-year flood. Parcel 8 has a base flood elevation of 10 feet, parcel 9 has a base flood elevation of 9.9 feet, and parcel 10 has a base flood elevation of 9.8 feet. See Figures 7A-7C.

Construction within Zone A will conform to the Flood Hazard District regulations of the Land Use Ordinance (LUO) at the time building permits are submitted.

3.8 Flora/Fauna

The three subject lots were once fully developed with residential homes. Inspection of the site did not reveal any rare, threatened, or endangered species of plans or animals. Common plants that currently inhabit the property include palms, plumerias, grasses, and shrubs. Animals encountered on the property include various species of small birds.

3.9 Historical/Cultural/Archaeological

The State Historic Preservation Division (SHPD) has reviewed the project and commented that a burial site, State site 50-80-14-5320, is present on the subject properties and that overall, the subject properties are in a moderate- to high-probability area for encountering burials. The SHPD recommended that an archaeological survey be conducted for the entire project site. Subsequently, an archaeologist was consulted and a survey of the project site was completed in March 2007, see Appendix E.

The Archaeological Inventory Survey, prepared by T.S. Dye & Colleagues, Archaeologists, Inc., verifies the location of State site 50-80-14-5320, as well as the moderate- to high-probability of encountering burials all along Kahala Avenue. The burial site on the subject properties is a reburial of the remains of three historic era (19th century) individuals that were discovered inadvertently during construction activities that took place in the 1990s. The State site is located on parcel 8, see Figure 3 of Appendix E, and is marked by an elongate basalt boulder located directly above, see Figure 12 of Appendix E.

The survey states that the development of homes along the Kahala beachfront began in the 1930s. Prior to that, the Kahala area was used for agriculture, pig farming, horse breeding, and dairy and cattle ranching. Forty-nine artifacts were found during the survey and all but one are made of modern materials and represent common activities

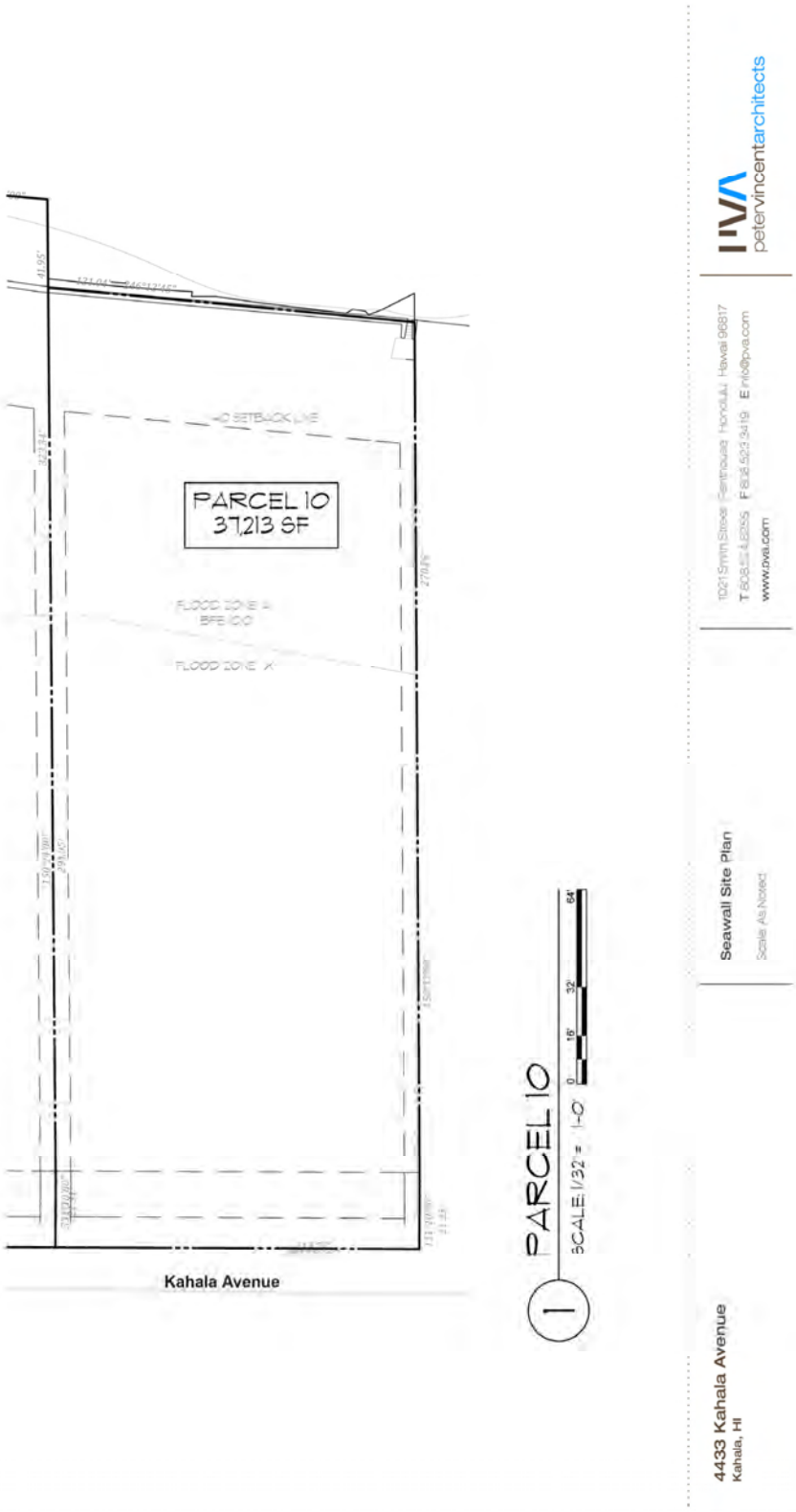


Figure 7A: Flood Zones, Parcel 10

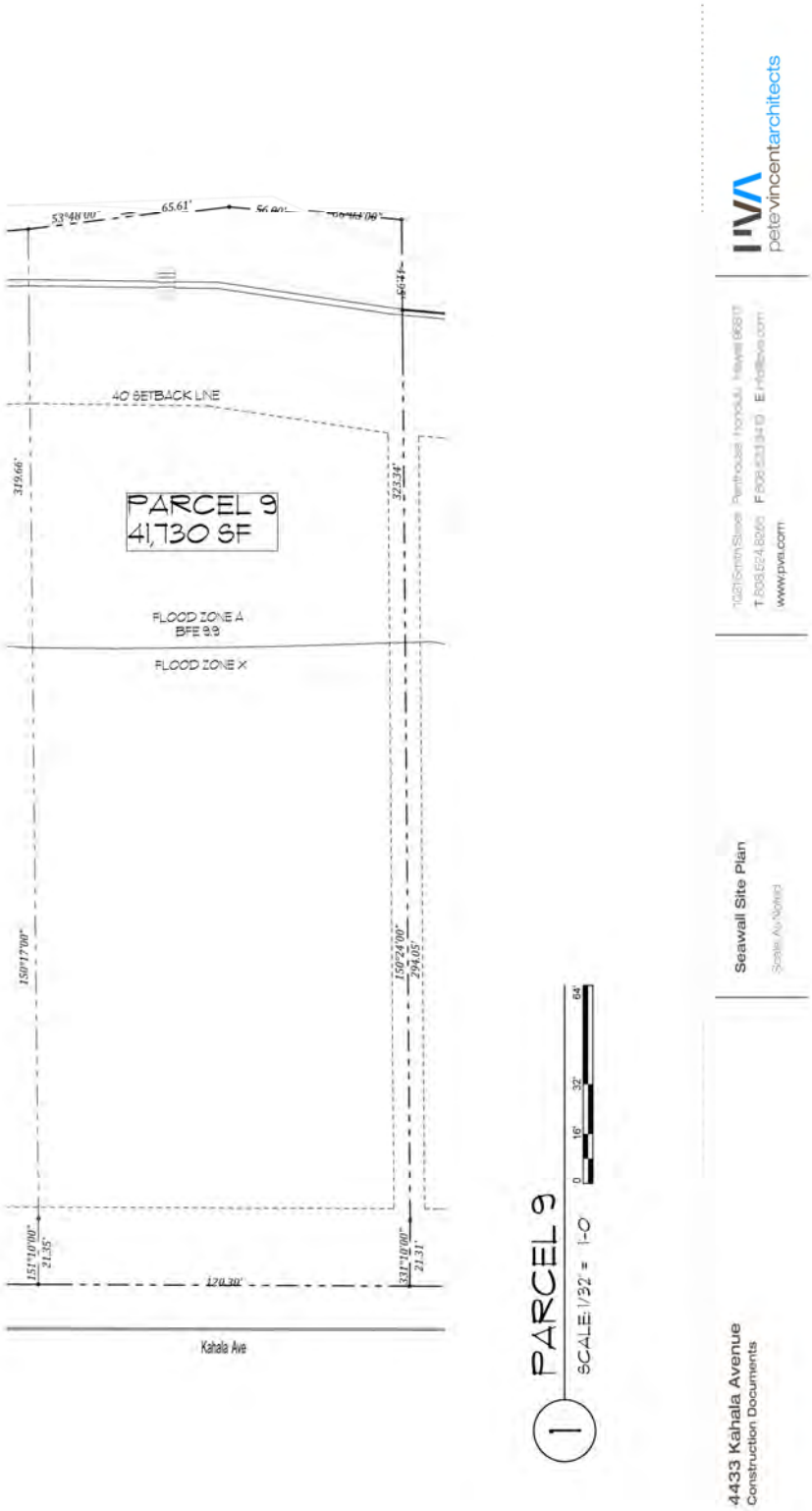


Figure 7B: Flood Zones, Parcel 9

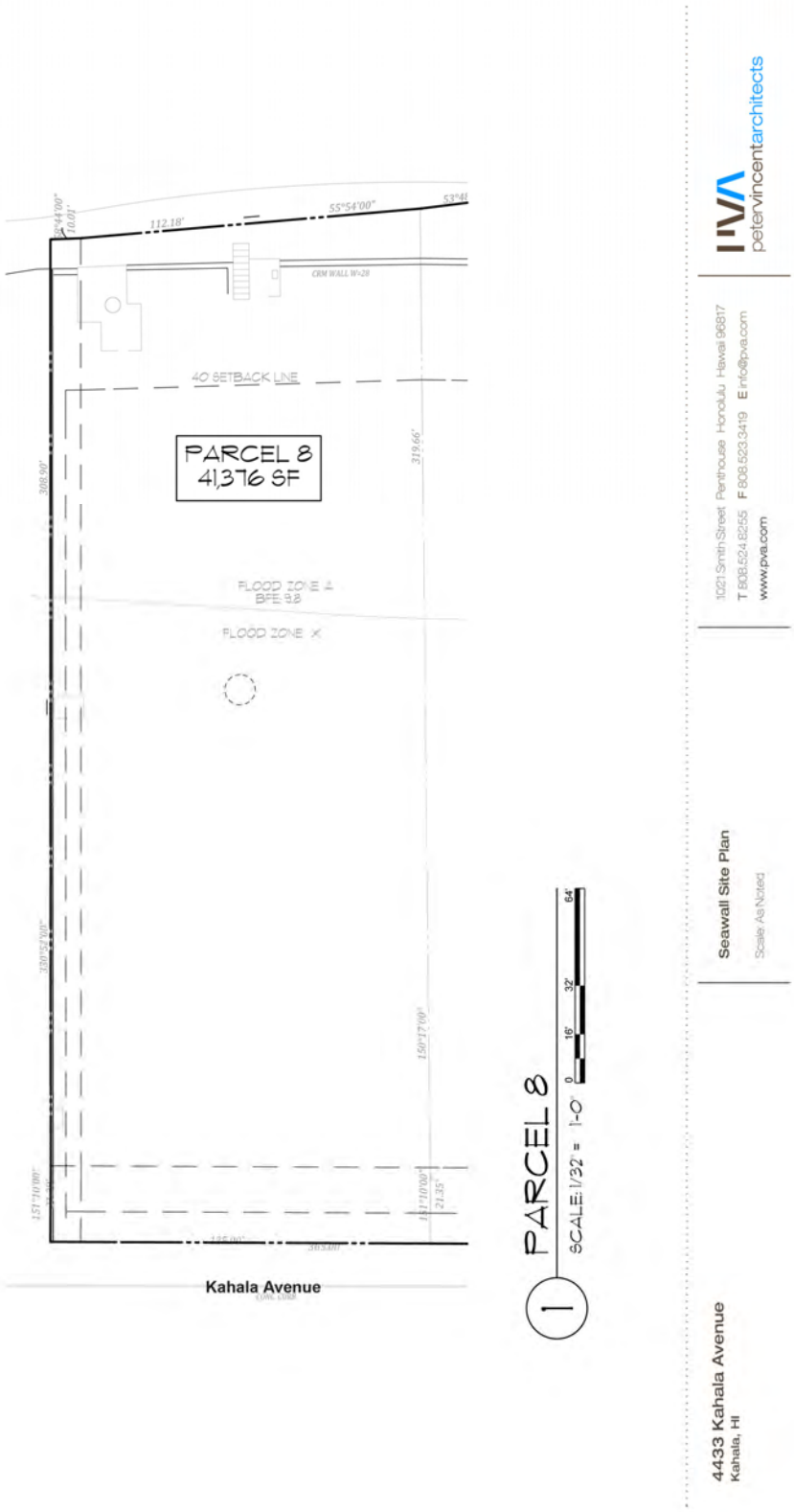


Figure 7C: Flood Zones, Parcel 8

carried out in and around modern houses. A basalt flake that was found might possibly be a traditional Hawaiian artifact. The survey did not find any other remains or any evidence for traditional Hawaiian use of the properties. It also shed some light on earlier work regarding the subject properties, particularly an interpretation by Erkelens and Tomonari-Tuggle on the possibility of two distinct cultural deposits, one of which was likely to date back to traditional Hawaiian times. The survey concludes that the two deposits were actually a single old land surface, or paleosol, upon which a variety of historic-period artifacts had been deposited.

The survey report concludes that the setback area of the project site "does not contain potentially significant cultural deposits….The seawall stabilization work will have 'no effect' on historic properties because historic properties are absent in the area of potential effect."

The SHPD has reviewed the Archaeological Inventory Survey and concurred with its recommendations that a plan be developed and approved by the SHPD to protect Site 50-80-14-5320 during construction, and that the proposed plans to stabilize the existing seawall will have no effect on historic properties. See Appendix F.

However, should subsurface remains, artifacts, or other historical deposits be discovered during excavation activities, all work shall cease and the appropriate agencies and authorities, including the SHPD, will be notified.

Proposed activities will have no effect on the existing public use of the beach or ocean waters, or traditional or customary gathering activities.

3.10 Recreational

There are two public beach rights-of-way near the subject property. One is located two lots (approximately 200 feet) to the west of parcel 10, and the second is located nine lots (approximately 600 feet) east of parcel 8, see **Figure 2**. The westerly right-of-way is identified as TMK 3-5-003:039, and the easterly right-of-way is identified as TMK 3-5-003:041.

TMK 3-5-003:040 once existed as a utility easement adjacent to parcel 8 on the east. Because of beach loss, lateral access along the shoreline is restricted during high tide. During low tide, there is little to no beach fronting the subject lots or adjacent shoreline lots, but lateral access is more open. The project will not impede public recreation activities or use of the beach. Kahala Beach is typically used by wading fishermen, seaweed collectors and spear fishermen.

3.11 Visual Resources

The property lies within the Kahala section of the Maunalua Bay Viewshed. From the shoreline, the 180-degree panoramic view of the ocean extends from Koko Head in the distance to the nearby flanks of Diamond Head. Views landward are constrained

by the existing seawalls. Lateral views along the shoreline will not be affected by the proposed project. The City & County of Honolulu Coastal View Study does not identify any significant views from the shoreline or road.

3.12 Roads and Utilities

Kahala Avenue borders the northern edge of the properties and provides access. Because the proposed activities are located along the side of the property furthest away from Kahala Avenue, short-term construction related traffic will have little effect on the local traffic conditions.

The proposed project is not expected to affect local utilities, including water, sewer, electricity, drainage, solid waste disposal, and communication services. The new residence, as a whole, may reduce demand on utilities since a single household will replace the previously existing three households. In addition, the applicant is seeking possible alternative energy sources to supply electricity to the residential dwelling.

3.13 Public Services

The proposed project will not increase, and may even reduce, the demand on public services, including law enforcement, fire protection, educational, medical, and recreation facilities. Reduction on demand is anticipated because one household will be replacing three separate households.

3.14 Summary of Short-Term and Long-Term Impacts

Short-term impacts include temporary elevations in ambient noise during daylight hours, and dust and exhaust from construction activities and machinery. The project itself will impose no additional long-term impact on recreational, biological, or scenic resources. However, as a whole, the seawalls along the entire stretch of beach artificially fixes the shoreline and affects natural sand accumulation and beach migration processes during a beach erosion trend. The project will have negligible short-term impacts on roads, utilities, or public services.

3.15 Adverse Environmental Effects Which Cannot Be Avoided

Impacts associated with the project that cannot be avoided are those related to construction activities. These impacts are short-term effects on air quality and noise levels.

3.16 Irreversible and Irretrievable Commitments of Resources

Resources to be committed are limited to rock, other construction materials, and human effort. The project will be funded privately.

4.0 Alternatives

The Coastal Engineering Evaluation, see Appendix H, assessed several alternatives. The discussion is summarized below.

4.1 No Action

According to the coastal engineering report, "the no action alternative would result in the gradual deterioration of the existing seawall." The existing sinkholes which are evidenced by large depressions adjacent to the seawall would continue to expand and deepen until eventual failure of the wall. If the wall were allowed to fail, large amounts of soil and debris would spill into the nearshore area. Erosion of the property would persist endangering the adjacent properties. High wave events would make erosion particularly severe causing high turbidity. Property loss would result.

4.2 Beach Nourishment

Because of the general lack of sand at both the shoreline and offshore, the possibility of a beach naturally accreting is unlikely. Sand placed locally on the beach next to the project site would most likely be washed away in the larger regional littoral system. Beach nourishment in the Kahala area is only feasible on a grand scale involving the larger community.

Without large deposits of sand offshore that can be dredged and placed at the shoreline, sand would have to be imported from another source. Fine-grained sand from fossil dunes on the island of Maui is available, but is only appropriate on sheltered beaches. Therefore, beach nourishment is not a practical solution.

4.3 Revetment

Replacing the seawall with a rock revetment would have substantial construction impacts, would occupy a large land area, and would create structural and erosion problems for the flanking vertical seawalls on either side. Revetments in Hawaii are typically built with 1.5-2 horizontal to 1 vertical slope. A 6.25 foot MSL would require a base width of about 12 feet. Simply another form of shoreline hardening, building a revetment would be of little, if any, improvement over what is existing already at the shoreline. It would involve major earthwork, require more area with possibly more encroachment into State conservation area, and be more costly.

4.4 Sand Bags

Recently, sand bags have been authorized by state and county governments as emergency and temporary solutions to coastal erosion. Sand bags are not an appropriate solution here because they are aesthetically unpleasant, become hazardous when algae growth occurs under repeated inundation, are difficult to fill

and place, require a wide footprint, and are susceptible to slashing and other forms of vandalism. Placing bags in front of the existing wall would encroach onto State land.

4.5 Seawall Improvement, Preferred Alternative

A properly designed and constructed seawall is a proven durable, stable, low maintenance shore protection method. However, seawalls are narrow, inflexible structures and their suitability depends upon the stability of their foundations.

Except for beach nourishment, all of the alternatives considered involve hardening of the shoreline. Beach nourishment is a realistic option, but only if undertaken as a joint community effort. If the pattern of coastal erosion persists, sand placed on the beach would likely be washed away requiring additional nourishment in the future. Improvement of the existing seawall is the most practical and least invasive option. Improvement will not change the existing environmental conditions.

5.0 Consistency with the Hawaii Coastal Zone Management (CZM) Objectives and Policies

Hawaii Revised Statutes (HRS) Chapter 205A sets forth objectives and policies for coastal zone management in the State of Hawaii, as well as delegating regulatory authority of the Special Management Area (SMA) to the counties. Under SMA regulations, single-family residences and accessory structures are exempt from permit requirements.

Objectives and policies relevant to beaches and shore protection structures include the following (HRS §205A-2):

(b)(1) Provide coastal recreational opportunities accessible to the public by:

(c)(1)(B-i) "protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas" (i.e., sandy beaches); and

(c)(1)(B-iii) "providing and managing adequate public access to and along shorelines with recreational value."

(b)(9) Protect beaches for public use and recreation by:

(c)(9) (B) "prohibiting construction of private erosion-protection seaward of the shoreline…"

Construction of a shore protection structure is a measure of last resort, usually undertaken when progressive coastal erosion threatens to destroy a home or other structure. Typically, the erosion has already consumed a portion of a homeowner's property. A shore protection structure prevents continued erosion of sediments from private property and therefore the further nourishment of the beach adjacent that property. In this specific case, the property has had a shore protection structure for approximately 45 years.

The CZM Act's policy to protect beaches and to prohibit shoreline structures is a statement of general public policy. The Act, however, also recognizes that shore protection is justified in certain circumstances where there is a hardship and therefore provides a variance procedure. Under HRS §205A-46(9), a variance may be granted where shoreline erosion would cause hardship if the shore protection structure were not allowed. In this case, the hardship would occur in the loss of land and use of that land if the shore protection structure were not repaired and maintained. Public natural resources would experience detrimental effects should the existing wall fail.

6.0 List of Approvals and Permits Required

The project requires a Shoreline Setback Variance permit for retrofit work on the existing seawalls and other work within the 40 foot setback area, a Minor Shoreline Structure Permit for the proposed open metal sideyard fences within the setback area, a Grading Permit and Building Permit. The proposed improvements will be accessory to single-family residential use.

7.0 Determination of Significance

The Department of Health Rules Chapter 11-200-12 provide thirteen "Significance Criteria" for determining if an action will have a significant impact on the environment. This includes all phases of a project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. According to the Rules, an action shall be determined to have a significant impact on the environment if it meets any one of the criteria listed below.

1. Involves an irrevocable commitment to loss or destruction of any natural cultural resources.

The proposed construction would not affect existing littoral processes, nor would it change the pattern of beach erosion along Kahala Beach. The project would not affect public access to the shoreline. A cultural resource (historic burial site) does exist on the subject properties. The applicant is working with the SHPD to ensure protection of this resource and any others that may be found during excavation and construction.

2. Curtails the range of beneficial uses of the environment.

As evidenced by the area's zoning, the subject property is committed to residential development and use. The proposed project will not curtail the existing uses of the privately owned land nor surrounding properties. The support structure proposed for the seawalls would not affect beach resources inasmuch as it would neither alter the shoreline nor affect lateral access.

3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders.

The proposed activities are consistent with the environmental policies established in HRS, Chapter 344. The proposed activities would not alter the area's existing natural processes or resources and would not lower the quality of life for Hawai'i residents. While the project does not support the guideline of preserving shorelines free of manmade structures, it is consistent with the longstanding history of government decisions approving shore protection structures in Kahala. This statement is supported by the fact that the subject seawall was constructed about 45 years ago and that the entire reach of shoreline far beyond the subject properties is hardened.

4. Substantially affects the economic or social welfare of the community or state.

The proposed project would have no significant effect on the socio-economic welfare of the community or state.

5. Substantially affects public health.

The proposed project will not affect public health.

6. Involves substantial secondary impacts, such as population changes or effects on public facilities.

The subject project does not involve substantial secondary impacts.

7. Involves a substantial degradation of environmental quality.

It is not anticipated that the proposed project would further degrade environmental quality. The proposed seawall support structure is planned to be completely subterranean and will not change the existing natural processes of the area, nor will it result in a degradation of aesthetic impacts. The proposed improvements are relatively small in size. In fact, several man-made structures will be removed from within the shoreline setback area.

8. Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions.

The proposed project is individually limited, would itself have an insignificant effect on the environment, and does not involve a commitment of larger actions. The proposed seawall support structure will not increase shore protection structures along Kahala Beach, but maintains the status quo. The other proposed work and fences are small in size and will have no adverse effect on the surrounding environment.

9. Substantially affect a rare, threatened or endangered species or its habitat.

There are no rare, threatened, or endangered plants or animal species on the subject property.

10. Detrimentally affects air or water quality or ambient noise levels.

Construction may produce temporary impacts to air quality and noise levels. These impacts are short-term and would be negligible. All construction material will be free of contaminants or pollutants. Best Management Practices will be adhered to during construction to prevent debris, petrol products, or other construction-related material from entering coastal waters.

11. Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal water.

The proposed seawall support is expressly designed to preserve residential structures from the effects of coastal erosion and flooding. The additional support to the existing wall will increase protection against storm waves and or tsunami. None of the proposed activities will increase the erosion or flood hazard for the subject property or surrounding properties.

12. Substantially affects scenic vistas and view planes identified in county or state plans or studies.

Because the proposed seawall support is subterranean, it would not affect scenic vistas or view planes identified by the county or state. The other proposed improvements are small in size. Planned landscaping improvements will enhance the appearance of the property from the shoreline.

13. Requires substantial energy consumption.

The proposed project and its related construction are relatively small in scale. They do not require any post-construction public or private utilities. Energy consumption will be limited to fuel for construction machinery.

8.0 Anticipated Determination

Based on the findings of this Environmental Assessment (EA), it is anticipated that the approving agency will determine that the proposed project will not have a significant environmental impact, and an Environmental Impact Statement (EIS) will not be required.

Therefore, a Finding of No Significant Impact (FONSI) is anticipated.

9.0 Justification for Shoreline Setback Variance Under Revised Ordinances of Honolulu §23-1.8(b)(3), Hardship Standard

The application for a shoreline setback variance fulfills the three criteria for a "hardship" variance set forth in ROH Sec. 23-1.8(b)(3). The owner of the subject property will suffer a hardship if the seawall support is not constructed and other minor improvements to the seawalls are not allowed. The three criteria are addressed below:

1. The applicant would be deprived of reasonable use of the land if required to comply fully with the shoreline setback ordinance and shoreline setback rules.

The subject properties currently have nonconforming seawalls. If the proposed support were not allowed, future storm waves could undermine the seawalls and cause them to fail. This, in turn, would lead to a substantial loss of land as the shoreline would continue to erode. Subsequent erosion of the land would threaten the foundations of the planned residences and eventually economically viable use of the land.

Other proposed improvements include grading, grubbing, construction of a seawall fence/guardrail and construction of sideyard fences. The fences on either side of the property are needed for security and the seawall fence is needed for safety. These are minimal improvements accessory to residential use. Chapter 23, ROH allows for minor structures, such as the fences, and activities to occur in the shoreline setback. The applicant also proposes to demolish existing decks and other hardscape within the shoreline setback. The

net result would be more landscape planting and a greater amount of permeable surface near the shoreline.

2. The applicant's proposal is due to unique circumstances and does not draw into question the reasonableness of this chapter or the shoreline setback rules.

Kahala Beach has been undergoing coastal erosion from before the 1960s, as evidenced by the construction of seawalls along much of the Kahala shoreline. The reason for the proposed support structure is to prevent further undermining and eventual failure of the seawalls that have long existed on parcels 8, 9, and 10. The subject seawalls are adjacent to other seawalls that are characteristic of the area. The subject seawalls, as well as other seawalls along Kahala Beach, were all constructed for different owners and of unique forms and materials.

3. The proposal is the practicable alternative which best conforms to the purpose of this chapter and the shoreline setback rules.

The Coastal Engineering Evaluation report analyzed a number of alternative measures. A no action alternative would lead to eventual undermining and failure of the seawall resulting in large quantities of soil, sand, and debris to be scattered along the shoreline.

Beach nourishment demands careful planning for an entire reach of shoreline. It would affect many properties and require permits for work in State and Federal jurisdictions. Such a project is beyond the capability of a single property owner.

Replacing the seawall with a rock revetment would have substantial construction impacts, would occupy a large land area, and would create structural and erosion problems for the flanking vertical seawalls on either side. Simply another form of shoreline hardening, building a revetment would be of little, if any, improvement over what is existing already at the shoreline. It would involve major earthwork, require more area with possibly more encroachment into State conservation area, and be more costly.

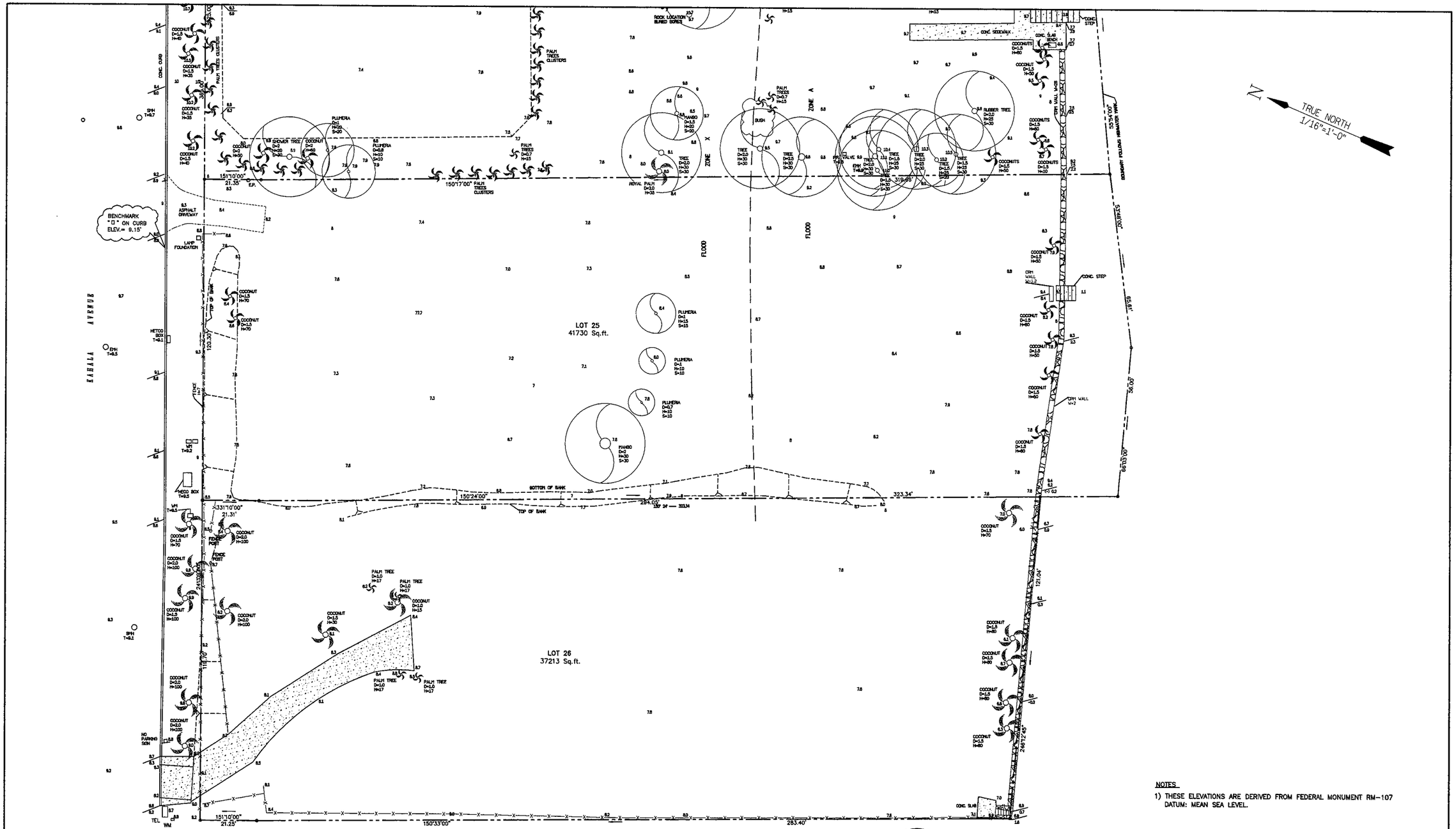
Installing large geotextile sandbags is typically used as a temporary emergency measure. Placing sandbags seaward of the seawall would, among other results, have a negative impact on lateral shoreline access.

As stated in the Coastal Engineering Evaluation, seawall repair – i.e., the construction of foundation support – is the preferred alternative. A properly constructed seawall is a proven, low maintenance, and long lasting shore protection method. Repairing the existing seawall will not change the existing shoreline or other environmental conditions.

APPENDICES

Appendix A

Topographic Survey



NOTES

1) THESE ELEVATIONS ARE DERIVED FROM FEDERAL MONUMENT RM-107
DATUM: MEAN SEA LEVEL.

TOPOGRAPHIC SURVEY TAX MAP KEY: 3-5-03: 8, 9, & 10		
SCALE: 1/16"=1'-0"	APPROVED BY: -	DRAWN BY: NMH
DATE: AUG. 20, 2007		REVISED: -
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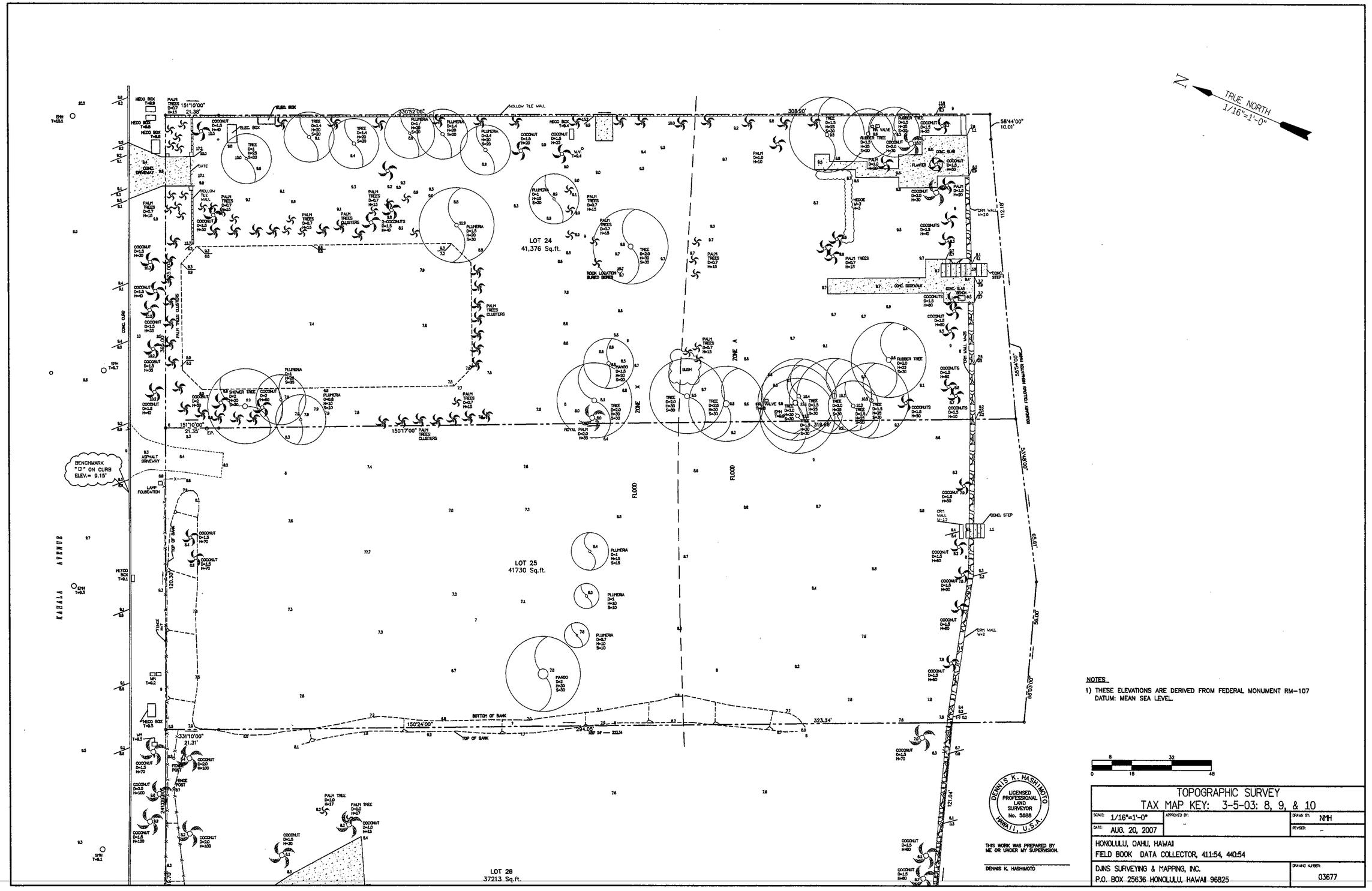


NOTES

1) THESE ELEVATIONS ARE DERIVED FROM FEDERAL MONUMENT RM-107
DATUM: MEAN SEA LEVEL.

0 8 16 32 48

DENNIS K. HASHIMOTO
LICENSED PROFESSIONAL LAND SURVEYOR
No. 5688
HAWAII, U.S.A.

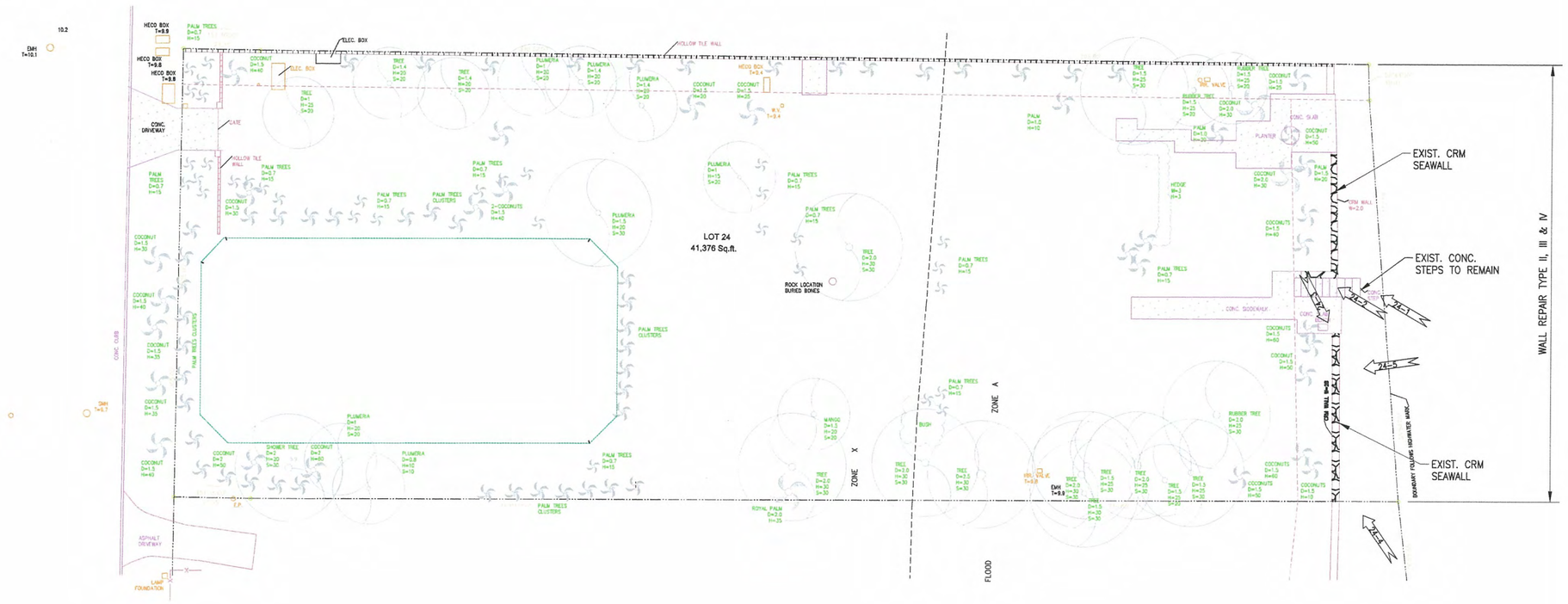
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

DENNIS K. HASHIMOTO

TOPOGRAPHIC SURVEY TAX MAP KEY: 3-5-03: 8, 9, & 10		
SCALE: 1/16"=1'-0"	APPROVED BY: --	DRAWN BY: NMH
DATE: AUG. 20, 2007		REVISED: --
HONOLULU, OAHU, HAWAII FIELD BOOK DATA COLLECTOR, 411:54, 440:54		
DJNS SURVEYING & MAPPING, INC. P.O. BOX 25636 HONOLULU, HAWAII 96825		DRAWING NUMBER: 03677

Appendix B

Structural Engineer Drawings



SITE PLAN – LOT 24 & 24A

PHOTO 24–1

PHOTO 24–2

PHOTO 24–3

PHOTO 24–4

PHOTO 24–5

PHOTOS

XIANG YEE
LICENSED PROFESSIONAL ENGINEER
No. 9373-S
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

SIGNATURE 4/30/2012 EXP. DATE

IMH ENGINEERING INC.
Consulting Structural Engineer · Construction Management
1914 South King Street, No. 205 Honolulu, Hawaii 96826
Phone (808) 392-2386 Fax (808) 356-1326
E-Mail xiangyee@hawaiiantel.net or imh@hawaii.rr.com

PROJECT: SEA WALL RETROFIT
KAHALA AVENUE
HONOLULU, HAWAII

SHEET TITLE: LOT 24 4433 KAHALA AVENUE
T.M.K. 3-5-003:008

REV	DATE	DESCRIPTION

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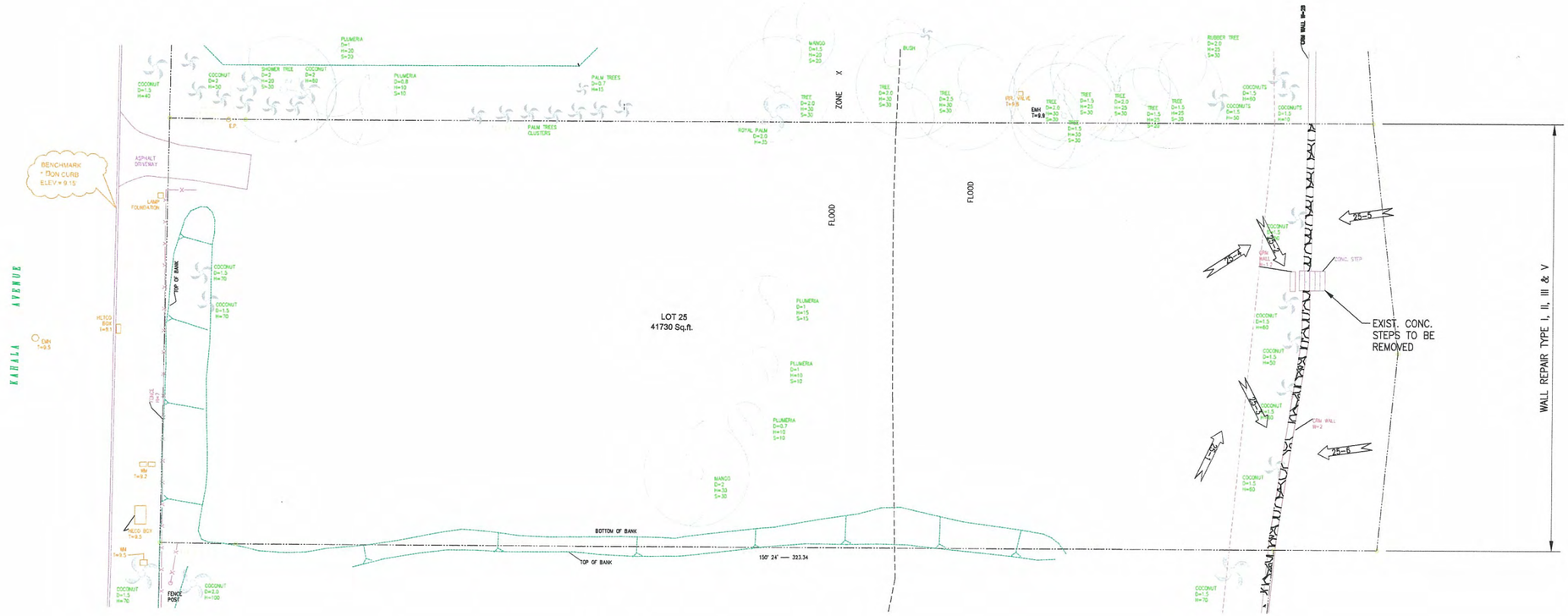
DRAWN BY	CADD
CHECKED BY	XY
PROJECT NO.	06149
DATE	APRIL 6, 2010

SHEET No. S-1 OF SHEETS



SITE PLAN – LOT 25 & 25A

PHOTO 25–1

PHOTO 25–2

PHOTO 25–3

PHOTO 25–4

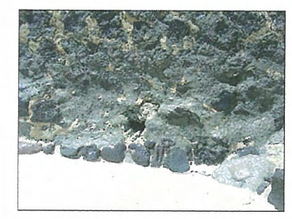


PHOTO 25–5

PHOTO 25–6

PHOTOS

XIANG YEE
LICENSED PROFESSIONAL ENGINEER
No. 9373-S
HAWAII, U.S.A.

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SIGNATURE 4/30/2012 EXP. DATE

IMH ENGINEERING INC.
Consulting Structural Engineer · Construction Management
1914 South King Street, No. 205 Honolulu, Hawaii 96826
Phone (808) 392-2388 Fax (808) 356-1326
E-Mail xiangyee@hawaiiantel.net or imh@hawaii.rr.com

PROJECT: SEA WALL RETROFIT
KAHALA AVENUE
HONOLULU, HAWAII

SHEET TITLE: LOT 25 4423 KAHALA AVENUE
T.M.K. 3-5-003:009

REV	DATE	DESCRIPTION

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DRAWN BY	CADD
CHECKED BY	XY
PROJECT NO.	0514G
DATE	APRIL 6, 2010

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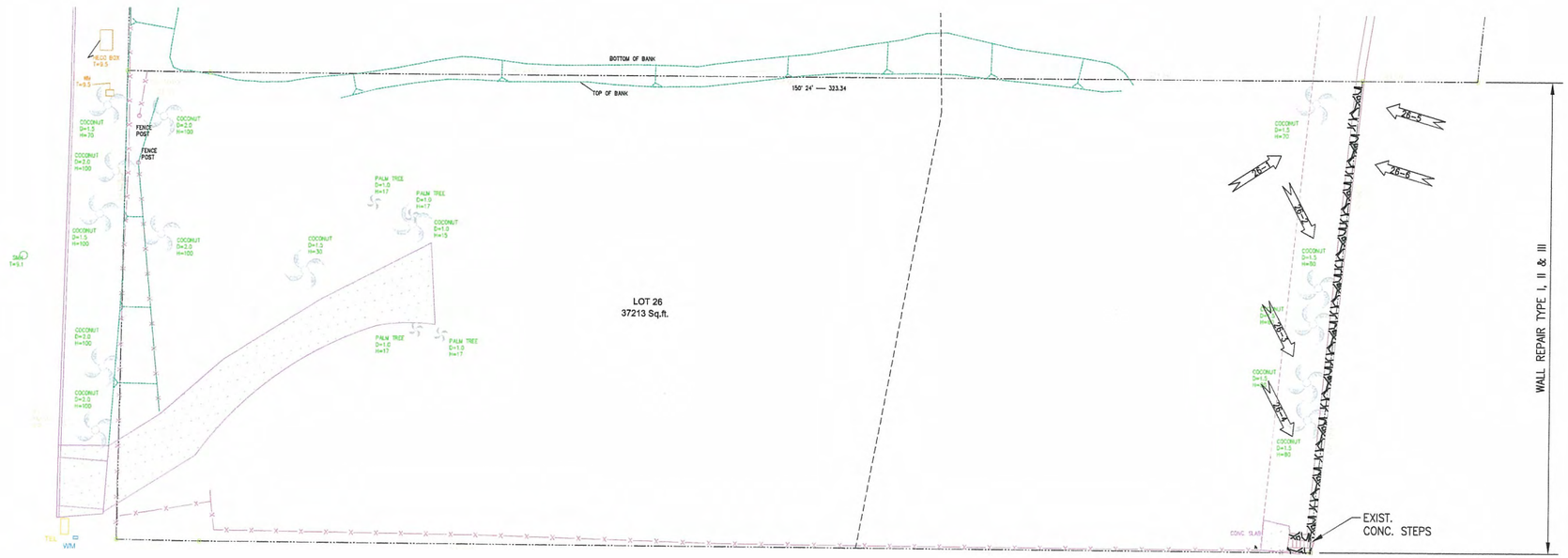

SITE PLAN – LOT 26 & 26A

PHOTO 26–1

PHOTO 26–2

PHOTO 26–3

PHOTO 26–4

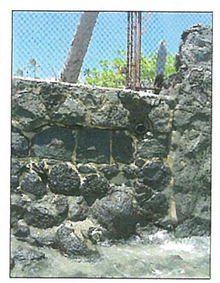

PHOTO 26–5

PHOTO 26–6

PHOTOS

XIANG YEE
LICENSED PROFESSIONAL ENGINEER
No. 9373-S
HAWAII, U.S.A.

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SIGNATURE 4/30/2012 EXP. DATE

IMH ENGINEERING INC
Consulting Structural Engineer · Construction Management
1914 South King Street, No. 205 Honolulu, Hawaii 96826
Phone (808) 392-2388 Fax (808) 356-1326
E-Mail xiangyee@hawaiiantel.net or imh@hawaii.rr.com

PROJECT: SEA WALL RETROFIT
KAHALA AVENUE
HONOLULU, HAWAII

SHEET TITLE: LOT 26 4415 KAHALA AVENUE
T.M.K. 3-5-003:010

REV	DATE	DESCRIPTION

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DRAWN BY	CADD
CHECKED BY	XY
PROJECT NO.	06149
DATE	APRIL 6, 2010

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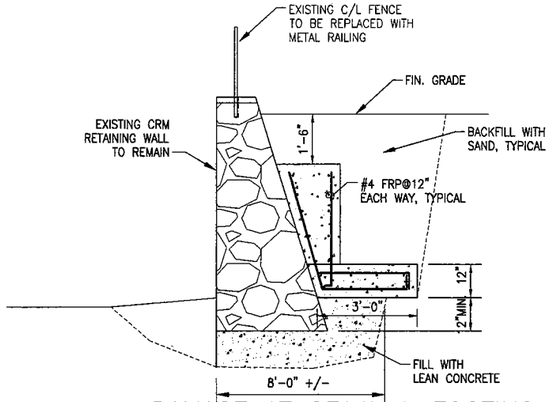
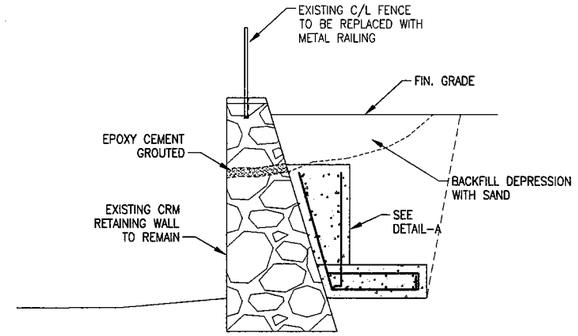


DAMAGE AT SEAWALL FOOTING

A WALL RETROFIT – TYPE I

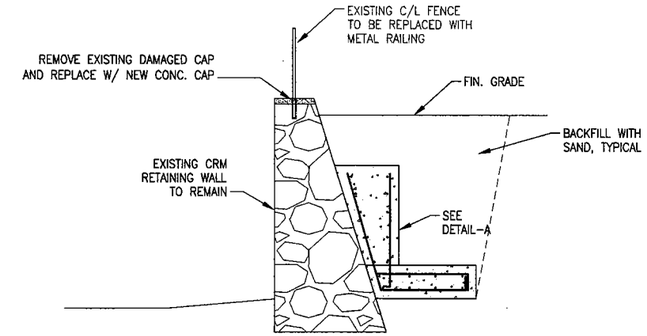
SCALE: 1/2" = 1'-0"



DAMAGE THRU SEAWALL

B WALL RETROFIT – TYPE II

SCALE: 1/2" = 1'-0"



WALL CAP REPAIR

C WALL RETROFIT – TYPE III

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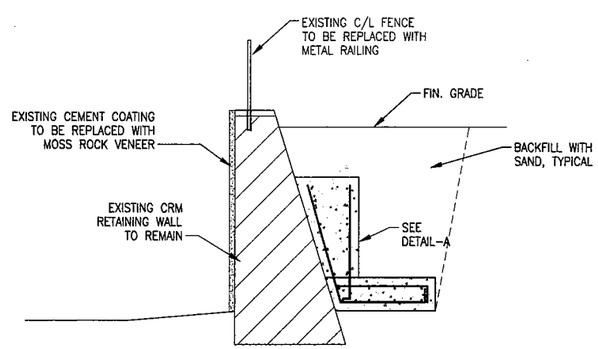

WALL FACE REPAIR

D WALL RETROFIT – TYPE IV

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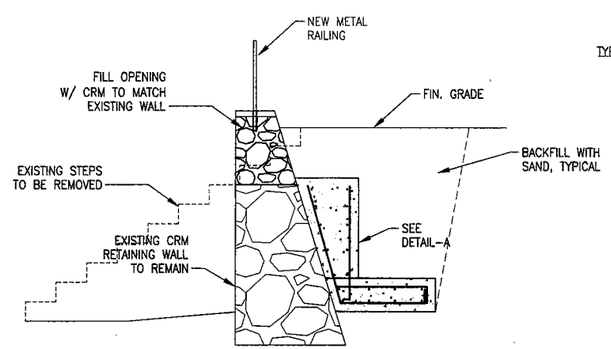
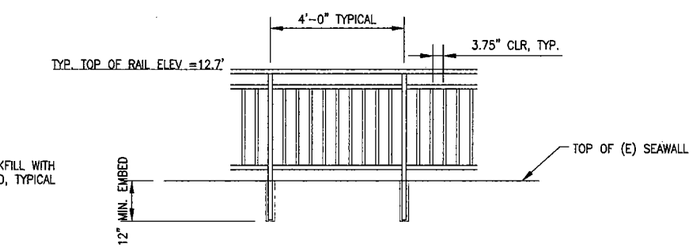


REMOVE STEPS

E WALL RETROFIT – TYPE V

SCALE: 1/2" = 1'-0"



F GUARDRAIL ELEVATION

SCALE: 1" = 1'-0"

NOTE TO CONTRACTOR:

1. CONTRACTOR IS RESPONSIBLE TO EXAM THE EXISTING SEAWALL CONDITION AND VERIFY ALL DAMAGE INCLUDING LENGTH AND SIZE OF THE EXISTING SEAWALL.

XIANG YEE LICENSED PROFESSIONAL ENGINEER No. 9373-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

SIGNATURE 4/29/2012 EXP. DATE

IMH ENGINEERING INC
Consulting Structural Engineer · Construction Management
1914 South King Street, No. 205 Honolulu, Hawaii 96826
Phone (808) 392-2388 Fax (808) 356-1326
E-Mail xiangyee@hawaiiantel.net or imh@hawaii.rr.com

PROJECT: SEA WALL RETROFIT
KAHALA AVENUE
HONOLULU, HAWAII

SHEET TITLE: TYPICAL SEAWALL REPAIR DETAILS AND SECTIONS

REV	DATE	DESCRIPTION

DESIGNED BY	XY
DRAWN BY	CADD
CHECKED BY	XY
PROJECT NO.	06149
DATE	APRIL 6, 2010

SHEET No. S-4 OF SHEETS

Appendix C

Soils Report

REPORT
SOILS INVESTIGATION

PROPOSED DEY RESIDENCE
4415/4423/4433 KAHALA AVENUE
HONOLULU, HAWAII
TMK: 3-5-03: 08, 09 & 10

for

PETER VINCENT & ASSOCIATES LLC
Architects

Project No. 07-0120
November 19, 2007

SHINSATO ENGINEERING, INC.
98-747 KUAHAO PLACE, #E
PEARL CITY, HI 96782

SHINSATO ENGINEERING, INC.
CONSULTING GEOTECHNICAL ENGINEERS

98-747 KUAHAO PLACE, SUITE E
PEARL CITY, HAWAII 96782
PHONE: (808) 487-7855
FAX: (808) 487-7854

November 19, 2007
Project No. 07-0120

Peter Vincent & Associates LLC
Attention: Brad Ladwig
1021 Smith Street, Penthouse
Honolulu, Hawaii 96817

Gentlemen:

The attached report presents the results of a soils investigation for the proposed Dey residence to be located at 4415, 4423, and 4433 Kahala Avenue in Honolulu, Hawaii; TMK: 3-5-059: 08, 09 and 10.

A summary of the findings is as follows:

1) The subsurface condition of the site was explored by drilling twelve (12) test borings to depths of 11.5 to 21.583 feet below existing grade. In addition, test boring logs from a previous soils investigation were reviewed.

   In general, the explorations disclosed the site to be underlain by tan and brown loose to moderately dense, calcareous SAND and silty SAND to the final depths of the borings. The material graded to very dense at depths of 18.0 to 21.5 feet.

2) Groundwater was encountered in the borings at depths of 5.67 to 8.17 feet below existing grade.

3) Special considerations are anticipated in the design and construction of the project due to existing site conditions. These include but may not be limited to the following:

   a) The upper SAND was found to be loose. It is recommended that the bottom of all footing excavations be compacted prior to construction of the footings.

   b) The underlying SAND is susceptible to caving especially at or near groundwater level. Excavation and trenching shall be done in accordance with applicable OSHA standards.

   c) Compaction of fills and backfills shall be performed with static rollers or small vibratory compactors. The use of large vibratory equipment may cause damage to adjacent structures.

   d) There are areas adjacent to the existing seawalls where the backfill material has eroded and created depressions. The erosion appears to be due to piping (internal erosion) of the sandy backfill material through separations between the wall foundation and the underlying coral and through openings in the wall. The piping is likely due to wave and tidal action. Underpinning of the wall foundation and installation of filter fabric or other impermeable barriers are possible means of minimizing future erosion of the backfill material. Since the seawalls are along the shoreline, special techniques, methodology and/or permits may be required to implement the remedial work.

4) Based on the findings and observations of this investigation, it is concluded that spread and continuous footings may be used to support the proposed structure. A summary of the foundation design recommendations is as follows:

a.	Allowable soil bearing value:	2,000 psf for an 18-inch wide footing embedded 12 inches below lowest adjacent grade (measured to bottom of footing) bearing on firm on-site soils or properly compacted fill. The bearing value may be increased by 250 psf for each additional foot of depth and by 250 psf for each additional foot of width to a maximum of 4,000 psf.
b.	Estimated settlement:	less than 3/4 inch.
c.	Passive earth resistance:	300 pcf
d.	Frictional resistance:	0.5 times the dead load for the underlying soils or imported select granular fill
e.	Active earth pressure:	30 pcf free-standing wall, level backfill using on-site sandy soils or imported select granular fill; 45 pcf restrained wall, level backfill; increase for surcharge loading and sloping backfill
f)	Site Class(2003 IBC):	E: soft soil profile

5) Two (2) field percolation tests were performed to determine the percolation rate of the underlying soil. The results of the percolation tests indicate a soil percolation rate of less than 1 minute per inch.

Details of the findings and recommendations are presented in the attached report.

This investigation was made in accordance with generally accepted engineering procedures and included such field and laboratory tests considered necessary for the project. In the opinion of the undersigned, the accompanying report has been substantiated by mathematical data in conformity with generally accepted engineering principles and presents fairly the design information requested by your organization. No other warranty is either expressed or given.

Respectfully submitted,

SHINSATO ENGINEERING, INC.

Lawrence S. Shinsato, P.E.
President

LSS:ds

LAWRENCE S. SHINSATO
LICENSED PROFESSIONAL ENGINEER
No. 4169-C
HAWAII, U.S.A.

This work was prepared by me
or under my supervision.
License Expires 04/30/08

TABLE OF CONTENTS

INTRODUCTION

This investigation was made for the purpose of obtaining information on the subsurface conditions from which to base recommendations for foundation design for the proposed Dey residence to be located at 4415, 4423, and 4433 Kahala Avenue in Honolulu, Hawaii. The location of the site, relative to the existing streets and landmarks, is shown on the Vicinity Map, Plate 1.

SCOPE OF WORK

The services included drilling 12 test borings to depths of 18.0 to 21.583 feet, obtaining samples of the underlying soils, conducting 2 percolation tests to depths of 5 feet below grade, reviewing previous test borings from a previous soils investigation, performing laboratory tests on the samples to determine pertinent engineering characteristics, and performing an engineering analysis from the data gathered. In general, the following information is provided for use by the Architect and/or Engineer:

1. General subsurface conditions, as disclosed by the explorations.
2. Physical characteristics of the soils encountered.
3. Recommendations for foundation design, including bearing values, embedment depth and estimated settlement.
4. Recommendations for placement of fill and backfill.
5. Special considerations.

PLANNED DEVELOPMENT

From the information provided, the project will consist of constructing one and two-story residential structures that will have concrete slabs-on-grade with CMU wall and wood framing.

SITE CONDITIONS

Surface

The site consists of three parcels designated by Tax Map Key Numbers 3-5-03: 08, 09 and 10. They are

located on the oceanside of Kahala Avenue between Elepaio Street and Kala Street. The properties are bound by existing residences to the east and west, Kahala Avenue to the north and the ocean to the south. At the time of the investigation, the lots were vacant and covered by weeds, trees, and shrubs. The topography of the lot is relatively level to gently sloping. There are seawalls along the back of the parcels.

Subsurface

The subsurface conditions at the site were explored by drilling 12 test borings to depths of 18.0 to 21.583 feet and conducting 2 percolation tests to depths of 5 feet below grade. The locations of the test borings and percolation tests are shown on the Plot Plan, Plate 2. Detailed logs of the test borings are presented in the Appendix to this report.

In general, the explorations disclosed the site to be underlain by tan and brown loose to moderately dense, calcareous SAND and silty SAND to the final depths of the borings. The material graded to very dense at depths of 18.0 to 21.5 feet.

Groundwater was encountered in the borings at depths of 5.67 to 8.17 feet below existing grade.

From the USDA Soil Conservation Service "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," the site is located in an area designated as Jaucas sand, 0 to 15 percent slopes (JaC). The Jaucas series consist of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean. In the JaC portion of the series, permeability is rapid, and runoff is very slow to slow. The hazard of water erosion is slight, but wind erosion is a severe hazard where vegetation has been removed (USDA, 1972, pp. 48-49, Plate 63).

Geology

The site is located on the southeastern end of the elongated Koolau Mountain range. The formation of the

Koolau Mountain Range above sea level is believed to have begun in the late Tertiary/early Pleistocene time (between 1 and 12 million years ago) by eruptions of lava from a rift zone roughly paralleling the existing mountain crest trends. After cessation of the main volcanic activity, deep valleys such as Palolo and Manoa were carved into the mountain. During high stands of sea levels, the valleys were in filled with sediment (alluviated) grading to the high sea level stands.

Volcanic activity later resumed on the southeastern end of the Koolau Range. These late-stage eruptions, known as the Honolulu Volcanic Series, form familiar landmarks on Oahu such as Diamond Head, Punchbowl, Tantalus, Round Top and Salt Lake craters (Stearns and Vaksvik, 1935).

The underlying tan/white coralline sand found on the site is part of the marine deposits that developed along the shoreline of Oahu during changes in sea level from fringing coral reefs.

CONCLUSIONS AND RECOMMENDATIONS

General

Based on the findings and observations of this investigation, it is concluded that the proposed residential structures may be supported on spread and continuous footings bearing on firm on-site soils or properly compacted fill.

Special Considerations

Special consideration will be required in the design and construction of the project due to existing condition:

a) The borings disclosed the upper SAND to be loose. It is recommended that the bottom of all footing excavations be compacted prior to construction of the footings.

b) The underlying SAND is susceptible to caving especially at or near groundwater level. Excavation and trenching shall be done in accordance with applicable OSHA standards.

c) Compaction of fills and backfills shall be performed with static rollers or small vibratory compactors. The use of large vibratory equipment may cause damage to adjacent structures.

d) There are areas adjacent to the existing seawalls where the backfill material has eroded and created depressions. The erosion appears to be due to piping (internal erosion) of the sandy backfill material through separations between the wall foundation and the underlying coral, and through openings in the wall. The piping is likely due to wave and tidal action. Underpinning of the wall foundation and installation of filter fabric or other impermeable barriers are possible means of minimizing future erosion of the backfill material. Since the seawalls are along the shoreline, special techniques, methodology and/or permits may be required to implement the remedial work.

Foundations

An allowable bearing value of 2,000 pounds per square foot may be used for an 18-inch wide footing embedded 12 inches below lowest adjacent grade. The bearing value may be increased by 250 psf for each additional foot of depth and by 250 psf for each additional foot of width to a maximum of 4,000 psf. The bottom of the footing excavation shall bear on firm on-ste soil or properly compacted fill.

For footings located adjacent to new or existing utility trenches, the bottom of the footing shall be deepened below a 1 horizontal to 1 vertical plane projected upwards from the edge of the utility trench.

For footings located on or adjacent to slopes, the footing shall be deepened such that there is a minimum horizontal distance of 5 feet from the edge of the footing to the slope face.

The bearing value is for dead plus live loads and may be increased by one-third for momentary loads due to wind or seismic forces. If any footing is eccentrically loaded, the maximum edge pressure shall not exceed the bearing pressure for permanent or for momentary loads.

The bottom of all footing excavations shall be compacted prior to laying of steel or placing of concrete. Any loose soils which cannot be compacted shall be removed to firm material and the resulting depression shall be backfilled with properly compacted structural fill. Disturbed soil and soil which falls into the footing excavation shall be removed prior to pouring of concrete.

Site Class Definition

In accordance with the 2003 International Building Code, Section 1615, the site class and soil profile name may be assumed as E: soft soil profile.

Settlement

Under the fully applied recommended bearing pressure, it is estimated that settlement of footings up to 3 feet continuous or 5 feet square that bear on properly compacted fill or on firm on-site SAND will be less than 3/4 inch.

Differential settlement between footings will vary according to the size and bearing pressure of the footing.

Lateral Resistance

For resistance of lateral loads, such as wind or seismic forces, an allowable passive resistance equivalent to that exerted by a fluid weighing 300 pounds per cubic foot may be used for footings, or other structural elements, provided the vertical surface is in direct contact with undisturbed soil or properly compacted fill.

Frictional resistance between footings and the underlying soils may be assumed as 0.5 times the dead load. Lateral resistance and friction may be combined.

Retaining Walls

Foundations for retaining walls shall be designed as per the foundation section of this report.

For free-standing retaining walls with properly draining backfill, the following active earth pressures may be used to design the wall:

Backfill Slope	Active Earth Pressure (pcf) Horizontal Component	Vertical Component
Level	30	0
3H:1V	35	12
2H:1V	45	22

These values apply to imported structural fill and non-expansive on-site soils placed within a 1H:2V plane projected upwards from the bottom edge of the footing.

Free-standing walls are defined as walls that are allowed to rotate between 0.005 and 0.01 times the wall height. The rotation of the wall develops "active earth pressures." If the wall is not allowed to move as in the case of basement walls or walls that are restrained at the top, the soil pressure that will develop is known as an "at-rest" pressure. For restrained walls, the above active earth pressures shall be increased by 50 percent.

The above active earth pressures do not include surcharge loads such as footings located within a 45-degree plane projected upwards from the heel of the footing, and/or from hydrostatic pressures. If such conditions occur, the active earth pressure shall be increased accordingly.

Drainage for the retaining wall backfill shall be accomplished by providing either weepholes (minimum 3-inch diameter) spaced 8-feet on-center or by using a 4-inch diameter perforated PVC footing drain pipe. For weepholes, crushed gravel (one cubic foot in size) shall be placed at each weephole location. For footing drain pipes, the crushed gravel shall extend along the entire length of the pipe and shall have a minimum cross sectional area of 12 inches square. The gravel shall be wrapped with non-woven geotextile filter fabric such as AMOCO 4545 or similar.

The backfill material for retaining walls shall be properly compacted in accordance with the Site Preparation and Grading section to this report. Also, surface drainage shall be designed to minimize surface water runoff

from entering the backfill area. In non-pavement areas, the top 12 inches of backfill material shall be fine-grained, cohesive soil.

Slab-on-Grade

No expansive type soils were observed on the site or encountered in the explorations. Conventional slab-on-grade construction may be used. However, during construction should expansive CLAY soils be found under slab areas, the expansive CLAY shall be removed and if necessary to achieve finished subgrade elevation, shall be replaced with properly compacted structural fill.

Moisture barriers shall be provided under floor slabs with moisture sensitive floor covering. This may consist of 6-mil polyethylene sheeting placed on 4-inches of compacted gravel base. Where the subgrade soil consists of the clean on-site sand, the gravel base material shall consist of 3/4-inch minus City and County of Honolulu aggregate base course gravel in order to minimize penetration or mixing of the sand with the normally used 3/4-inch clean gravel.

For design of slabs, a modulus of subgrade reaction of 150 pci may be used for the on-site soil or properly compacted structural fill.

Preparation of the subgrade shall be in accordance with the Site Preparation and Grading section to this report.

Slopes

Cut and fill slopes shall not exceed 2 horizontal to 1 vertical (2H:1V). Fill slopes shall be constructed in accordance with the Site Preparation and Grading section to this report.

Exposed slopes shall be covered as soon as practical after construction to minimize erosion.

Fill slopes shall be constructed by either overfilling and cutting back to compacted soil, or the slope shall be track rolled at 5-foot vertical height intervals.

Temporary construction of cut slopes including trench excavations are susceptible to caving. Excavation and trenching shall be done in accordance with applicable OSHA standards.

Pavement Design

For design of pavement areas, the recommended pavement sections are as follows where the subgrade soil consists of the on-site SAND or structural fill material:

	Flexible Pavement			Rigid Pavement	
Traffic Load	A.C	Base	Subbase	PCC	Base
Vehicles 10,000 lbs. GVW or less	2"	6"	0	5"	0
Over 10,000 lbs. GVW	2.5"	6"	0	6"	4"

The top 6 inches of pavement subgrade, subbase, and base course gravel shall be compacted to at least 95 percent of the maximum dry density (ASTM D1557).

All material quality and compaction requirements for pavement section shall be in accordance with the Hawaii Standard Specifications for Road, Bridge and Public Works Construction, dated 1994.

Field Percolation Tests

Percolation tests were performed at two location on the property using test procedures developed by the Robert A. Taft Sanitary Engineering Center. The field work consisted of drilling the test borings to depths of 5 feet below existing grade using a 4-inch diameter auger. The locations of the percolation tests are shown on the Plot Plan, Plate 2.

In general, the tests consists of drilling the bore holes, filling the bottom with 2 inches of coarse sand and then

saturating the hole with water (overnight for clayey soils). The test is conducted by filling the hole with clear water and then measuring the drop in water level with time. The results of the measurements are used to determine the percolation rate.

The percolation test borings encountered SAND to the final depths of the test. The results of the percolation tests are as follows:

Boring No.	Test Depth	Percolation Rate
P-1	5.0'	less than 1 minutes/inch
P-2	5.0'	less than 1 minutes/inch

From the "Septic Tank Systems" by Winneberger (1984), the correlation between the coefficient of permeability and the soil percolation rate is given by the equation:

$$\log k = -4.76 + 1.55 \log p$$

where k = Darcy's coefficient of permeability (cm/sec)

p = USPHS percolation rate (in/hr)

Using this equation, the coefficient of permeability is calculated to be 9.91×10^{-3} cm/sec or 3.25×10^{-4} ft./sec.

Site Preparation and Grading

It is recommended that the site be prepared in the following manner:

1. Clearing and Grubbing:

   In all areas to receive fill and in structural areas, all vegetation, weeds, brush, roots, stumps, rubbish, debris, old foundations and pavements, soft soil and other deleterious material shall be removed and disposed of off-site.

2. Preparation of Ground to Receive Fill:

   The exposed surface shall then be scarified to a depth of 6 inches, moisture conditioned to near

optimum moisture (ASTM D1557-00) and then compacted to the degree of compaction specified below. If soft or loose spots are encountered, the loose/soft areas shall be removed to firm material and the resulting depression shall be filled with properly compacted fill.

3. Types of Fill and Backfill Material:

Structural fill and backfill shall be described as material placed beneath buildings and extending a horizontal distance of 3 feet beyond the edge of the building line. Non-structural fill shall be described as material placed beyond 3 feet from the building line.

4. Material Quality:

Fill and backfill material shall consist of soil which is free of organics and debris. The maximum size particle for fill and backfill material shall be as follows:

a. Structural Fill

Top 2 feet below finished subgrade (FSG)	3"
Below 2 feet from FSG	6"

b. Non-structural fill and Pavement areas

Top 2 feet from FSG	3"
2 to 6 feet from FSG	6"
*Below 6 feet from FSG	12"

(FSG = Finished Subgrade Elevation; defined as the elevation below any subbase, and granular cushion fill beneath pavements and floor slabs).

*If larger rock or boulders (up to 12 inches in diameter) are used in deep fills, they shall be well embedded. The interstices between the rock or boulders shall be filled with fine-grained materials so as to produce a compacted mass. If utility lines are to be installed within fill areas, the maximum particle size shall be reduced to minimize obstruction of trenching work.

Structural fill shall have a Unified Soil Classification of either GW, GM, GC, SW, SM, SP or SC. The plasticity index of the fine portion as determined by the ASTM D4318-84 test shall be less than 15.

5. Placement of Fill and Backfill:

Each layer of fill and backfill material shall be placed in lifts not exceeding the following (loose thickness):

a. Structural Fill (including pavement areas)

Top 2 feet below finished subgrade (FSG)	8"
Below 2 feet from FSG	12"

b. Non-structural fill

Top 6 feet from FSG	12"
Below 6 feet from FSG	*

*The loose thickness of this layer shall not exceed 1.5 times the largest size particle; this is predicated upon proper compaction of each lift.

Prior to placing of fill and backfill material, the material shall be aerated or moistened to near optimum moisture content (ASTM D1557-00 test procedure).

Where fill is placed on existing ground that is steeper than 5 horizontal to 1 vertical, the existing ground surface shall be benched into firm soil as the fill is placed.

6. Degree of Compaction:

Each layer of fill and backfill, and the ground surface that is exposed and scarified after clearing and grubbing shall be thoroughly compacted from edge to edge using conventional compaction equipment designed for the purpose. The minimum degree of compaction for each layer (as determined by the

ASTM D1557-00 test procedure) shall be as follows:

a.	Structural Fill (under and 3 feet beyond the edge of buildings):	95%
b.	Pavement Area Fill	
	Top 2 feet below finished subgrade (FSG)	95%
	Below 2 feet from FSG	90%
c.	Non-structural fill	*90%

*Where compaction tests are not practical due to the size of the material, each layer shall be compacted by trackrolling until it does not weave or creep under the weight of the trackrolling equipment (D-8 dozer or larger).

It is particularly important to see that all fill and backfill soils are properly compacted in order for the design parameters to remain applicable.

7. Preparation of Footing Excavations:

Prior to placing of steel or pouring concrete, the bottom of footing excavations shall be cleaned of loose materials and soils that have been disturbed by the excavation process. Any soft/loose soils encountered at the bottom of the footing excavation that cannot be properly compacted shall be removed to firm material. The resulting depression shall then be backfilled with properly compacted structural fill, concrete, controlled low-strength material (CLSM) or other approved backfill material.

8. Site Drainage:

During construction, drainage shall be provided to minimize ponding of water adjacent to or on foundation and pavement areas. Ponded areas shall be drained immediately. Any subgrade soil that has become soft due to ponding shall be removed to firm material and replaced with compacted structural fill.

9. Erosion Control:

The on-site soils are susceptible to water and wind erosion. Exposed surfaces shall be covered with vegetation as soon as practical after construction.

Concentrated surface water flow shall not be allowed to run over slopes unless lined channels are provided.

10. Remedial Work To Minimize Soil Erosion Along Seawall:

Remedial work to minimize soil erosion may consist of the following:

a. Underpin or seal the underside of the seawall foundation using concrete or other types of sealant material. Because the seawall is located along the shoreline, special permits and construction techniques will likely be required.

b. Excavate the existing soil from behind the seawall in order to install geotextile filter fabric against the face and heel of the seawall. The filter fabric shall be non-woven, minimum 8-ounce fabric. Backfill against the filter fabric with sand or well-graded gravel.

INSPECTION

During the progress of construction, so as to verify compliance with the design concepts, recommendations and specifications, qualified engineering personnel should be present to observe the following operations:

1. Site preparation.
2. Placement of fill and backfill.
3. Footing excavations.

REMARKS

The conclusions and recommendations contained herein are based on the findings and observations made

at the boring locations. If conditions are encountered during construction which appear to differ from those disclosed by the explorations, this office shall be notified so as to consider the need for modifications.

This report has been prepared for the exclusive use of Peter Vincent & Associates, LLC and their respective design consultants. It shall not be used by or transferred to any other party or to another project without the consent and/or thorough review by this facility. Should the project be delayed beyond the period of one year from the date of this report, the report shall be reviewed relative to possible changed conditions.

Samples obtained in this investigation will deteriorate with time and will be unsuitable for further laboratory tests within one (1) month from the date of this report. Unless otherwise advised, the samples will be discarded at that time.

- o 0 o -

The following are included and complete this report:

Appendix

- Field Investigation
- Laboratory Testing
- Vicinity Map
- Plot Plan
- Logs of Test Borings
- Results of Laboratory Tests
- Cross Sections of Existing Seawall

APPENDIX

FIELD INVESTIGATION

General

The field investigation consisted of performing explorations at the locations shown on the Plot Plan. The borings were advanced with a Badger drill rig using continuous flight augers.

Soil Sampling

Samples of the underlying soils were obtained from the borings by driving a sampling tube into the subsurface material using a 140-pound safety hammer falling from a height of 30 inches. Relatively undisturbed ring samples were obtained using a 3-inch outside diameter, 2.5 inch inside diameter steel sampling tube with an interior lining of one-inch long, thin brass rings. Standard Penetration Test (SPT) values and disturbed soil samples were obtained with a 2-inch (outside diameter) split-barrel sampler instead of the 3-inch sampler.

The sampling tube is driven approximately 18 inches into the soil and the number of blows required to drive the sampler is recorded at 6-inch intervals. The blow count for the last 12-inches is shown on the boring logs. The sampler is then retracted and a section of the retrieved soil sample is removed and placed in a close fitting waterproof container in order to retain field conditions until completion of the laboratory tests. The soil is visually classified using the Unified Soil Classification System.

LABORATORY TESTING

General

Laboratory tests were performed on various soil samples to determine their engineering properties. Descriptions of the various tests are listed below.

Unit Weight and Moisture Content

The in-place moisture content and unit weight of the samples are used to correlate similar soils at various depths. The sample is weighed, the volume determined, and a portion of the sample is placed in the oven.

After oven-drying, the sample is again weighed to determine the moisture loss. The data is used to determine the wet-density, dry-density and in-place moisture content.

Classification Tests

The terms and symbols used to describe the soil materials are based on the Unified Soil Classification System which provides a basis for classifying soils using either visual methods or laboratory test results. Laboratory tests include sieve and hydrometer analysis for particle size distribution, and Atterberg Limits test for liquid limit, and plasticity index determination.

Grain-size distribution of the soil is determined by passing the soil through a series of sieves. If 50 percent or more of the soil by dry weight passes the #200 sieve, the soil is classified as fine-grained. If more than 50 percent of the soil by dry weight is retained on the #200 sieve, the soil is classified as coarse grained.

Coarse grained soils are described as follows:

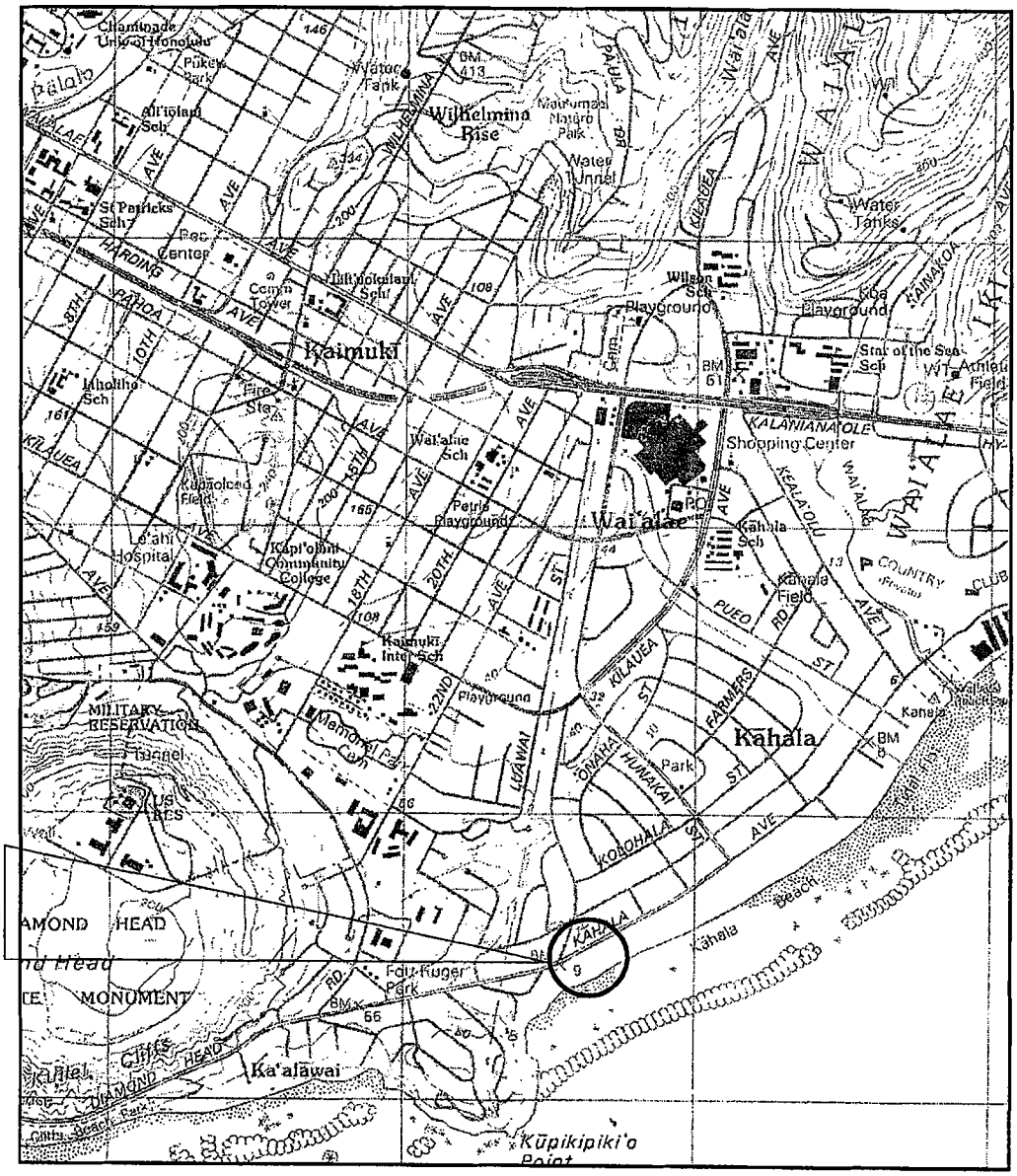
Boulder:	Material retained on a 12-inch square sieve
Cobble:	Material passing a 12-inch sieve but retained on a 3-inch sieve
Gravel:	Material passing a 3-inch sieve but retained on a #4 sieve
Sand:	Material passing a #4 sieve but retained on a #200 sieve

Fine-grained materials are silts and clays. The liquid limit and plastic limit results from an Atterberg Limits test are used to determine if the soil is a silt or clay.

Direct Shear

Direct shear tests are performed to determine the strength characteristics of the representative soil samples. The test consists of placing the sample into a shear box, applying a normal load and then shearing the sample at a constant rate of strain. The shearing resistance is recorded at various rates of strain. By varying the normal load, the angle of internal friction and cohesion can be determined.

VICINITY MAP



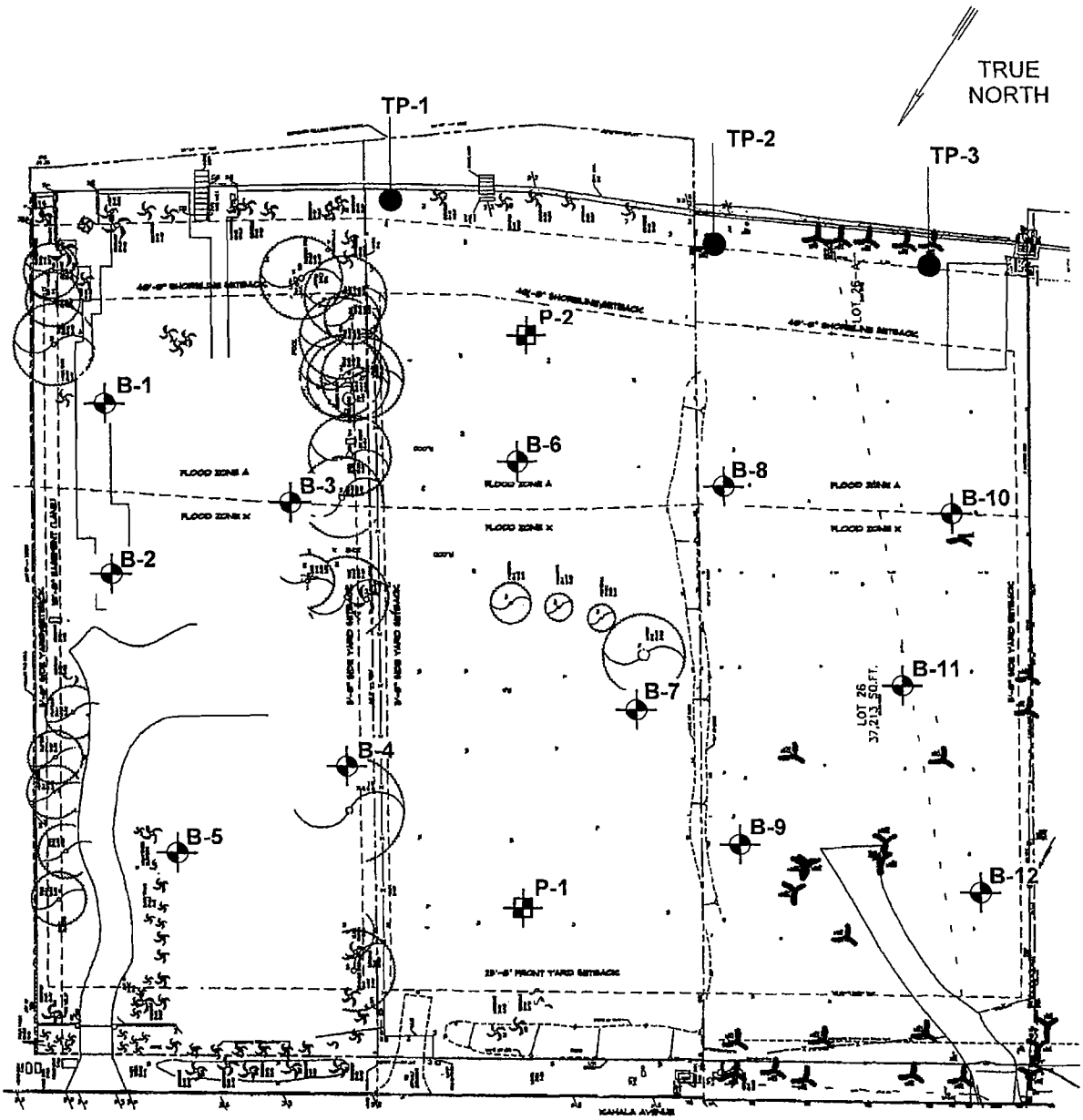
REFERENCE:
USGS TOPOGRAPHIC MAP
HONOLULU QUADRANGLE
DATED 1998

DEY RESIDENCE
4433 KAHALA AVENUE

SHINSATO ENGINEERING, INC.
CONSULTING GEOTECHNICAL ENGINEERS

98-747 KUAHAO PL. PEARL CITY, HI 96782

PROJECT NO.	07-0120
DATE:	10/07
SCALE:	1"=2000'
PLATE	1



LEGEND:

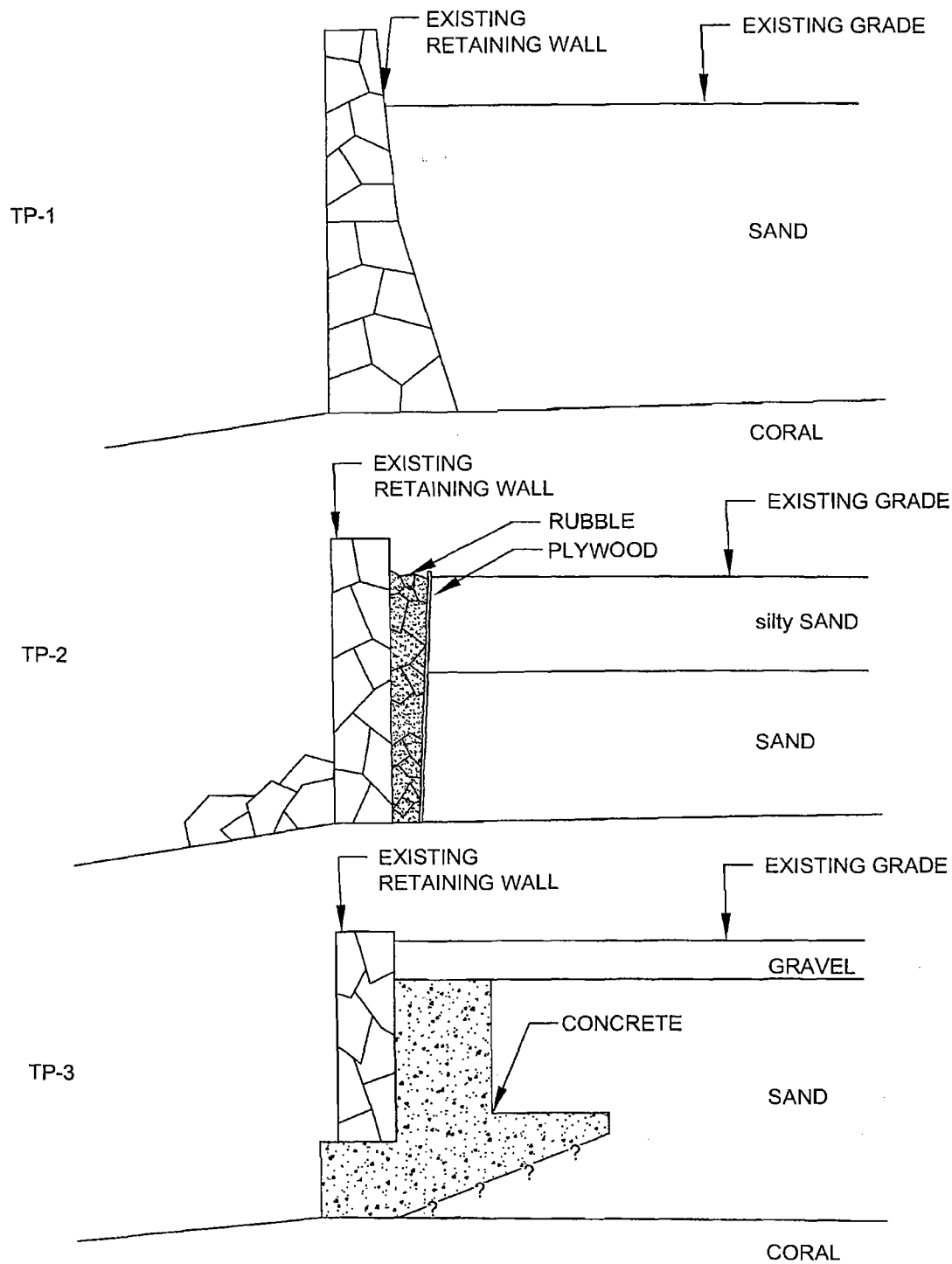
BORING LOCATION

PERC TEST LOCATION

TEST PIT LOCATION

PLOT PLAN
SCALE: 1" = 60'

Project: DEY RESIDENCE 4433 KAHALA AVENUE Project No.: 07-0120	*SHINSATO ENGINEERING, INC.* *CONSULTING GEOTECHNICAL ENGINEERS* *98-747 KUAHAO PL. PEARL CITY, HI 96782*	**PLATE 2**



RETAINING WALL SECTIONS

SCALE: 1" = 4'

Project: DEY RESIDENCE Project No.: 07-0120	**SHINSATO ENGINEERING. INC.** *Consulting Geotechnical Engineers* 98-747 Kuahao Pl. Pearl City, HI 96782	PLATE 2.1

LOG OF BORING NO. 1

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **8'**
DEPTH OF BORING (FT.): **16.5**
DEPTH TO GROUNDWATER (FT.): **8.166**
DATE DRILLED: **October 9, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SP	SAND; some fines, few gravel			tan	slightly moist	loose				
2					17	white			94.8	2.7		
			--trace fines, no gravel					mod. dense				
4					19				78.7	6.6		
6								loose				
					9					9.9		
8							▼	mod. dense				
		SM	--silty, with gravel		17	light gray				33.0		
10												
					6					29.9		
12												
14												
16					1/18"			very loose		45.5		
			END OF BORING									
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
3

LOG OF BORING NO. 2

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **8'**
DEPTH OF BORING (FT.): **16.5**
DEPTH TO GROUNDWATER (FT.): **7.666**
DATE DRILLED: **October 9, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; some gravel			brown	slightly moist	loose				
			--with gravel					mod. dense				
2					28				91.8	10.2		
		SP	--trace fines			tan						
4					15					8.3		
								loose				
6					9					16.7		
8		SM	--silty, with gravel			white	▼	dense				
					32					33.5		
10						light gray		mod. dense				
					11					29.1		
12												
14												
								loose				
16					5					45.3		
			END OF BORING									
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
4

LOG OF BORING NO. 3

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **8'**
DEPTH OF BORING (FT.): **19.083**
DEPTH TO GROUNDWATER (FT.): **7.917**
DATE DRILLED: **October 10, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SP	SAND; few gravel, some organic debris			tan	slightly moist	loose				
								mod. dense				
2					25				78.1	2.7		
								loose				
4					9					10.4		
								mod. dense				
6					12					14.3		
8						white	▼					
					19					31.0		
10		SM	--silty, with gravel									
					11					30.9		
12												
14												
16					8					30.1		
			--PROBE @ 16.5'		8							
18					14			mod. dense				
					66/7"							
			END OF BORING					very dense				
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
5

LOG OF BORING NO. 4

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **8'**
DEPTH OF BORING (FT.): **16.5**
DEPTH TO GROUNDWATER (FT.): **5.66**
DATE DRILLED: **October 10, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; few gravel			brown	slightly moist	loose				
								mod. dense				
2					23				76.7	13.3		
		SP	--trace fines			tan						
4					25					18.6		
			--no gravel									
6					19					30.1		
								loose				
8					9					27.0		
		SM	silty SAND; with gravel			light gray						
10												
					4					46.8		
12												
14												
						tan		mod. dense				
16					12					34.2		
			END OF BORING									
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
6

LOG OF BORING NO. 5

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **8'**
DEPTH OF BORING (FT.): **16.5**
DEPTH TO GROUNDWATER (FT.): **6.166**
DATE DRILLED: **October 10, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; few gravel			brown gray	slightly moist	loose				
			--no gravel					mod. dense				
2					31				77.2	8.9		
		SP	--trace fines			tan						
4					12					10.9		
6					18		▼			27.0		
8					15					19.9		
10		SM	silty SAND; with gravel			light gray		loose				
					4					38.1		
12												
14												
16					7					29.0		
			END OF BORING									
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
7

LOG OF BORING NO. 6

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **8'**
DEPTH OF BORING (FT.): **21.5**
DEPTH TO GROUNDWATER (FT.): **7.666**
DATE DRILLED: **October 10, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND;			brown tan	slightly moist	loose				
		SP	--trace fines					mod. dense				
2					21	tan			79.8	1.9		
4					13			loose		6.4		
6					9							
8						light gray	▼	mod. dense				
					13					31.3		
10		SM	--silty, with gravel					loose				
					9					28.3		
12												
14												
		(CR)	CORAL;			tan		mod. dense				
16					28					38.9		
					21							
18					13							
					14							
20					29							
					79			very dense				
22			END OF BORING									
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
7

LOG OF BORING NO. 7

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **Unknown**
DEPTH OF BORING (FT.): **16.5**
DEPTH TO GROUNDWATER (FT.): **6.6'**
DATE DRILLED: **October 16, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SP	SAND; trace roots			tan	slightly moist	loose				
2					12				79.3	10.1		
4			--no roots									
6					11		▼			31.9		
8												
10		SM	silty SAND; with gravel (calcareous)			light gray		very loose				
12					1					43.2		
14												
16		GM	silty GRAVEL;		7	tan				42.3		
			END OF BORING									
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
9

LOG OF BORING NO. 8

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **Unknown**
DEPTH OF BORING (FT.): **16.5**
DEPTH TO GROUNDWATER (FT.): **5.75'**
DATE DRILLED: **October 16, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND;			brown	slightly moist	loose				
		SP	SAND;			tan						
2					18					10.0		
4												
6					14		▼			35.2		
8												
10		SM	--few gravel, with silt			light gray						
12					7					46.1		
14												
16					4					54.7		
			END OF BORING									
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
10

LOG OF BORING NO. 9

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **Unknown**
DEPTH OF BORING (FT.): **18.417**
DEPTH TO GROUNDWATER (FT.): **7.5'**
DATE DRILLED: **October 16, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SP	SAND; few roots			brown tan	slightly moist	loose				
2					17				81.8	5.8		
4			--no roots									
6					12	light gray	moist			32.1		
8												
10		SM	silty SAND; with gravel									
12					3					72.2		
14												
16			PROBE at 15.0' - 18.42'		6 9 7							
18					60/5"			very dense				
			END OF BORING									
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
11

LOG OF BORING NO. 10

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **Unknown**
DEPTH OF BORING (FT.): **11.5**
DEPTH TO GROUNDWATER (FT.): **7.0'**
DATE DRILLED: **October 10, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; with roots, trace gravel			brown	slightly moist	loose				
		SP	--no gravel, no roots			tan		moderately dense				
2					24				81.5	3.4		
4					12					7.8		
							very moist					
6					10					22.0		
8												
10		(CR)	CORAL;			white gray		dense				
					36					56.2		
12			END OF BORING									
14												
16												
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
12

LOG OF BORING NO. 11

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **Unknown**
DEPTH OF BORING (FT.): **21.583**
DEPTH TO GROUNDWATER (FT.): **Unknown**
DATE DRILLED: **October 16, 2007**

DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; few roots			brown	slightly moist	loose				
									79.8	7.3		
2		SP	SAND; trave gravel		20	tan		moderately dense	75.6	8.0		
4												
							very moist					
6					12					30.4		
8												
10		SM	silty SAND; with gravel			light gray		very loose				
					1					37.4		
12												
14												
			PROBE at 15.0' - 21.58'		2							
16					2							
					12			moderately dense				
18					14							
					17							
20					21							
					37/7"			very dense				
22			END OF BORING									
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
13

LOG OF BORING NO. 12

DRILLING METHOD: **Badger Drilling Rig**
HAMMER WEIGHT (lbs): **140**
HAMMER DROP (in): **30**

ELEVATION: **Unknown**
DEPTH OF BORING (FT.): **16.5**
DEPTH TO GROUNDWATER (FT.): **7.0'**
DATE DRILLED: **October 16, 2007**

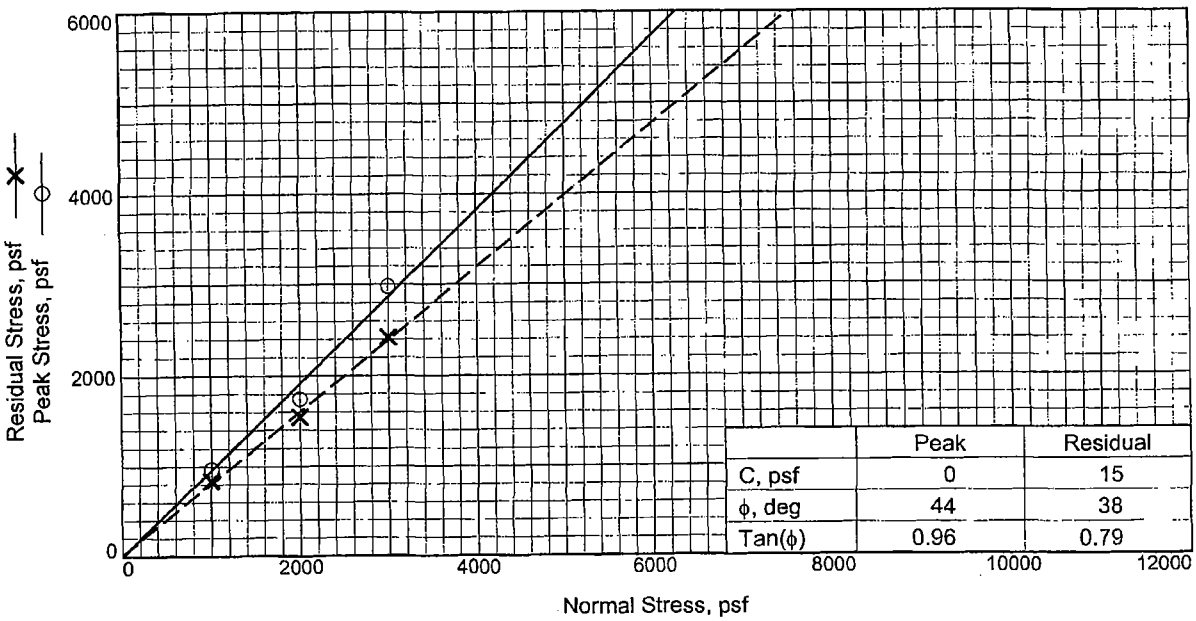
DEPTH (FT.)	GRAPHIC SYMBOL	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	BLOWS/FOOT	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	TORVANE STRENGTH (TSF)
0		SM	silty SAND; few roots			brown	slightly moist	loose				
								very loose				
2		SP	SAND;		7	tan			73.2	5.0		
4												
			--trace gravel (calcareous)					loose				
6					11					25.5		
8												
10		SM	silty SAND; with gravel			light gray						
					3					50.2		
12						tan						
14												
		GM	silty GRAVEL;					dense				
16					65					24.2		
			END OF BORING									
18												
20												
22												
24												
26												
28												
30												

PROJECT NAME: DEY RESIDENCE
4433 KAHALA AVENUE

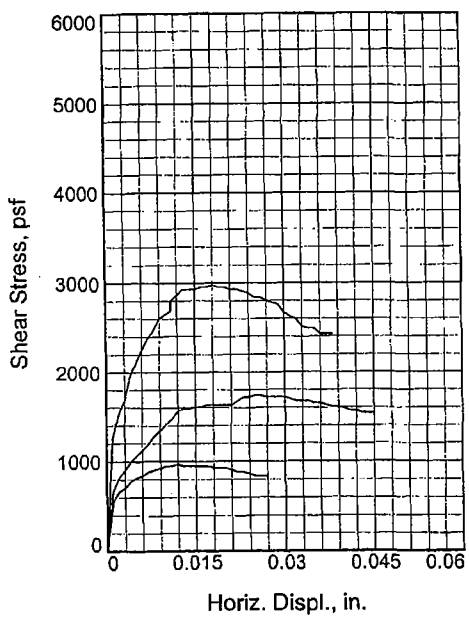
PROJECT NO.: 07-0120

SHINSATO ENGINEERING, INC.
Consulting Geotechnical Engineers
98-747 Kuahao Place, #E
Pearl City, HI 96782

PLATE
14



	Peak	Residual
C, psf	0	15
ϕ, deg	44	38
Tan(ϕ)	0.96	0.79



	Sample No.	1	2	3
Initial	Water Content, %	N/A	N/A	N/A
	Dry Density, pcf	N/A	N/A	N/A
	Saturation, %	N/A	N/A	N/A
	Void Ratio	N/A	N/A	N/A
	Diameter, in.	2.42	2.42	2.42
	Height, in.			
At Test	Water Content, %	N/A	N/A	N/A
	Dry Density, pcf			
	Saturation, %			
	Void Ratio			
	Diameter, in.			
	Height, in.			
	Normal Stress, psf	1000	2000	3000
	Peak Stress, psf	970	1741	2975
	Displacement, in.	0.01	0.03	0.02
	Residual Stress, psf	838	1543	2424
	Displacement, in.	0.03	0.04	0.04
	Strain rate, in./min.	N/A	N/A	N/A

Sample Type:

Description: --trace fines, no gravel

Assumed Specific Gravity=

Remarks:

Client:

Project: DEY RESIDENCE
4433 KAHALA AVENUE

Source of Sample: 1 **Depth:** 3.5

Sample Number: 2

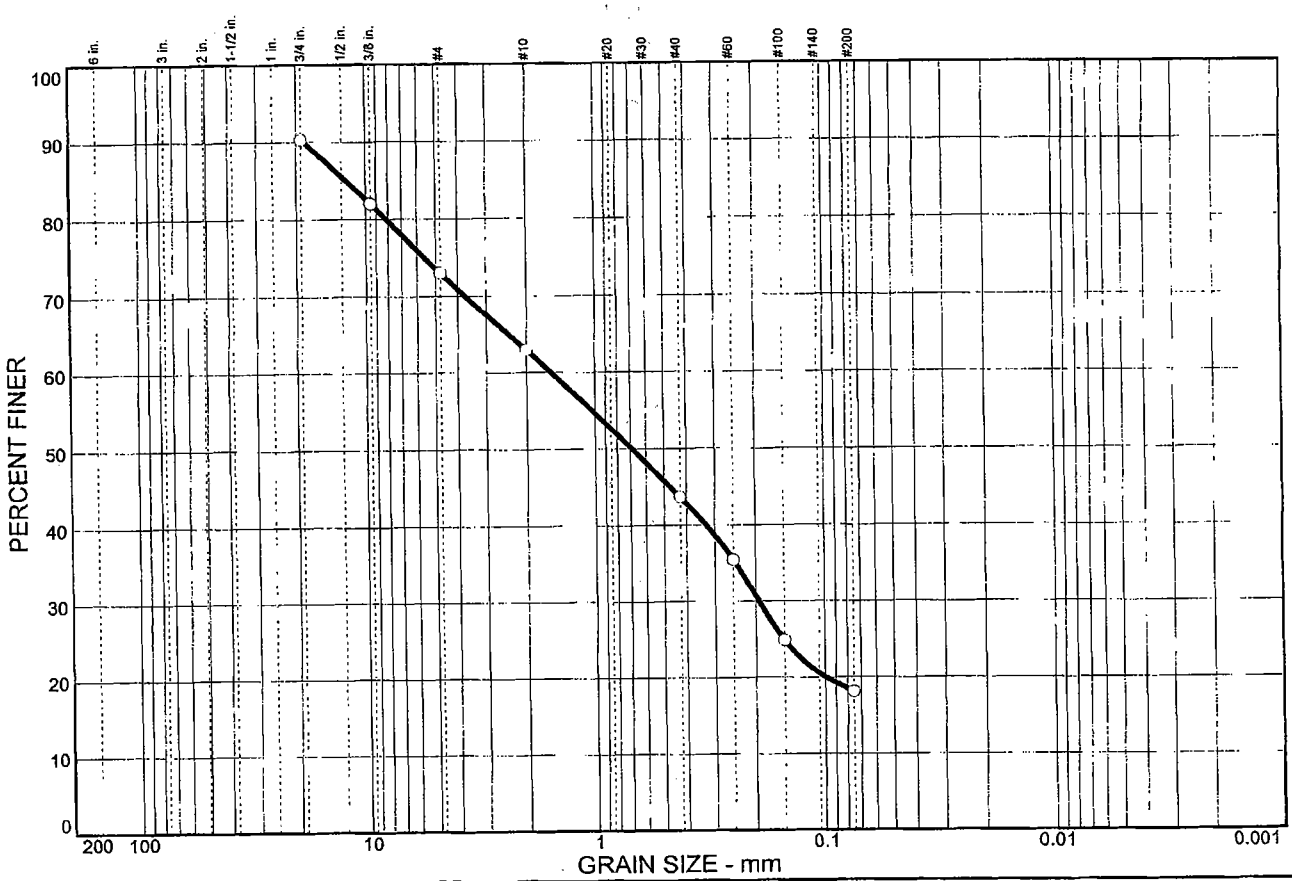
Proj. No.: 07-0120 **Date Sampled:**

DIRECT SHEAR TEST REPORT

Shinsato Engineering, Inc.

PLATE 15

Grain Size Distribution



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
			17.3	10.1	19.2	25.6	18.1	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	DESCRIPTION	USCS
	1	5	11.0	silty SAND; with gravel	SM

Grain Size Distribution

Shinsato Engineering, Inc.

Client:

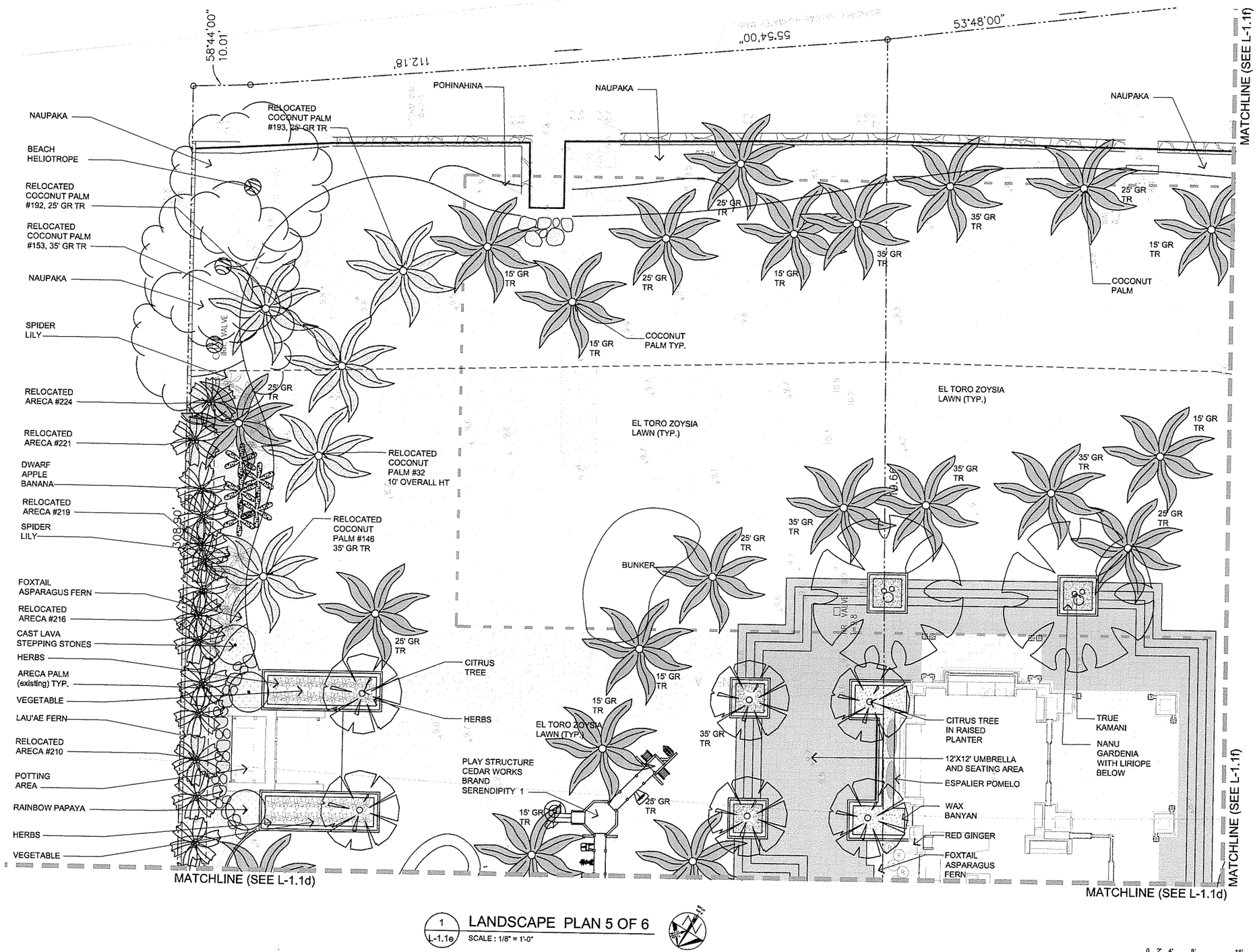
Project: DEY RESIDENCE
4433 KAHALA AVENUE

Project No.: 07-0120

PLATE 16

Appendix D

Preliminary Landscape Plan



1 L-1.1e LANDSCAPE PLAN 5 OF 6

SCALE : 1/8" = 1'-0"

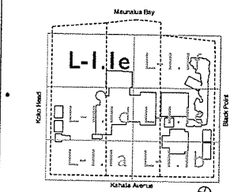
PVA
petervincentarchitects
1021 Smith Street Penthouse
Honolulu Hawaii 96817
T 808.524.8255 F 808.523.3419
E info@pva.com www.pva.com

Monaghan Landscape Architects LLC
47-513 Pulama Road
Kaneohe, Hawaii 96744
Phone: (808) 781-5596
Email: rkmla@hawaii.rr.com

4433 Kahala Avenue

4423 and 4433 Kahala Avenue
Honolulu, HI 96815

TMK: 3-5-03:008,009,010



Key Plan

Project	06-081.03
Date	5 February 2010
Drawing	Landscape Plan 5 of 6
Scale	1/8"=1'-0"
Drawn By	RKM, TN,

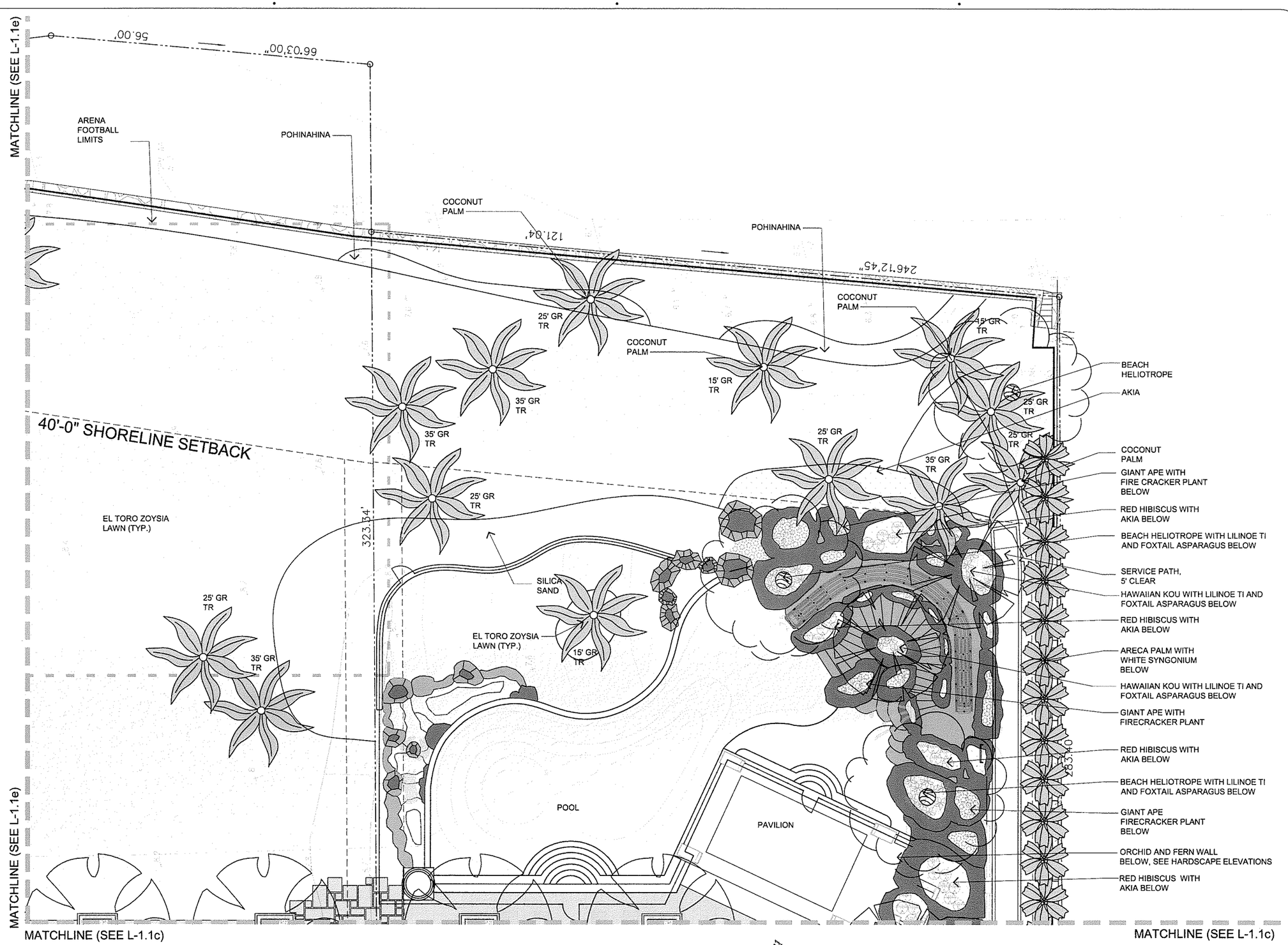
Revisions:

Pricing Set

This work was prepared by me or under my supervision and represents a set of plans that will be used in the specific Association of Condominium Apartment Owners Hawaii Designers of Condominiums, Inc. Scope of Work including Architect, Architectural, Civil Structural and Landscape Architect.

4/30/10
Signature Expiration Date of License

L-1.1e



1 L-1.1f LANDSCAPE PLAN 6 OF 6

SCALE : 1/8" = 1'-0"

0 2' 4' 8' 16'

SCALE: 1/8" = 1'-0"

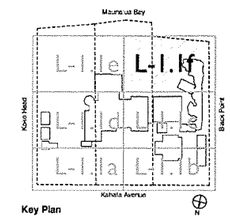
PVA
petervincentarchitects
1021 Smith Street Penthouse
Honolulu Hawaii 96817
T 808.524.8255 F 808.523.3419
E info@pva.com www.pva.com

Monaghan Landscape Architects LLC
47-513 Pulama Road
Kaneohe, Hawaii 96744
Phone: (808) 781-5696
Email: rkmla@hawaii.rr.com

4433 Kahala Avenue

4423 and 4433 Kahala Avenue
Honolulu, HI 96815

TMK: 3-5-03:008,009,010



Key Plan

Project 06-081.03

Date 5 February 2010

Drawing Landscape Plan 6 of 6

Scale 1/8" = 1'-0"

Drawn By RKM, TN,

Revisions:

Pricing Set

This work was prepared by me or under my supervision and construction of this project will be under my supervision. Supervision of construction is defined as the periodic site observations to ascertain that the quality of work, materials, and workmanship are in accordance with the Contract Documents. Architects, Land Surveyors and Landscape Architects

Signature 4/30/10 Expiration Date of License

L-1.1f

Appendix E

Archaeological Inventory Survey

T. S. Dye & Colleagues, Archaeologists, Inc.
735 Bishop St., Suite 315, Honolulu, Hawai'i 96813

Archaeological Inventory Survey of a Residential Parcel on Kāhala Avenue, O'ahu, Hawai'i (TMK:3–5–3:8, 9, 10)*

Thomas S. Dye, Ph.D. Elaine H. R. Jourdane

March 7, 2007

Contents

*Prepared for Choi International, 1215 Hunakai Street, Suite 200, Honolulu, HI 96816.

Illustrations

Tables

Abstract

At the request of Choi International, T. S. Dye & Colleagues, Archaeologists, Inc. has completed an archaeological inventory survey of a residential lot on Kāhala Avenue. The residential lot contains the reburied remains of three historic-era individuals discovered inadvertently during construction activities in the 1990s; the reburial location has been given the State site number 50–80–14–5320. The inventory survey excavated 20 shovel test units and 24 m^2 in areal excavations in addition to 51 shovel test units excavated earlier by Pacific Consultant Services, Inc. The 71 shovel test excavations and the three areal excavations yielded information on the stratigraphic history of the residential lot and identified historic-period activities including creation of small fires near the beach, a dump for construction trash, and disposal of small items associated with modern dwellings. The excavations failed to find any evidence for traditional Hawaiian use of the area. Future construction at the residential lot will need to take into account the presence of the human remains at site 50–80–14–5320 through preparation and implementation of a burial site component of a data recovery plan, but other archaeological work at the lot will not be required because no other significant historic sites are present.

1 Introduction

At the request of Choi International, T. S. Dye & Colleagues, Archaeologists, Inc. has completed an archaeological inventory survey of a residential lot consisting of three tax map parcels on Kāhala Avenue. The inventory survey was completed as part of the due diligence for a sale of the parcels and was not required by a governmental agency. Prospective buyers of the lot were concerned to establish the location of human remains that had been discovered in 1995 during construction of an addition to a house on one of the parcels [7] and to learn the distribution and extent of possibly significant cultural deposits believed to be present at the lot [3]. The State Historic Preservation Division (SHPD) was consulted throughout the planning and implementation of the survey, which was designed to meet the criteria set out in the SHPD's *Rules Governing Standards for Archaeological Inventory Surveys and Reports* (§13–276).

significant

1.1 Survey Area

The survey area consists of three adjacent ocean-front residential parcels totaling approximately 2.76 ac., and identified on tax maps as TMK:3–5–3:8, 9, and 10. They are located in the traditional *ahupua'a* of Waikīkī, Kona (now Honolulu) District, O'ahu Island (fig. 1) and are currently owned by WF Coastal Properties, LLC.

ahupua'a

1.2 Environment

All three parcels have been developed as residences. The houses on parcels 9 and 10 were demolished as early as 1993 and the house on parcel 8 was demolished in 2004 [4:1, 6]. The parcels are flat and fronted by sea walls at the water's edge. They support remnants of modern landscaping vegetation, such as grass lawns, coconut and other palms, mango trees, a variety of flowering trees and shrubs, and weeds that have sprouted since the lots

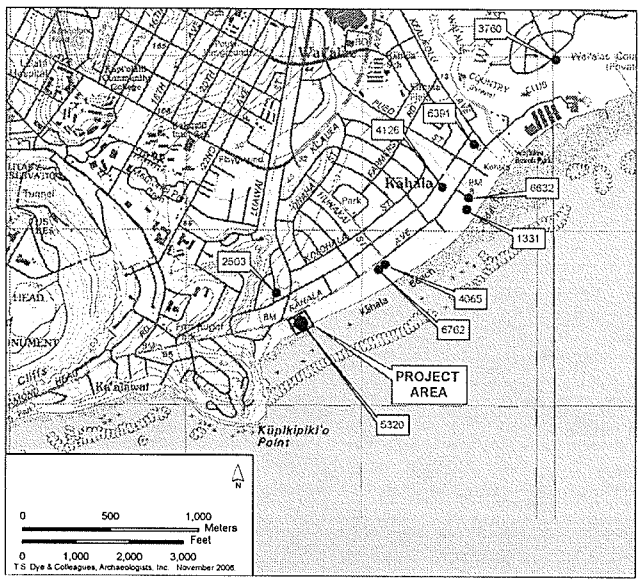


Figure 1. Location of the survey area and nearby historic sites on a portion of the USGS 7.5' topographic map, Honolulu quadrangle.

have been vacant. Most of these plants grow in fill topsoil that was applied to calcareous sands that occur naturally on all three parcels. In places where topsoil was not applied, soils classified as Jaucas sand [9] have developed. These soils are excessively drained sands that occur as narrow strips adjacent to the ocean on all the Hawaiian islands. The survey area's leeward, coastal location ensures that it is relatively dry, with an average annual precipitation of 20–30 in., most of which falls in the winter [11]. The nearest drainage is Kapakahi stream, which drains Waiʻalaenui and Kapakahi gulches, and runs into the sea more than 1.5 km northeast of the survey area.

1.3 Background Research

Documents and materials at the State Historic Preservation Division (SHPD) library, the SHPD geographic information system database, the Hawaiʻi State Library, the Hawaiʻi State Archives and the library of T. S. Dye & Colleagues, Archaeologists, Inc. were consulted. All available archaeological project reports for the Kāhala and Waiʻalae area were reviewed for this project.

1.3.1 Traditional and Historic Land Use

The project is located in the area of Kanewai Kāhala in the region known as Waiʻalae nui.[1] Waiʻalae, translated as "mudhen water" by Pukui et al. [25], takes its name from a spring

[1]Depending upon the source, Waiʻalae nui is either an *ahupuaʻa* or an *ʻili* of Waikīkī *ahupuaʻa*.

that fed a small set of agricultural terraces [13]. Sterling and Summers [29] tell a story of how Kamehameha III was shown the location of the well by an older couple who were its keepers. Otherwise, Sterling and Summers [29] have no references to Kāhala and only a few references to Waiʻalae nui or the neighboring region of Waiʻalae iki. One of these, from the Hawaiian newspaper, *Kuokoa*, gives near identical descriptions of Waiʻalae iki and Waiʻalae nui, the only difference being the name of the *konohiki* of fishing; Pākī was *konohiki* of fishing for Waiʻalae nui and Kamāmalu for Waiʻalae iki.

konohiki

> Many people lived along the shores and they worked at farming and fishing. Plants grew. There were taro patches, tobacco, sweet potatoes, bananas and sugar cane. There were many *konohikis* in former days ... There were ever so many people on the shores when these chiefs came to spend a while with the common people. [29:275, 276]

Alapaʻi, a Hawaiʻi island chief was told during his attempt to take possession of Oʻahu in the mid-1700s that good harbors existed at Waikīkī and Waiʻalae. However, his attempts to land at Waikīkī and Waiʻalae were unsuccessful. His canoes were pushed back by Kanahaokalani's army and landed at Koʻolaupoko instead [16].

According to Kamakau [16], at the time of Kamehameha's battle with Kalanikūpule for Oʻahu in 1795, Kamehameha's fleet of canoes landed on the south shore from Waikīkī to Waiʻalae. After his conquest of Oʻahu, Kamehameha gave the *ʻili* of Waiʻalae to Kaʻahumanu [17].

ʻili

The survey area is located within the land of Kanewai Kāhala which was awarded to Kalaiheana as Land Commission Award (LCA) 228:2 during the *māhele*. Kalaiheana was a *kahu* to Liholiho and participated in the 1824 invasion of Kauaʻi [16:220, 268]. Testimony on the LCA, obtained from the Native Register on file at the Hawaii State Archives, indicates that Kalaiheana received the lands after Kamehameha's conquest of Oʻahu.

māhele
kahu

> Kalaiheana's land, called Kanewai, is at Waikiki. It has some *leles* in Manoa—Keapuapu, Holoawalu [Kaloalu in N. T.], Pakui, and the *lele* of Pahoa at Waikiki; and the sea of Kahala. That was the land of Keeaumoku at Waikiki, adjoining the north side of Kalaepohaku. This land became his upon the victory of Kamehameha I at the Battle of Nuuanu, also Waialua, as was the custom of granting lands to the chiefs at the time. When the *peleleu* [fleet of large canoes] came, the land passed from Keeaumoku to Papa and Kalaiheana, and all the *leles* were also conveyed. From thence came this acquisition and there was no deterrent until the year 1841. For the first time, an edge of Kahala was taken for Waialae. And in the year 1846 another portion was taken for Kalaepohaku, in the month of May, or perhaps June. The witnesses are Kehana and Elele. This is ended.

According to Erkelens and Tomonari-Tuggle [7]

> Kalaiheana died in 1855. John ʻIʻi testified during probate proceedings that Kalaiheana, in the presence of his beneficiaries (two nephews and his wife, Kalama), stated that he wished to leave "the *ʻili* of Kanewai to me [ʻIʻi]

> as the Guardian of Victoria [Kamamalu]" (Probate 1576). 'I'i explained that Kalaiheana claimed "Kanewai before the Land Commission but as I understand not in his own right but as possession of the land under Kamamalu." Victoria Kamamalu was granted the *ahupua'a* of Wai'alae Nui as LCA 7713, probably as the heir to Kīnau her mother, who had received the lands of Ka'ahumanu upon the latter's death.
>
> Bernice Pauahi Bishop inherited Kamamalu's land (through Kekūanao'a and Ruth Ke'elikōlani). That Victoria Kamamalu ultimately controlled Kāhala is indicated by an 1883 transaction between Bernice Pauahi and her husband Charles R. Bishop and a group led by W. C. Akana (Bureau of Conveyances, Liber 84, page 53). The Bishops offered a lease on the "konohiki portion of Wa'alae," excepting "the parcel called Kahala adjoining the sea covering about sixty acres and following the ancient boundaries as nearly as possible." Upon Bernice Pauahi's death in 1885, Kāhala was given to Lili'uokalani.

Erkelens and Tomonari-Tuggle [7] reprint a 1903 map of Wai'alae that shows a group of buildings at the base of Black Point that are part of Lili'uokalani's complex. The current survey area is located ca. 200 m east of these buildings.

Bishop Estate leased portions of Wai'alae Kāhala for agriculture, pig farming, horse breeding, and dairy and cattle ranching. Title was also held for fisheries offshore. In 1888, Daniel Paul Rice Isenberg purchased land in Wai'alae for the development of a dairy ranch. Prior to the Isenberg's purchase, Wai'alae was leased by Bishop Estate to a Captain Ross who raised beef cattle. Isenberg planted large fields of alfalfa and was operating a first class dairy, the Waialae Ranch Company, within a few years. After his death in 1919, the Waialae Ranch Company continued under the direction of Robert McCorriston, George Fuller and Fred Schattauer and by 1924 was the largest dairy in Honolulu. In July 1927, the Isenberg ranch home, near the mouth of Wai'alae stream, became the club house for the Wai'alae Golf Course. The golf course,owned by the Hawaiian Hotels Company, was established for their guests (Honolulu Star Bulletin, August 25, 1934).

By the 1930s, the beachfront along Kāhala Avenue was being developed with homes, while farming continued in other areas. In 1938, more than 50 pig farms were operating in the vicinity of Farmers Road and Kāhala Avenues. Residents of the area, citing an increase in rats and mice at Kāhala, petitioned the territorial board of health to remove the pig farms (Honolulu Advertiser, December 20, 1938).

The recent land history records trace ownership of the survey area to Bishop Estate in the 1940s and 1950s when the Kāhala area was subdivided and leased as individual residential sites. Between 1986 and 1987 the three parcels comprising the current project area were sold by Bishop Estate and were subsequently acquired by the current owner.

1.3.2 Regional Archaeology

Archaeological investigations in the coastal portion of Kāhala have been limited (fig. 1). In 1967, Soehren [28] conducted test excavations in a natural rock shelter, designated State site 50–80–14–2503, located 0.1 mi. northwest of the survey area. The shelter was identified as a habitation shelter and contained a variety of traditional Hawaiian artifacts,

including a fishhook, octopus lure, and coral file, along with historic bottle glass from the period AD 1880–1920. McMahon [23] conducted a reconnaissance survey of 19 ac. at the base of Diamond Head within the Fort Ruger Military Reservation. The remains found there reflect the use of the area as a military reservation established in 1909. Kennedy [20] surveyed a parcel of land on the *mauka* side of Kalaniana'ole Highway, at the junction of Wai'alae Nui and Kapakahi Streams. No evidence of traditional Hawaiian occupation was found. In 2003, Jones and Hammatt [15] conducted archaeological monitoring of water system improvements in the Black Point area west of the survey area. No significant historic sites or deposits were reported. A small historic pit feature with minimal ash and charcoal flecking was found within unconsolidated calcareous sands on the eastern portion of Royal Place.

mauka

The remainder of the archaeological investigations conducted in Kāhala and coastal Wai'alae Nui have focused on recovery of inadvertently discovered human remains in the sandy sediments near the beach.

Construction excavations in 1963 for the Kāhala Hilton Hotel exposed a burial. In 1966, during construction of condominiums between the hotel and Wai'alae Beach Park, an historic-era cemetery was exposed. Twenty-four burials, all in coffins, were recovered. Traditional Hawaiian and historically introduced materials were recovered from the burials: *pulu* used for pillow padding, a basalt adze, glass bottles, buttons, coins and a metal fishhook were found with the remains. The burials appeared to be interred within a man-made mound in the vicinity of the former Waialae Ranch (Honolulu Star Bulletin, January 27, 1966).

pulu

Several discoveries of human remains have been found along and near Kāhala Avenue.

State site 50-80-14-3760 In 1988, Bath and Griffin [2] documented the remains of a single individual within a pit feature uncovered during excavation of a swimming pool at 1013 Waiholo Street. The primary burial was identified as a traditional Hawaiian.

State site 50-80-14-4126 In 1989, Bath [1] documented the discovery of human skeletal remains found during construction activities at 4745 Aukai Avenue, ca. 0.6 mi. east of the survey area. The remains were located near an existing water main connection and had been previously disturbed. Two polished basalt adze chips were also found in the vicinity of the burial. The remains represented a single male individual, 40–45 years of age and was identified as a traditional Hawaiian burial.

State site 50-80-14-4065 In 1989, Kawachi [18] documented the recovery of human remains found during excavation of a house foundation at 4585 Kāhala Avenue, ca.ō.3 mi. east of the survey area. *In situ* remains indicated that this was a flexed burial although the upper third of the individual had been heavily impacted during the foundation excavation. The remains represented a single female, 25–35 years of age, and was identified as a traditional Hawaiian burial.

State site 50-80-14-3725 In 1987, Griffin [12] documented the recovery of human remains found during construction at 4505 Kāhala Avenue, ca. 0.15 mi. east of the survey area. The remains were exposed at 1.0–1.3 m below surface. The remains represented two individuals, a female, 30–40 years old, and the lower limbs of a male at least 25 years old.

State site 50-80-14-6632 In 2001, Scientific Consulting Services [27] conducted recovery excavations of human skeletal remains found during subsurface construction

activities at 814 Keala'olu Street. The remains represented four individuals, three adults and a child not more than 15 years old.

State site 50-80-14-6632 In 2003, Putzi and Dye [26] documented the recovery of the partial remains of four individuals and a complete individual at 4773 Kāhala Avenue. Traditional Hawaiian artifacts recovered from the back-dirt pile included a basalt abrader fragment, drilled *pipipi* marine shell beads, basalt flakes, and *kukui* nuts. One iron nail was also recovered from the back-dirt pile. The remains were likely of Hawaiian ancestry, based on the presence of traditional Hawaiian artifacts and absence of historic-period materials associated with the remains.

pipipi
kukui

State site 50-80-14-6762 In 2005, Dye [5] recovered human skeletal remains disturbed during construction activities at 4577 Kāhala Avenue. The skeletal remains were discovered during excavation of a sewer line along the west end of the parcel, running from near the middle of the parcel to Kāhala Avenue. Skeletal remains from a minimum of two individuals were recovered.

1.3.3 Previous Archaeology in the Survey Area

The inadvertent discovery of human remains during construction of an addition to the house formerly located at parcel 8 prompted the first archaeological research within the survey area. Erkelens and Tomonari-Tuggle [7] recovered the skeletal remains of three individuals of East Asian or mixed East Asian/Polynesian and Hawaiian/Polynesian ethnicity. The presence of a shell button and porcelain beads with one individual and a square cut iron nail in the fill of the burial pit that held the other two individuals led to the conclusion that all three individuals were buried in the nineteenth century. During the recovery of the human remains, two "charcoal-stained cultural deposits" were identified and recorded. These deposits, designated layers III and IV, appear to have been distinguished on the basis of their color value; layer III is described as a grey deposit that is darker at the bottom than it is at the top, and layer IV, which directly underlies layer III, is described as a black deposit. Both layers are relatively thin. Layer III is 8 cm thick and the thickness of layer IV varies between 4 and 10 cm. Both layers contained features. A fire pit with thermally-altered basalt, charcoal, and a charred log interpreted as a piece of driftwood [7:16], was excavated from the surface of layer III. A small, shallow pit, designated feature 1, was recorded at the base of layer IV. Its contents appear not to have differed from the general layer IV matrix. Both of these deposits were interpreted by the excavator as belonging to the traditional Hawaiian period because their stratigraphic position indicates they pre-date the nineteenth century burials. No traditional Hawaiian artifacts were recovered from the layers and no materials from them were submitted for ^{14}C dating.

No further archaeological work took place at the survey area until the summer of 2006 when Collins and Clark [4] carried out a program of subsurface test excavation that identified two layers interpreted as cultural deposits, designated layers II and IV. The descriptions of these two layers indicates that they are similar to one another, both consisting of fine to very fine coral sand ranging in color from black through dark grayish brown to light gray. Layers II and IV were not found in stratigraphic association, but instead had discrete distributions across the survey area, with Layer IV running across the middle of parcels 8 and 9 and layer II in three separate deposits in parcels 9 and 10.

The layers were distinguished from one another by the type of sediment overlying them. Layer II was buried directly by fill topsoil; layer IV was separated from the fill topsoil by a layer of a light-colored fine calcareous sand. Both layers II and IV were developed on calcareous sand, although the sands beneath the two layers are presumed to be different from one another.

> Where layer IV is not present, layer III sands are presumed to directly overlay layer V sands. In these cases, the boundary between layers III and V is either barely distinct or not visible ... [4:14]

Layer II was tentatively correlated with the layer III deposit of Erkelens and Tomonari-Tuggle [7] and layer IV was correlated with the layer IV deposit of Erkelens and Tomonari-Tuggle [7]. As was the case with the earlier burial recovery excavations, no traditional Hawaiian artifacts were found in layers II or IV. Small quantities of wood charcoal, thermally-altered rock, marine gastropods, and fish bone, all materials typically found in traditional Hawaiian deposits, were reported, however. These materials support the interpretation of layers II and IV as cultural deposits, but none of them are diagnostic of traditional Hawaiian deposits and they all could be present either naturally, as components of the coastal sediments, or as the remains of activities in the historic period.

2 Methods

Inventory survey of the property was carried out in two field work sessions. The first session consisted of an extensive program of subsurface test excavation [4] in which 51 test units were excavated with shovel and sand augur. This work was led by principal investigator, Sara Collins, Ph.D. Sediments with deposits believed to be cultural were screened through 0.125 in. mesh to facilitate the recovery of small items. The sediments encountered in the test excavations were described with reference to five layers interpreted as an imported topsoil, two relatively dark cultural layers, and two non-cultural layers of light-colored calcareous sand [4:12]. The results of the excavations were presented in a table that identifies the layers present in each test unit, records the base of excavation, indicates the presence or absence of cultural layers and, in comments, their depth below surface. Stratigraphic profile drawings for seven of the test units are presented in a figure showing a proposed correlation of stratigraphic layers across the property [4:13].

The second phase, reported here, expanded on the initial subsurface test excavations to accomplish three goals:

1. Locate the re-interment site for the human remains recovered by Erkelens and Tomonari-Tuggle [7] at site 50–80–14–5320;
2. Conduct controlled archaeological excavations in the subsurface cultural deposits identified by Collins and Clark [4]; and
3. Conduct test excavations in areas not excavated previously to complete coverage of the survey area.

This work was directed by the principal investigator, Thomas S. Dye, Ph.D., a fully qualified archaeologist according to the criteria set out in §13–281–3, with the assistance of archaeologists Alan Carpenter, 'Ahia Dye, Kekapala Dye, Elaine Jourdane, and Eric

Komori and backhoe operators Charles Souza and Chad Souza. Field work began on August 19, 2006 and was completed on September 1, 2006.

The re-interment site for the human remains recovered by Erkelens and Tomonari-Tuggle [7] appears not to have been recorded at SHPD or the Bureau of Conveyances. In an effort to discover the re-interment site location, Dr. J. Stephen Athens of International Archaeological Research Institute, Inc. contacted Mr. Ka'iana Markell, who was the SHPD burial staff member originally assigned to this case. Mr. Markell graciously agreed to guide the search for the reinterment site, which was carried out with a backhoe that excavated shallowly in search of the reburial pit. Mr. Markell successfully directed the backhoe excavation with the goal of minimizing disturbance to the re-interred human remains. Once the human remains were discovered, the reburial area was filled with clean sand and an elongate basalt boulder was set upright to mark the spot. A digital photograph of the upright boulder was taken and the location was recorded with differentially corrected global positioning system equipment.

The subsurface testing program conducted by Collins and Clark [4] covered the bulk of the parcel, with the exception of setbacks along Kāhala Avenue and the beach and at a few places where conditions made hand excavation difficult or impossible (fig. 2). Accordingly, the test excavation program was expanded to include:

- The 40 ft. shoreline setback;
- The area in the northwest portion of parcel 10 south of shovel test 10–4 and northwest of shovel test 10–9;
- The area in parcel 9 east of shovel tests 9–1, 9–4, 9–7 and 9–10;
- The old driveway on the east side of parcel 8;
- The area east of shovel tests 8–6 and 8–7; and
- The 25 ft. setback adjacent to Kāhala Avenue.

Twenty additional test units were excavated; the backhoe was used to excavate through surface fill materials, which were often compact and difficult to penetrate, and a shovel was used to excavate the calcareous sands beneath them. Excavations were taken to depths greater than the depths of nearby deposits identified as cultural by Collins and Clark [4]. Digital photographs were taken of the completed excavations and representative stratigraphic profiles were drawn at a scale of 1:20.

The two cultural layers identified by Collins and Clark [4] were distributed spatially in three discrete deposits (fig. 2). The two Layer II deposits are believed to be associated with historic period habitation or other activities. Although it had not been confirmed, prior to the current inventory survey field work the Layer IV deposit was believed to be associated with traditional Hawaiian activities. The objectives of controlled excavation were to characterize the nature of these putative cultural deposits, determine their functions and ages, and establish their stratigraphic relations.

Prior to controlled excavations, the backhoe removed fill material down to the surface of the underlying sand. The two Layer II subsurface cultural deposits were each sampled by an areal excavation 3 × 2 m in size. These excavations were identified as blocks 1 and 2. The Layer IV deposit was sampled by an areal excavation 4 × 3 m in size identified as block 3. All sediments from the cultural deposits were put through 0.125 in. mesh screens to facilitate the recovery of small materials. Subsurface features were identified in the block 1 excavations; these were assigned their own contexts so their contents were collected and analyzed separately.

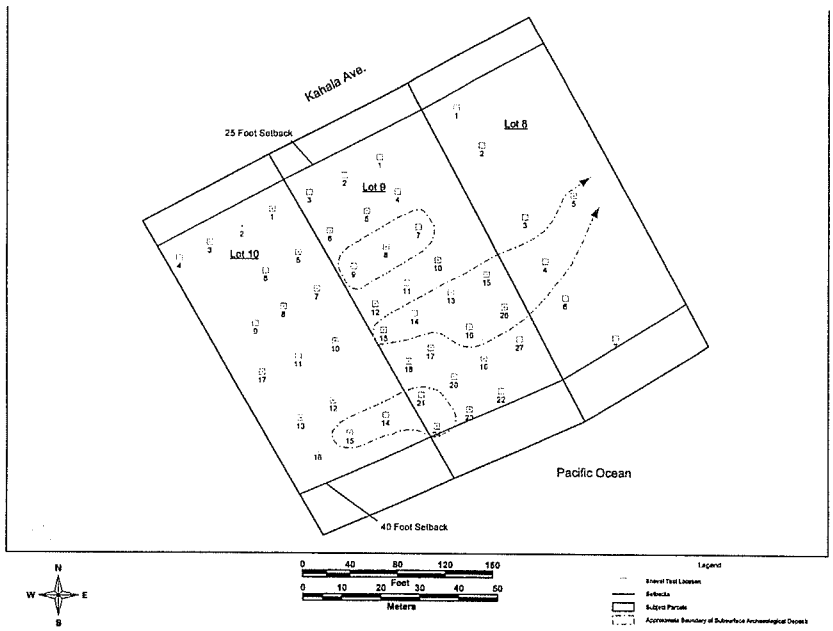


Figure 2. Test excavation and cultural deposit locations. Map courtesy of Pacific Consulting Services, Inc.

Standard archaeological recording procedures were implemented, including plan view drawings of subsurface features, representative profile drawings and profiles showing subsurface features, collection of cultural materials, and recovery of suitable dating material.

suitable dating material

Materials collected in the field were placed in plastic bags identified with unique numbers (appendix B) for transport to the laboratory. In the laboratory, materials were identified, sorted, and counted or weighed, as appropriate. Marine shells were identified with reference to Kay [19] and fish bones with reference to Dye and Longenecker [6]. Three fish otoliths were identified by Ken Longenecker, ichthyologist at B. P. Bishop Museum. The information generated in the laboratory was entered into a relational database, which was queried to create data tables and appendices for this report. Wood charcoal collected from three subsurface features in block 1 was sent to Gail Murakami of the International Archaeological Research Institute Wood Identification Laboratory for identification. Five samples of short-lived taxa, each consisting of a single piece of charcoal, were submitted to Beta Analytic, Inc. for dating with an accelerator mass spectrometer (AMS).

Stratigraphic profiles of the shovel test excavations and the block excavations drawn in the field were drafted using a standard symbol set. The sequence of sediment deposits was established by phasing, working up from the base of the stratigraphic sequence, as is customary in archaeology [14:108].

sequence
phasing

3 Field Survey Results

This section presents the results of the shovel test units excavated by T. S. Dye & Colleagues, Archaeologists, Inc., the three areal excavations at blocks 1, 2, and 3, and the identification of the location where three sets of inadvertently discovered human remains were buried in the 1990s. Additional information that complements the shovel test unit excavations can be found in Collins and Clark [4].

3.1 Shovel Test Excavations

Twenty shovel test units were excavated to complete the sampling program initiated by Collins and Clark [4]. These are located primarily in the 40 ft. shoreline setback, along the eastern edge of parcel 8, and in the 25 ft. setback along Kāhala Avenue (fig. 3).

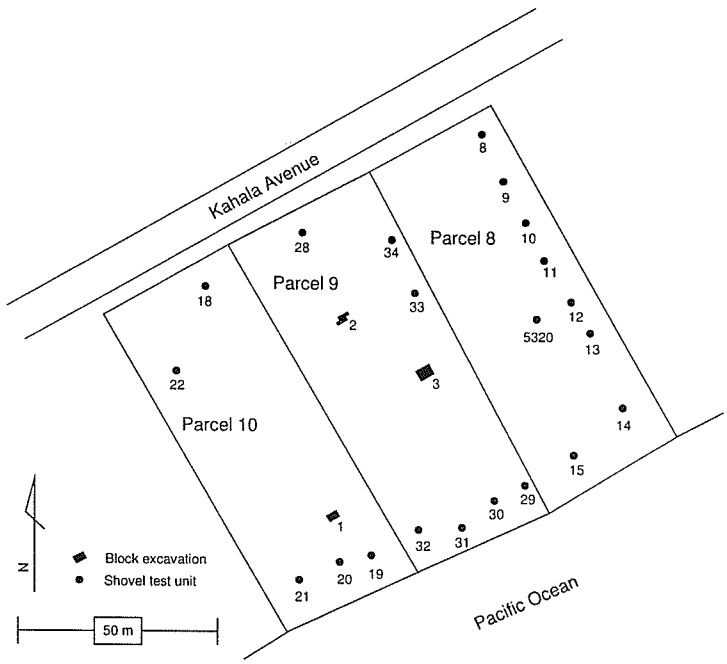


Figure 3. Location of shovel test units, block excavations, and the reinterment site 50–80–14–5320.

Nineteen of the shovel test units exposed stratigraphic information useful for the inventory survey (fig. 3, table 1); shovel test unit 10–21 in the southwest corner of the survey area exposed a trash pit filled with debris from the demolition of one or more modern structures and did not yield any stratigraphic information. Paleosols were found in eleven shovel test units, four each in parcels 8 and 9 and three in parcel 10. In seven of the shovel test units—8–11, 8–13, 8–14, 9–33, 9–34, 10–18, and 10–20—the paleosol was

paleosol

buried by terrestrial fill material, similar to the layer II stratigraphy described by Collins and Clark [4]. In four of the shovel test units—8–12, 9–30, 9–32, and 10–19—paleosols were buried by a light-colored calcareous sand, similar to the layer IV stratigraphy of Collins and Clark [4]. In most of these shovel test units the surface layer is terrestrial fill material, but in shovel test unit 9–30 the surface layer is an *A*-horizon developed in calcareous sand. In the other eight shovel test units no paleosol was found. These units typically show imported terrestrial fill material applied directly to a natural deposit of light-colored calcareous sand, but there are three units that varied from this typical pattern. In shovel test unit 8–8 terrestrial fill material was applied to a compacted calcareous sand that likely represents a fill event and in shovel test units 9–29 and 9–31 the terrestrial fill material was applied to secondarily deposited calcareous sands mixed with varying amounts of terrestrial material.

Table 1. Sediment descriptions for shovel test units

Context	Phase*	Depth†	Color	Description	Interpretation
Shovel test unit 8–10					
25	3	0–43	10YR 4/3	Brown terrestrial loamy sand; non-sticky, non-plastic; abrupt, smooth lower boundary.	Fill material deposition event.
26	1	43–130+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 8–11					
27	3	0–38	10YR 4/3	Brown terrestrial and marine loam; non-sticky, non-plastic; abrupt, broken lower boundary.	Fill material deposition event.
28	2	38–50	10YR 4/1	Dark gray marine and terrestrial loamy sand; slightly sticky, slightly plastic; clear, smooth lower boundary.	Natural deposition process.
29	1	50–112+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 8–12					
59	3	0–45	10YR 5/2	Grayish brown terrestrial loam; non-sticky, non-plastic; abrupt, wavy lower boundary.	Fill material deposition event.
60	3	45–85	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; abrupt, smooth lower boundary.	Natural deposition process.
61	2	85–99	10YR 3/1	Very dark gray terrestrial loam; slightly sticky, slightly plastic; clear, smooth lower boundary.	Natural deposition process.

* See page 26 for a description of phases.

† Centimeters below surface.

Continued on next page

Continued from previous page

Context	Phase*	Depth†	Color	Description	Interpretation
62	1	99–130+	10YR 6/2	Light brownish gray marine loamy sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 8–13					
63	3	0–37	10YR 5/3	Brown terrestrial sand; non-sticky, non-plastic; abrupt, wavy lower boundary.	Fill material deposition event.
64	2	60–170+	10YR 3/1	Very dark gray marine loam; slightly sticky, slightly plastic; base of excavation.	Natural deposition process.
65	1	60–170+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 8–14					
32	3	0–39	10YR 4/3	Brown terrestrial sand; non-sticky, non-plastic; abrupt, smooth lower boundary.	Fill material deposition event.
33	2	39–73	10YR 6/2	Light brownish gray marine fine sand; non-sticky, non-plastic; clear, smooth lower boundary.	Natural deposition process.
34	1	73–110+	10YR 8/3	Very pale brown marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 8–15					
30	2	0–36	10YR 4/2	Dark grayish brown terrestrial and marine sand; non-sticky, non-plastic; gradual, smooth lower boundary.	Fill material deposition event.
31	1	36–100+	10YR 7/2	Light gray marine medium sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 8–8					
21	3	0–50	10YR 4/3	Brown terrestrial clay loam; moderately sticky, moderately plastic; abrupt, smooth lower boundary.	Fill material deposition event.
22	3	50–138+	10YR 6/2	Light brownish gray marine fine sand; non-sticky, non-plastic; base of excavation.	Fill material deposition event.
Shovel test unit 8–9					
23	3	0–78	10YR 4/2	Dark grayish brown terrestrial clay loam; moderately sticky, moderately plastic; abrupt, smooth lower boundary.	Fill material deposition event.

* See page 26 for a description of phases.

† Centimeters below surface.

Continued on next page

Continued from previous page

Context	Phase*	Depth†	Color	Description	Interpretation
24	1	78–170+	10YR 7/3	Very pale brown marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 9–28					
4	3	0–30	10YR 6/2	Light brownish gray marine and terrestrial fine sand; non-sticky, non-plastic; abrupt, smooth lower boundary.	Fill material deposition event.
5	1	30–100+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 9–29					
13	3	0–12	10YR 4/2	Dark grayish brown terrestrial and marine sandy loam; slightly sticky, slightly plastic; abrupt, smooth lower boundary.	Fill material deposition event.
14	3	12–29	10YR 7/3	Very pale brown marine fine sand; non-sticky, non-plastic; abrupt, wavy lower boundary.	Natural deposition process.
15	3	29–74	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; gradual, wavy lower boundary.	Fill material deposition event.
16	1	74–100+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 9–30					
6	3	0–16	10YR 5/2	Grayish brown marine and terrestrial fine sand; non-sticky, non-plastic; gradual, smooth lower boundary.	Natural deposition process.
7	3	16–50	10YR 7/3	Very pale brown marine fine sand; non-sticky, non-plastic; abrupt, wavy lower boundary.	Natural deposition process.
8	2	50–77	10YR 6/2	Light brownish gray marine fine sand; non-sticky, non-plastic; gradual, wavy lower boundary.	Natural deposition process.
9	1	77–100+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 9–31					
10	3	0–16	10YR 4/3	Brown terrestrial and marine sandy loam; slightly sticky, slightly plastic; abrupt, irregular lower boundary.	Fill material deposition event.

* See page 26 for a description of phases.

† Centimeters below surface.

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Context	Phase*	Depth†	Color	Description	Interpretation
11	3	16–65	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; clear, smooth lower boundary.	Fill material deposition event.
12	1	65–100+	10YR 7/3	Very pale brown marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 9–32					
17	3	0–20	10YR 4/3	Brown terrestrial sandy loam; slightly sticky, moderately plastic; abrupt, wavy lower boundary.	Fill material deposition event.
18	3	20–49	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; abrupt, smooth lower boundary.	Natural deposition process.
19	2	49–67	10YR 6/2	Light brownish gray marine fine sand; non-sticky, non-plastic; gradual, smooth lower boundary.	Natural deposition process.
20	1	67–100+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 9–33					
66	3	0–19	10YR 4/1	Dark gray terrestrial loamy sand; slightly sticky, slightly plastic; abrupt, wavy lower boundary.	Fill material deposition event.
67	2	19–36	10YR 3/1	Very dark gray terrestrial loam; slightly sticky, slightly plastic; gradual, smooth lower boundary.	Natural deposition process.
68	1	36–130+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 9–34					
69	3	0–14	10YR 4/2	Dark grayish brown terrestrial loam; slightly sticky, slightly plastic; abrupt, smooth lower boundary.	Fill material deposition event.
70	2	14–20	10YR 5/2	Grayish brown marine fine sand; non-sticky, non-plastic; clear, smooth lower boundary.	Natural deposition process.
71	1	20–120+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 10–18					
1	3	0–30	10YR 4/2	Dark grayish brown terrestrial and marine loamy sand; slightly sticky, slightly plastic; historic artifacts; abrupt, smooth lower boundary.	Fill material deposition event.

* See page 26 for a description of phases.

† Centimeters below surface.

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Context	Phase*	Depth†	Color	Description	Interpretation
3	2	30–34	10YR 6/2	Light brownish gray marine fine sand; non-sticky, non-plastic; abrupt, smooth lower boundary.	Natural deposition process.
2	1	34–100+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 10–19					
42	3	0–29	10YR 4/3	Brown terrestrial clay loam; moderately sticky, moderately plastic; abrupt, smooth lower boundary.	Fill material deposition event.
43	3	29–45	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; abrupt, smooth lower boundary.	Natural deposition process.
44	2	45–66	10YR 5/2	Grayish brown marine fine sand; non-sticky, non-plastic; clear, wavy lower boundary.	Natural deposition process.
45	1	66–92+	10YR 7/2	Light gray marine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 10–20					
46	3	0–33	10YR 4/2	Dark grayish brown terrestrial loam; slightly sticky, slightly plastic; abrupt, wavy lower boundary.	Fill material deposition event.
47	2	33–55	10YR 5/1	Gray marine and terrestrial fine sand; non-sticky, non-plastic; clear, wavy lower boundary.	Natural deposition process.
48	1	55–112+	10YR 7/2	Light gray marine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.
Shovel test unit 10–22					
57	3	0–39	10YR 4/2	Dark grayish brown terrestrial loamy sand; slightly sticky, slightly plastic; clear, wavy lower boundary.	Fill material deposition event.
58	1	39–94+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.

* See page 26 for a description of phases.
† Centimeters below surface.

A ceramic sherd was found in shovel test unit 8–12 and a small lead lead shot was recovered from shovel test unit 10–18. A small amount of invertebrate faunal remains was collected from shovel test unit 8–12 , but otherwise no artifacts or other remains were observed or collected during excavation of the shovel test units.

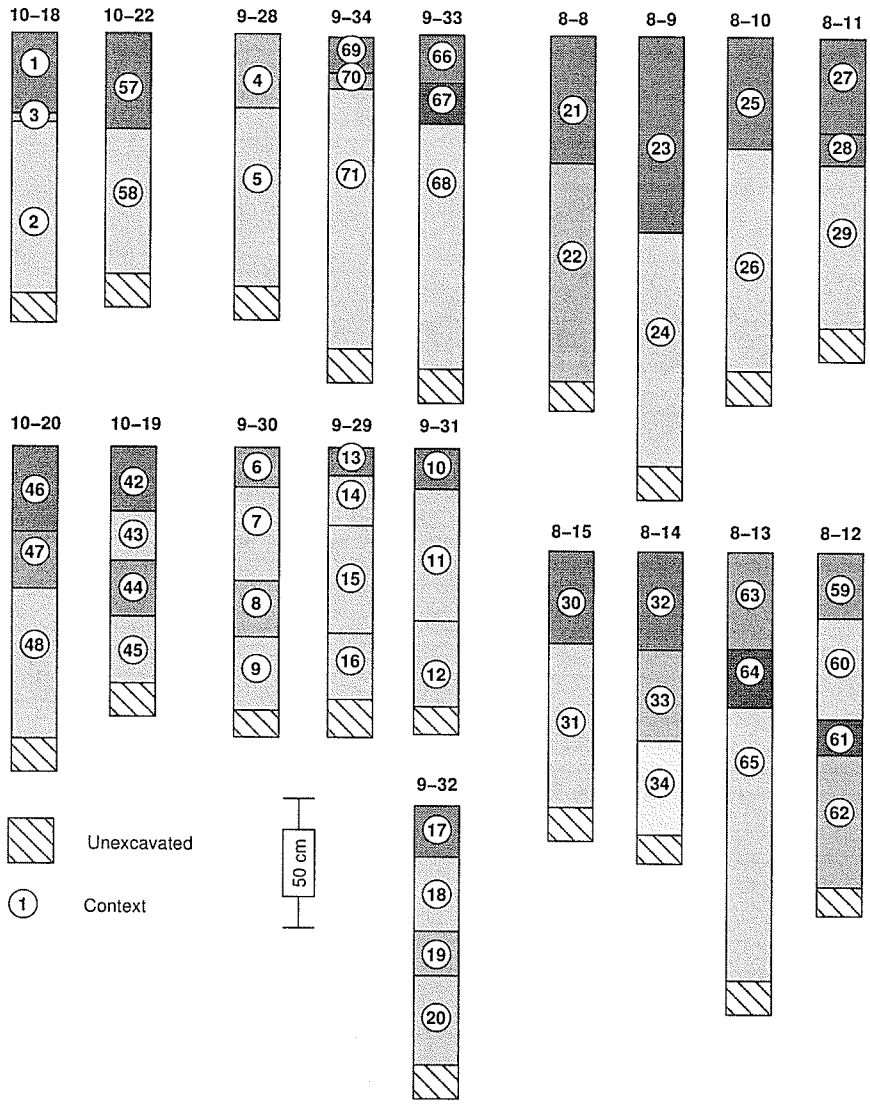

Figure 4. Stratigraphic profiles of shovel test units. See figure 3 on page 12 for locations of shovel test units.

3.2 Block Excavations

Excavation of 6 m^2 at block 1 was designed to sample the layer II deposit identified by Collins and Clark [4]. The block was laid out adjacent to shovel test unit 10–14 and a

sondage to expose the full stratigraphic sequence was excavated immediately southeast of the block (fig. 5).

sondage

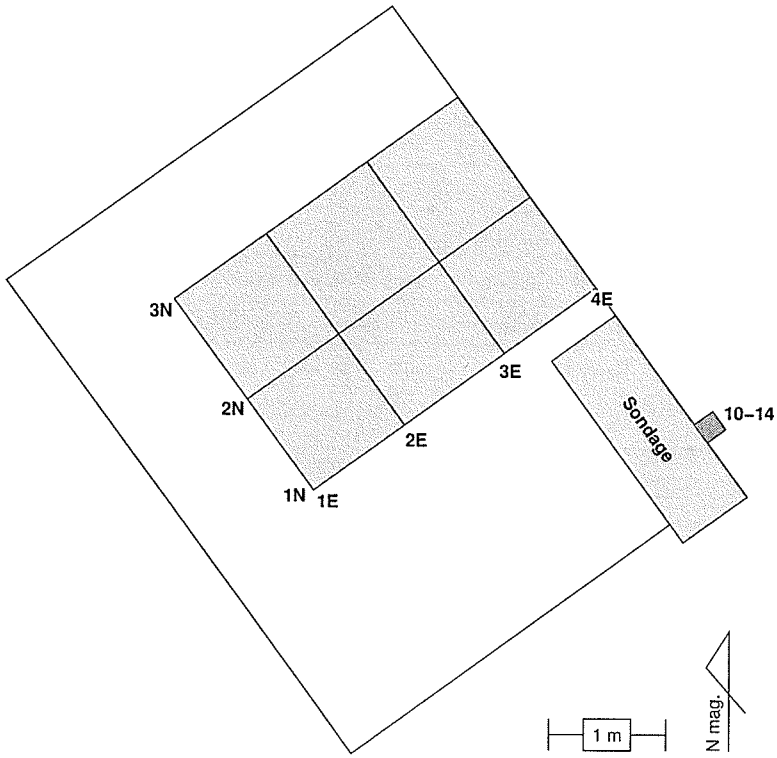

Figure 5. Plan view of excavation block 1 showing the sondage and shovel test unit 10–14. See figure 3 on page 12 for the location of block 1 on parcel 10.

The stratigraphic profile exposed in the sondage showed imported fill material, context 49, applied directly to a disturbed paleosol, context 50 (fig. 6, table 2). The disturbance to the paleosol shows as marbling of the dark gray paleosol sediment with the very pale brown sand that underlies it, visible on the left hand side of the photograph in figure 6, and by mixing at the contact between the paleosol and the overlying terrestrial fill material. The paleosol developed in unconsolidated calcareous sand, context 51.

Four subsurface features, all cut from the paleosol into the underlying calcareous sand, were identified (fig. 7). Feature 1, excavated as context 52, was a shallow, bowl-shaped pit filled with angular coral cobbles and a charcoal-rich sand matrix. The feature was approximately 40 cm in diameter when it was first identified at 20 cm below surface and was about 16 cm deep. Charcoal identified from the feature consisted of native shrubs and trees and coconut, which was introduced to the islands by Polynesians; no historically-introduced taxa were identified (see section 4). Feature 2, excavated as context 53, was an irregularly shaped, 1.5 cm thick deposit of charcoal-rich sand first discovered at 34 cm

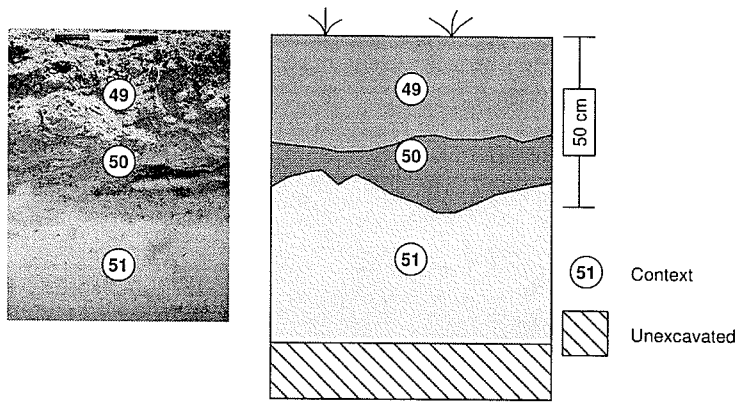

Figure 6. Stratigraphic profile of block 1 sondage. Note the disturbance evident in the paleosol, context 50. The scale bar in the photograph is marked in 10 cm increments.

Table 2. Sediment descriptions for block 1 excavations

Context	Phase*	Depth†	Color	Description	Interpretation
Block 1, east face					
49	3	0–35	10YR 5/3	Brown terrestrial sand; non-sticky, non-plastic; abrupt, wavy lower boundary.	Fill material deposition event.
50	2	35–44	10YR 4/1	Dark gray marine and terrestrial sand; non-sticky, non-plastic; historic artifacts; gradual, wavy lower boundary.	Natural deposition process.
51	1	44–90+	10YR 8/2	Very pale brown marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.

* See page 26 for a description of phases.
† Depth in cm below surface.

below surface, alongside the base of feature 1. Feature 2 appears to have been partially cut through by feature 1 and thus pre-dates feature 1. Charcoal identified from the feature included native shrubs and *kiawe*, a tree introduced to the islands in 1828. Feature 3, excavated as context 54, was a shallow pit approximately 45 cm in diameter filled with charcoal-rich sand. It was found at 24 cm below surface; its base was at 33 cm below surface. Charcoal identified from this feature included native shrubs and trees, along with ti, which was introduced to the islands by Polynesians. Feature 4, excavated as context 55, was a gray stain approximately 10 cm in diameter. It was found at 48.5 cm below surface and extended to 82 cm below surface, completely within the basal calcareous sand sediment.

The excavations yielded one possible traditional Hawaiian artifact and a variety of modern historic artifacts and a small amount of invertebrate faunal remains. The excavations did yield a large collection of vertebrate faunal remains, relative to excavation blocks 2 and 3, but much of the faunal material appears to have been deposited naturally.

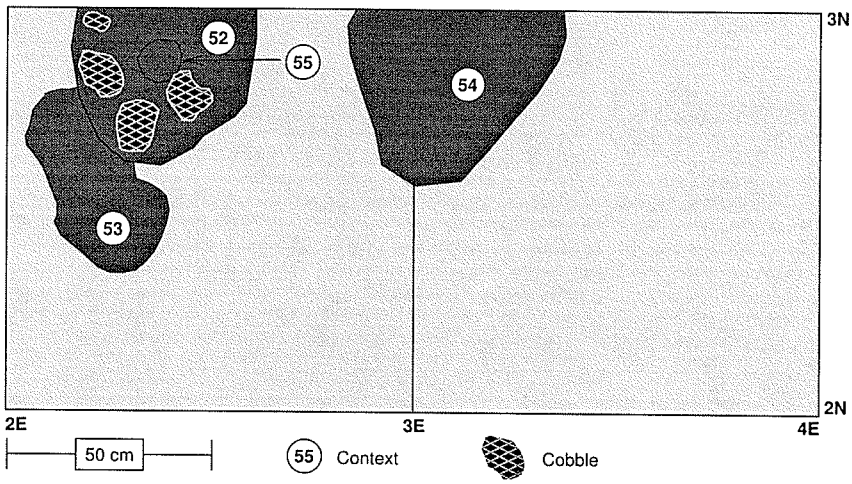

Figure 7. Plan view of features 1–4 in block 1. Note: Feature 1, context 52, is shown at 21 cm below surface; Feature 2, context 53, is shown at 34 cm below surface; Feature 3, context 54, is shown at 24 cm below surface; and Feature 4, context 55, is shown at 48 cm below surface.

Excavation block 2, totaling 6 m^2, was excavated to investigate the *mauka* exposure of layer II identified by Collins and Clark [4]. The block was laid out adjacent to shovel test unit 9–8 and a sondage was excavated east of the block to expose the full stratigraphic sequence (fig. 8).

The stratigraphic profile exposed in the sondage showed an imported terrestrial fill material, context 39, applied directly to a paleosol, context 40 (fig. 9, table 3). The paleosol here showed a moderate amount of mixing at the contact with the overlying fill material, but was more intact than, and lacked the marbling characteristic of, the paleosol in block 1. The paleosol was developed in unconsolidated calcareous sand, context 41.

No features were found during excavation of block 2. The excavations yielded a variety of historic-era artifacts typical of the debris found near a modern home and small amounts of vertebrate and invertebrate faunal remains that are interpreted as natural deposits. The impression gained during excavation was that the paleosol here wasn't buried by fill material until sometime after Kāhala was developed as a residential neighborhood, so that various modern artifacts associated with a home collected on it before it was buried.

The block 3 excavation, totaling 12 m^2, was laid out adjacent to shovel test unit 9–13 to investigate the layer IV deposit identified by Collins and Clark [4]. A sondage was excavated northwest of the block to expose the full stratigraphic profile (fig. 10).

The stratigraphic profile exposed in the sondage shows a paleosol, context 37, buried by at least two applications of fill material (fig. 11, table 4). The first fill material applied to the paleosol was a clean white calcareous sand, context 36. This sand closely resembles the sand exposed as the basal sediment throughout the survey area; its identification as a

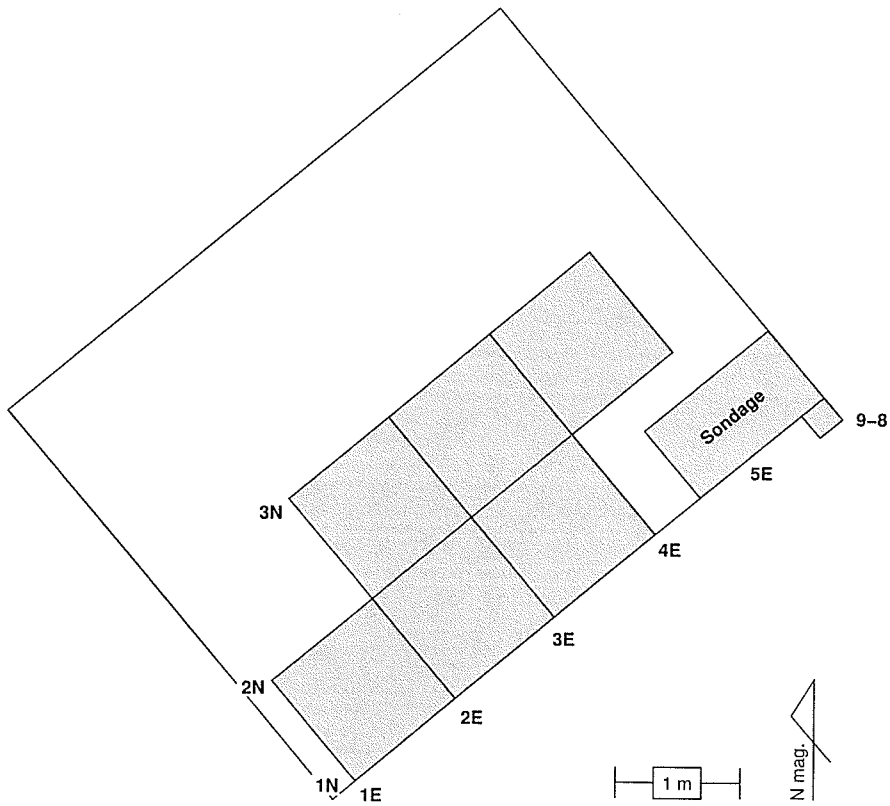

Figure 8. Plan view of excavation block 2 showing sondage and shovel test unit 9–8. See figure 3 on page 12 for the location of block 2 in parcel 9.

fill material was made possible by a band of marbling at its contact with the paleosol. This shows clearly in the photograph (fig. 11) and is indicated on the profile drawing as a facies break. This layer of white sand fill material was covered by the terrestrial fill material, context 35, that is found elsewhere in the survey area as topsoil. Here, the topsoil has been covered by a thin layer of sand, which was recorded as a facies of context 35.

As elsewhere in the survey area, the paleosol here developed on unconsolidated calcareous sand, context 38.

No features were identified during excavation of block 3. The excavations yielded two historic-period artifacts—a sherd of glass and another of ceramic—and a small amount of vertebrate and invertebrate faunal remains, most of which is interpreted as having been deposited naturally. The impression gained in the field during excavation of block 3 is that the paleosol represents a natural land surface that saw no perceptible use in traditional Hawaiian and early historic times.

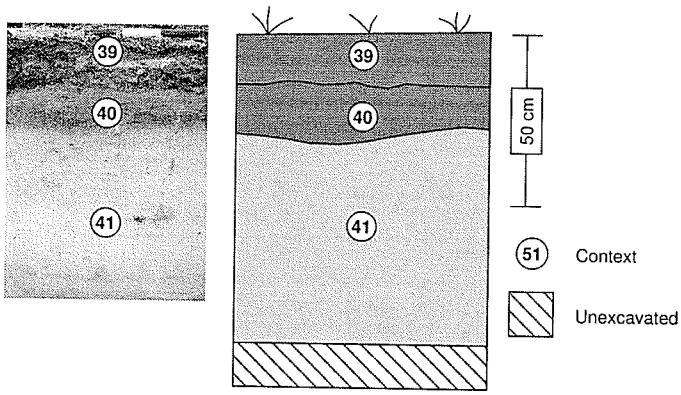

Figure 9. Stratigraphic profile of block 2 sondage. The scale bar in the photograph is marked in 10 cm increments.

Table 3. Sediment descriptions for block 2 excavations

Context	Phase*	Depth†	Color	Description	Interpretation
Block 2, south face					
39	3	0–15	10YR 4/2	Dark grayish brown terrestrial loam; slightly sticky, slightly plastic; abrupt, smooth lower boundary.	Fill material deposition event.
40	2	15–30	10YR 4/1	Dark gray marine loamy sand; slightly sticky, slightly plastic; historic artifacts; gradual, wavy lower boundary.	Natural deposition process.
41	1	30–90+	10YR 7/2	Light gray marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.

* See page 26 for a description of phases.
† Depth in cm below surface.

3.3 Identification of Human Remains

No record of the re-interment site for the human remains recovered by Erkelens and Tomonari-Tuggle [7] was found at SHPD or the Bureau of Conveyances by Collins and Clark [4] prior to the field work. Mr. Ka'iana Markell, who was the SHPD burial staff member assigned to the inadvertent discovery of human remains at the time, graciously offered to help find the re-interment site, based on his recollection of events a decade ago. The search focused on two boulders in an abandoned garden next to the elevator shaft where the human remains were found. Excavation was carried out by a backhoe, which removed thin layers of sediment in an attempt to find the outlines of the burial pit. The burial pit and human bones were found beneath the boulder at the *mauka* end of the abandoned garden, beneath a *kukui* tree (fig. 12). The reinterment location was marked by filling the backhoe pit with clean white sand and placing the boulder upright directly

mauka

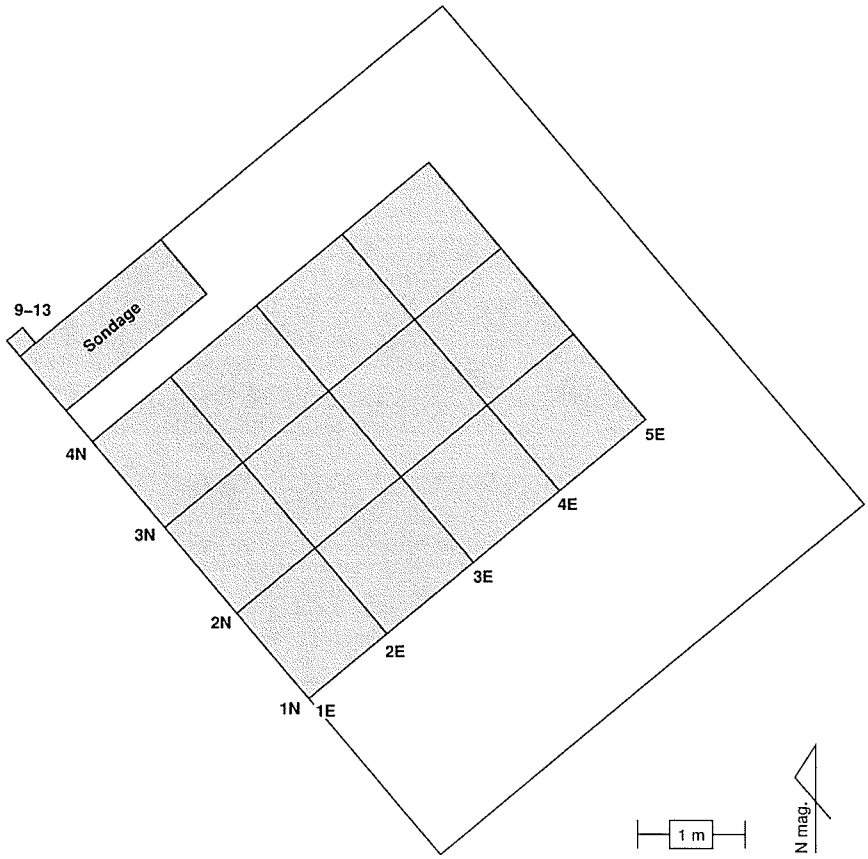

Figure 10. Plan view of excavation block 3 showing sondage and shovel test unit 9–13. See figure 3 on page 12 for the location of block 3 in parcel 9.

above it. The UTM Zone 4, North American Datum 1983 coordinate of the reinterment location, as fixed by differentially corrected global positioning software, is 2,351,491 N, 625,689 E (see fig. 3, pg. 12).

4 Laboratory Results

This section reports the results of analyses of materials and information collected in the field. It begins with a correlation of the various archaeological contexts described in section 3 and their grouping into a three phase interpretation of depositional history in the survey area, a process known as phasing. This is followed by a description of the artifacts, invertebrate and vertebrate faunal and other remains identified in the laboratory.

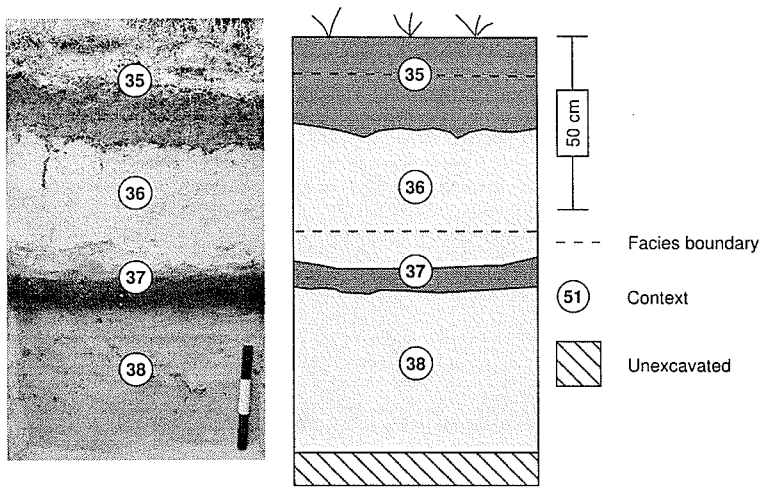

Figure 11. Stratigraphic profile of block 3 sondage. The scale bar in the photograph is marked in 10 cm increments.

Table 4. Sediment descriptions for block 3 excavations

Context	Phase*	Depth†	Color	Description	Interpretation
Block 3, west face					
35	3	0–10	10YR 6/2	Light brownish gray marine fine sand; non-sticky, non-plastic; abrupt, wavy lower boundary.	Fill material deposition event.
35	3	10–26	10YR 4/2	Dark grayish brown marine and terrestrial loam; slightly sticky, slightly plastic; abrupt, wavy lower boundary.	Fill material deposition event.
36	3	26–65	10YR 8/2	Very pale brown marine fine sand; non-sticky, non-plastic; broken lower boundary.	Fill material deposition event.
37	2	65–73	10YR 4/1	Dark gray marine loam; slightly sticky, slightly plastic; historic artifact; gradual, smooth lower boundary.	Natural deposition process.
38	1	73–120+	10YR 8/1	White marine fine sand; non-sticky, non-plastic; base of excavation.	Natural deposition process.

* See page 26 for a description of phases.
† Depth in cm below surface.

Finally, the wood charcoal identifications for features 1, 2, and 3 and the dating of selected pieces of wood charcoal from these features are described.

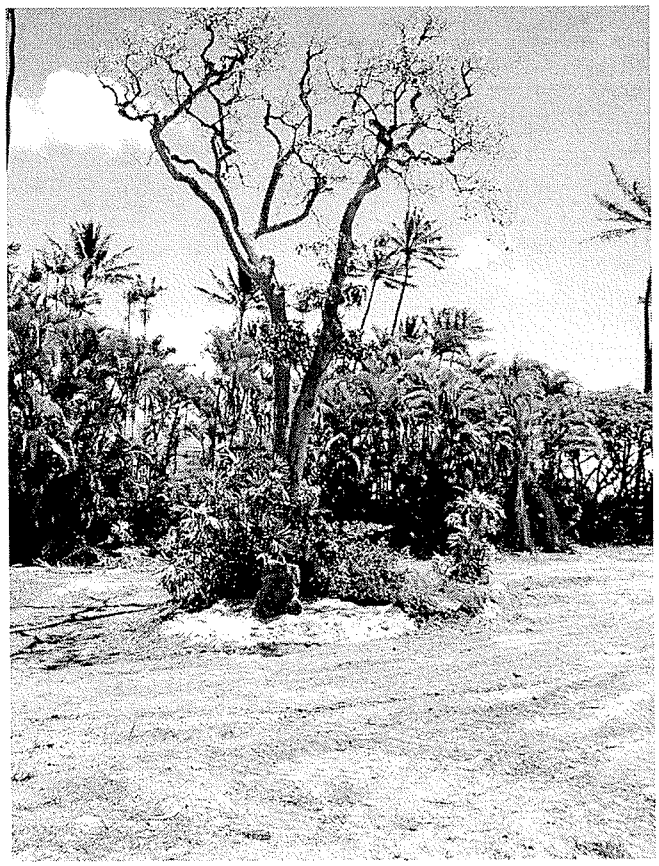

Figure 12. Location of the re-interment site marked by white sand and an upright boulder, looking east. Note the *kukui* tree. The scale is marked in 10 cm increments. See figure 3 on page 12 for the location of the reinterment site at site 50–80–14–5320 in parcel 8.

4.1 Phasing

Phasing is the process by which an archaeologist correlates the archaeological contexts recorded within a site or survey area, establishing a sequence of deposits and structures grouped together in a series of phases. The sequence of deposits and structures begins at the base of the excavation and works its way up to the modern land surface, yielding a model for the formation of a site or survey area over time.

A three phase depositional sequence describes the formation of the survey area. Contexts were assigned to phases on the basis of their sediment characteristics and their relative stratigraphic positions. The first phase represents the natural deposition of calcareous sand during a period of beach accretion, presumably during a drop in sea level

from its mid-Holocene high stand about 2,500 years ago [8]. The basal unconsolidated calcareous sand deposits present in all excavation units were assigned to this phase. The second phase represents development of an *A*-horizon after plants established themselves on the Holocene sand laid down in phase 1. It was the ground surface during the historic period, prior to modern development. Presumably, it was also the ground surface during traditional Hawaiian times, although no evidence for this was found during the inventory survey. The contexts assigned to this phase consisted of loams, sandy loams, and sands ranging in color from very dark gray to light brownish gray typical of *A*-horizons in soils classified as Jaucas sands [9:48–49]. Finally, phase 3 consists of various deposits laid down during modern development, including secondary deposits of local sediment moved during construction projects and fill materials imported primarily for use as topsoil. Deposits of this phase are present today at the surface over most of the survey area.

The assignment of contexts to phases is set out in appendix A.

4.2 Artifacts

Forty-nine artifacts were collected during the excavations (table 5). Except for a possible basalt flake (fig. 13*d*), which might possibly be a traditional Hawaiian artifact, the other 48 artifacts are all made of modern materials and belong to the historic era. Most of these are housewares, such as ceramic plates (fig. 13*c*) and glassware (fig. 13*b*), and other items that are typically found around modern homes. Most of these items probably derived from activities that took place in the twentieth century, after Kāhala became a residential neighborhood in the 1930s. The one possible exception to this generalization is a red glass bead (fig. 13*a*) that is similar to beads that were popular in Hawai'i in the nineteenth century. The bead is not sufficiently distinct that it can be dated more precisely, but it might provide some evidence for use of the survey area prior to the 1930s.

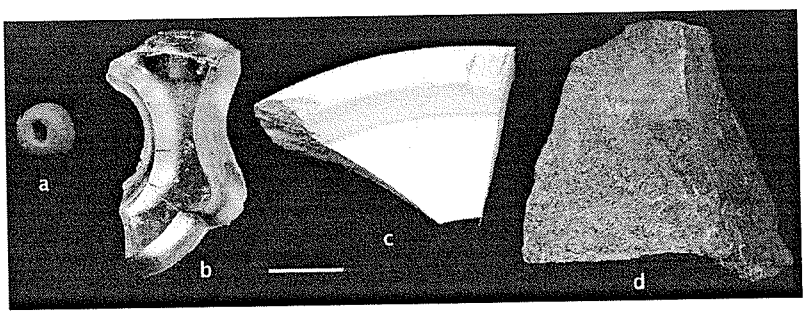

Figure 13. Artifacts from phase 2 deposits: *a*, glass bead, block 2; *b*, glass pitcher or vase handle(?), block 2; *c*, white ware plate base sherd, block 3; *d*, possible basalt flake, block 1. The scale bar is 1 cm.

The artifacts are listed in appendix C.

Table 5. Portable artifacts

Provenience	Artifact	Count
Shovel test unit 8–12	Ceramic sherd	1
Shovel test unit 10–18	Lead shot	1
Block 1	Basalt flake?	1
	Ceramic sherd	4
	Glass mirror	2
	Glass sherd	4
	Lead bullet	1
	Metal fragment	3
	Metal nail	1
Block 2	Glass bead	1
	Glass sherd	10
	Hard rubber fragment	2
	Metal fragment	15
	Metal tack	1
Block 3	Ceramic sherd	1
	Glass sherd	1

4.3 Invertebrate Faunal and Other Remains

Invertebrate faunal and other remains were collected from shovel test unit 8–12 and from the block excavations, all of which yielded a modest amount of remains. Block 1 yielded the greatest quantity, 1,293 g. Only a small bit was collected from block 2, 174 g, and block 3, 314 g. Most of the block 1 material, 950 g, was classified as cultural. The great bulk of this material, 797 g, was thermally-altered rock, but it also included 35.1 g of waterworn basalt, 25.8 g of charcoal, and small amounts of marine invertebrates, including Echinoidea, *pipipi*, *'ōpihi*, *Isognomon*, *Tellina*, and *Turbo*. These marine invertebrates were found elsewhere in non-cultural contexts and their determination as cultural material here is based on their proximity to features 1–4, rather than on something intrinsic to the materials themselves. In block 2 only 3.4 g of material was classified as cultural; charcoal from units 1N2E and 1N3E and a small waterworn stone from unit 1N3E that could not have been deposited naturally. The 48.1 g of material from block 3 classified as cultural includes 2.8 g of charcoal from units 3N2E, 2N4E, and 3N4E, and a broken waterworn pebble from unit 2N2E.

Complete information on the distribution of invertebrate faunal and other remains is set out in appendix E.

4.4 Vertebrate Faunal Remains

A relatively small number of highly fragmented vertebrate faunal remains was recovered. The nature of the remains was such that it was not possible to identify many of them to the level of genus or species; most are identifiable only as fish, bird, or mammal (table 6). The only generic identifications that were possible were the rat, *Rattus* sp., and four fish:

albulids, or *ʻōʻiō*; scarids, or parrotfish; labrids, or wrasses; and diodontids, or spiny pufferfish, all of which were found in small numbers. The albulids were identified by otoliths and it is possible to estimate the length and weight of the live fish from them. The fish represented by the otoliths were large, ranging from 44 to 50 cm standard length and weighing 1.4–2.1 kg. *ʻōʻiō*

As with the invertebrate faunal remains, it is difficult to determine which of the vertebrate faunal remains represent cultural deposits and which are natural. Given the lack of cultural features in blocks 2 and 3, the inventory of vertebrate remains from these two blocks, which are similar to one another, might be taken as the natural background. Against this background, the level of fish remains in block 1 appears elevated and the presence of medium mammal is unique. These two taxa might indicate cultural deposition around the fire-pit features. Otherwise, the vertebrate remains from block 1 are similar to those from the other two blocks.

Table 6. Vertebrate remains from the block excavations, counts

Class	Taxon	Block 1	Block 2	Block 3
Aves	Medium Bird	7		7
	Small Bird		80	12
Mammalia	*Rattus* sp.	10	2	2
	Medium Mammal	11		
	Small Mammal		12	2
Osteichthyes	Albulid	1	2	
	Diodontid	2		
	Labrid		1	
	Scarid	2		
	Fish	679	133	219

4.5 Wood Charcoal Identification and Dating

The results of the radiocarbon sample screening conducted by Gail Murakami at the International Archaeological Research Institute Wood Identification Laboratory are presented in table 7. The three fire pit features in block 1 each yielded predominantly native taxa, including the common coastal shrubs *ʻāheahea*, *ʻilima*, *hōʻawa*, and *ʻakoko* and the small trees *alaheʻe* and *olomea*. *Alaheʻe* is a hard, durable wood that was used to make tools in traditional Hawaiʻi. It probably grew at or near the survey area. *Olomea* is predominantly a wet forest tree and was likely brought to the survey area from a *mauka* location. In traditional Hawaiʻi, wood from the tree was used as fire lighting sticks, which might explain its presence in the wood charcoal collection. Two plants introduced to Hawaiʻi by Polynesians, coconut and ti, were also identified. Generic identifications of *Syzygium* sp. and *Senna* sp. might derive either from native plants or from historically introduced species of these genera. If the charcoal in the collections represents the native members of these genera, then the *Senna* sp. or *kolomona*, probably grew at or near the project area but the native *Syzygium* sp., *ʻōhiʻa hā*, or the Polynesian introduction *ʻōhiʻa*

ʻāheahea
ʻilima
hōʻawa
ʻakoko
alaheʻe
olomea

kolomona

kiawe

'ai, or mountain apple, was probably brought to the survey area from a *mauka* location. The only definite historical introduction, identified in feature 2, was the *kiawe* tree, which was introduced to Hawai'i in 1828.

Table 7. Taxa identified in charcoal samples

WIDL No.	Taxon	Common Name	Origin/Habit	Part
Catalog 79, Feature 1				
0613-1	*Chenopodium oahuense*	*'Āheahea, 'āweoweo*	Native/Shrub	Wood
0613-2	*Sida* cf. *fallax*	*'Ilima*	Native/Shrub	Wood
0613-3	cf. *Canthium odoratum*	*Alahe'e*	Native/Tree	Wood
0613-4	cf. *Senna* sp.	*Kolomona*	Native+Historic Introduction/Tree	Wood
0613-5	*Chamaesyce* sp.	*'Akoko*	Native/Shrub	Wood
0613-6	*Perrottetia sandwicensis*	*Olomea*	Native/Tree	Wood
0613-7	Unknown 1			Wood
0613-8	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/Tree	Nutshell
Catalog 81, Feature 2				
0613-18	cf. *Prosopis pallida*	*Kiawe*	Historic Introduction/Tree	Wood
0613-19	*Sida* cf. *fallax*	*'Ilima*	Native/Shrub	Wood
0613-20	cf. *Pittosporum* sp.	*Hō'awa*	Native/Shrub-Tree	Wood
0613-21	*Chenopodium oahuense*	*'Āheahea, 'āweoweo*	Native/Shrub	Wood
0613-22	Unknown 4			Wood
Catalog 84, Feature 3				
0613-9	*Chenopodium oahuense*	*'Āheahea, 'āweoweo*	Native/Shrub	Wood
0613-10	*Sida* cf. *fallax*	*'Ilima*	Native/Shrub	Wood
0613-11	cf. *Canthium odoratum*	*Alahe'e*	Native/Tree	Wood
0613-12	Unknown 2			Wood
0613-13	Unknown 3			Wood
0613-14	*Syzygium* sp.	*'Ōhi'a hā*, mountain apple, Java plum, rose apple, etc.	Native + Historic Introductions/Tree	Wood
0613-15	cf. *Cordyline fruticosa*	*Kī*, ti	Polynesian Introduction/Shrub	Wood
0613-16	cf. *Pittosporum* sp.	*Hō'awa*	Native/Shrub-Tree	Wood
0613-17	cf. *Senna* sp.	*Kolomona*	Native+Historic Introduction/Tree	Wood

The discovery of *kiawe* charcoal in feature 2 is interesting; in its absence the wood charcoal identifications would almost certainly be interpreted as dating to the traditional Hawaiian period, when the native shrubs and small trees identified in the features would have been common plants in the local environment. Its presence indicates that the burning events that created feature 2 and feature 1, which stratigraphically post-dates feature 2, took place sometime after 1828, well into the historic period. The wood charcoal

identification results are best interpreted as indicating that native vegetation persisted in the Kāhala area into the early historic period, when it was used for firewood near the beach.

The identification of *kiawe* does not provide information on the age of feature 3, because feature 3 does not have a direct stratigraphic association with features 1 or 2. Instead, the age of feature 3 was determined through a program of ^{14}C dating that involved dating single pieces of identified wood charcoal from all three features. This was necessary because it is extremely difficult to distinguish between the late traditional Hawaiian period and the early historic period with ^{14}C dating due to the large quantities of carbon put into the atmosphere at that time as a result of the Industrial Revolution in Europe.

Five single-piece samples of identified, short-lived taxa were submitted for ^{14}C dating. One sample of *'ilima* charcoal, catalog 81–1, was from feature 2, one sample of *'ilima* charcoal, catalog 79–1, and another of coconut nutshell charcoal, catalog 79–2, were from feature 1, and one sample of *'ilima* charcoal, catalog 84–1, and another of ti charcoal, catalog 84–2, were from feature 3 (table 8).

Table 8. ^{14}C age determinations

Catalog	Beta-	Material	Weight (g)	CRA*	$^{13}\delta$ ‰	95% Calibration†
79–1	222453	*Sida* cf. *fallax*	< 0.1	240±40	-27.8	AD 1530–1950
79–2	222454	*Cocos nucifera* nutshell	< 0.1	220±40	-25.0	AD 1640–1950
81–1	222455	*Sida* cf. *fallax*	< 0.1	150±40	-26.4	AD 1660–1950
84–1	222456	*Sida* cf. *fallax*	< 0.1	260±40	-24.8	AD 1520–1950
84–2	222457	cf. *Cordyline fruticosa*	< 0.1	140±40	-26.0	AD 1660–1950

* Conventional radiocarbon age [30].
† Reported by Beta Analytic, Inc.

The sample from feature 2 returned a date of 150±40, a relatively recent date that supports the evidence provided by the *kiawe* identification and indicates that the *kiawe* was not somehow intrusive to the feature. The two samples from feature 1, which on stratigraphic grounds post-dates feature 2, both yielded dates that are older than the date yielded by the sample from feature 1. When calibrated, however, both dates yield ranges that overlap the calibrated range of the sample from feature 1 and thus do not contradict the stratigraphic evidence.

Up to this point in the analysis, the ^{14}C dates have done little more than confirm what was already known from the identification of *kiawe* charcoal in feature 2. Their real value comes from the help they provide in interpreting the dating results from feature 3. The two samples from this feature yielded one date older than the dates on the features 1 and 2 samples and a second date younger than them. This apparent discrepancy, in which a single feature yields both the oldest and youngest dates, is more apparent than real. The calibrated age range of the older date encompasses that of the younger date, indicating that they can both date the same event. How does the age of feature 3 compare to the age of feature 1? The two ^{14}C dates from each feature can be pooled to provide a single age estimate. When this is done, the two features yield virtually identical results; feature 1 dates to AD 1636–1953 and feature 3 dates to AD 1648–1953. These dating results indicate

that there is no reason to believe that feature 3 is older than feature 1. Thus, feature 3 most likely dates to the historic period, sometime after AD 1828.

5 Discussion and Conclusions

The inventory survey fieldwork was designed with the expectation that two distinct cultural deposits would be investigated, one likely laid down during traditional Hawaiian times and the other during the historic period. This idea had its genesis in the work of Erkelens and Tomonari-Tuggle [7], who interpreted a thin deposit of dark sand as two cultural layers during recovery of human remains and hypothesized that the lower of these dated to traditional Hawaiian times. These ideas were picked up by Collins and Clark [4], who interpreted spatially disjoint buried deposits of dark sand as two cultural deposits and attempted to correlate them with the layers reported by Erkelens and Tomonari-Tuggle [7].

The prospect of investigating a stratified traditional Hawaiian archaeological sites was exciting because, aside from a cave deposit investigated many years ago by Lloyd Soehren, no others are known from the Kāhala region. Thus, it was somewhat disappointing that the excavations carried out for the inventory survey revealed that the two cultural layers were actually a single old land surface, or paleosol, upon which a variety of historic-period artifacts had been deposited. Given this situation it is worthwhile to ask how the earlier archaeological work yielded an incorrect interpretation of the situation?

Erkelens and Tomonari-Tuggle [7] appear to have over-interpreted the single deposit of dark sand they recorded, perhaps underestimating the effects of disturbance on the deposit. They divided the deposit into two layers, designated layers III and IV, on the basis of color, the deposit being darker at the bottom that at the top. Layer III was further subdivided into two facies, layers IIIa and IIIb. The profile drawing [7:13] indicates that the dark sand deposit had been disturbed by earlier construction activities, a backhoe, and excavation of one of the burial pits. In addition, a large fire-pit that does not show in the profile drawing was excavated. Thus, the stratigraphic situation was complex and would have been difficult to interpret in the limited exposure of the elevator pit. This complexity shows clearly in the profile drawing. Neither of the purported cultural layers is continuous throughout the profile. Facies IIIa and layer IV are present only in the north. Layer IV is truncated on the east by the application of surface fill material and on the west by the burial pit; it is not clear why layer IV is not found west and south of the burial pit. Facies IIIa has a more restricted distribution and is confined primarily to the northwest face of the excavation. It is truncated on the east by backhoe disturbance, but is absent on the other side of the backhoe disturbance. On the west, it is truncated by the burial pit and, like layer IV is absent west and south of the burial pit. Facies IIIb has the widest distribution but is truncated at one end by construction disturbance and the other by application of surface fill material. In this type of situation, where a deposit is exposed in a small area with many sources of disturbance, it is extremely difficult to distinguish modes of deposition so that interpretation of a deposit as a layer with the implication of continuous area expression, rather than simply a localized occurrence, must be considered hypothetical rather than conclusive. The alternative hypothesis—that layers III and IV represent a single deposit altered by multiple sources of disturbance—

would appear to be equally plausible on the basis of the evidence provided by Erkelens and Tomonari-Tuggle [7].

Erkelens and Tomonari-Tuggle [7] interpreted the deposit as a cultural layer because it contained two features. One of these, the feature 3 fire pit, contained a large driftwood log, which is unusual for a traditional cooking fire where fuel conservation generally appears to have been a concern. This feature might be modern. The feature 1 pit was a small, shallow undulation visible in the stratigraphic profile at the base of the deposit. Erkelens and Tomonari-Tuggle [7] mentions that a sample was taken of the pit fill, but does not report whether it differed from the surrounding matrix. Thus, its interpretation as a cultural feature, rather than a natural attribute of the deposit lacks evidential support. There is nothing here that supports the interpretation of the deposit as one or more cultural deposits, rather than a paleosol upon which a few events took place.

Finally, the assignments of an historic-era age to layer III and a traditional Hawaiian age to layer IV must be recognized as speculative. The age assignments depend logically on the interpretation of the deposit as a series of superimposed cultural layers and their stratigraphic relation to the burial pit, which contained artifacts dating to the nineteenth century. As noted above, the interpretation of the deposit as a series of cultural layers is questionable. There was no direct evidence of the age of the deposit; no traditional Hawaiian artifacts were found and the deposit itself was not dated.

These ideas were picked up by Collins and Clark [4], whose limited shovel test excavations did not yield enough evidence to disprove either the two layer hypothesis or the speculation that one of the layers represents a traditional Hawaiian cultural deposit. Instead, they interpreted their limited field results as generally supporting the two layer hypothesis. In part, they followed this course because, lacking evidence to disprove the hypothesis, they deferred to the original interpretation. However, it is also due in part to the procedure they used to phase the deposits, which did not work up from the bottom of the stratigraphic column, but instead worked down from the top. This inversion of the normal procedure led them to differentiate layer II from layer IV based on the sediments that were later deposited upon them and to presume that, in places, the basal sand deposit was actually two deposits, despite the fact that clear evidence for two deposits was not found. The interpretation that resulted is plausible if the light-colored sand that buried layer IV is, in fact, a natural deposit. If this were the case, then the observed spatial and stratigraphic positions of the layers could easily be explained as shifting loci of habitation in an environment of constant sediment deposition. But, as the inventory survey excavations show, most clearly in the block 3 excavations (see pg. 21) but also in shovel test units 9–29 and 9–31 (see pg. 13), this white sand is not a cultural deposit, but is instead fill material. Given this, the attempt to phase the deposits from the top down clearly gives erroneous results that do not support the distinction between layer II and layer IV deposits. These deposits are in fact one and the same.

The best explanation for the current distribution of sediments across the survey area posits a long period of sediment deposition and soil development, followed by landscaping to create the modern residential lots. Deposition of the unconsolidated calcareous sands along the south coast of O'ahu, depositional phase 1 in the survey area, most likely began between 2,000 and 3,000 years ago as the sea dropped to its current level from a mid-Holocene high stand of +1.8 m [8]. As the shoreline prograded and the sands behind the beach stabilized, they were colonized by various native plants and a

soil horizon began to form with the addition of organic material. This is depositional phase 2 in the survey area. Only portions of the land surface that formed at this time remain, buried by one or more applications of fill material. The paleosol is absent over most of parcel 10, in the *mauka* portions of parcels 8 and 9, and in the *makai* portion of parcel 8. It is present and deeply buried in the middle of parcels 8 and 9, surrounded by shallower deposits covered with terrestrial fill material. This pattern of absence and presence at various depths is best explained as a result of grading to level the lots for modern development. The places where the paleosol is absent today were formerly high spots on the landscape. The sands from these areas were pushed into low spots to create a level topography. The most prominent of these low spots was located in the middle of parcels 8 and 9 where the paleosol is covered by a thick layer of sand. Surrounding this low spot were areas that approximate the modern grade and it is here that paleosols are found buried by terrestrial fill material, which was applied over most of the survey area. This modern process of grading and applying terrestrial fill material is depositional phase 3 in the survey area.

Based on the history of sand deposits elsewhere on O'ahu, it is likely that the paleosol in the survey area formed a stable land surface during traditional Hawaiian times, from the time of first settlement around AD 750 [22; 31] through early historic times after AD 1778. There is no direct evidence for this, however, because the paleosol in the survey area lacks evidence of traditional Hawaiian use. The earliest use of the survey attested by archaeological remains is the nineteenth century, when at least three individuals were buried in parcel 8 at site 50–80–14–5320 and some fires were built near the beach in parcel 10 at features 1, 2, and 3 (see pg. 3.2). The identifications of wood charcoal indicate that vegetation through at least part of the nineteenth century remained predominantly native Hawaiian and that the common Polynesian introductions ti and coconut were established in the vicinity. The presence of *kiawe* in feature 2 along with the natives and Polynesian introductions suggests that the fires were made at a time when *kiawe* had just begun to establish itself in the region and before it displaced the native coastal dry forest community, as it later did throughout the islands [10:62].

The two artifacts recovered during the inventory survey that might date to this early historic-era use of the survey area are the red glass bead (see fig. 13*a*) and the possible basalt flake (see fig. 13*d*). The flake shows no signs of having been used as a tool or to have derived from some other traditional activity such as adze reworking. Its status as an artifact is somewhat uncertain and it carries little or no information about past use of the survey area.

All the other artifacts found during the inventory survey represent common activities carried out in and around modern houses. These were deposited on the paleosol, indicating that the terrestrial fill topsoil now found over most of the survey area was applied after the lots had been developed as residences in the twentieth century.

The three fire pit features discovered during inventory survey do not constitute a significant historic property. The activity that they represent, the building of small fires near the beach in the nineteenth century, is a common one and the information that this activity took place is not important for Hawaiian history.

The 40 ft. coastal setback was tested extensively with nine shovel test pits during the inventory survey. The setback does not contain potentially significant cultural deposits. This work satisfies SHPD's request for an inventory survey prior to undertaking measures

to stabilize the existing seawall at the property [3]. The seawall stabilization work will have "no effect" on historic properties because historic properties are absent in the area of potential effect.

Inventory survey has shown that the only significant historic property on the residential lot is site 50–80–14–5320, which contains the reburied remains of three individuals. The location of this site, which was not previously recorded, was established by the inventory survey. Prior to any construction on parcel 8, a plan to protect the site during construction and to preserve it in place must be approved by SHPD. Implementation of this plan will be the final step in the historic preservation review process for these three parcels.

A Stratigraphic Contexts

Context	Phase	Unit	Description
4415 Kahala Ave.			
1	3	10–18	Fill layer at surface.
2	1	10–18	Basal sand.
3	2	10–18	Gray paleosol.
4	3	9–28	Mixed terrestrial and marine fill material.
5	1	9–28	Basal sand.
6	3	9–30	A-horizon.
7	3	9–30	White sand.
8	2	9–30	Paleosol.
9	1	9–30	Basal sand.
10	3	9–31	Terrestrial fill material.
11	3	9–31	Gray sand fill mixed with terrestrial sediment.
12	1	9–31	Basal sand.
13	3	9–29	Paleosol.
14	3	9–29	White sand.
15	3	9–29	Mixed marine and terrestrial fill material.
16	1	9–29	Basal sand.
17	3	9–32	Terrestrial fill at surface.
18	3	9–32	White sand.
19	2	9–32	Paleosol.
20	1	9–32	Basal sand.
21	3	8–8	Terrestrial fill at surface.
22	3	8–8	Sand.
23	3	8–9	Terrestrial fill material at surface.
24	1	8–9	Basal sand.
25	3	8–10	Terrestrial fill material at surface.
26	1	8–10	Basal sand.
27	3	8–11	Terrestrial fill material at surface.
28	2	8–11	Paleosol.
29	1	8–11	Basal sand.
30	2	8–15	Paleosol.
31	1	8–15	Basal sand.
32	3	8–14	Terrestrial fill material.
33	2	8–14	*A*-horizon, poorly developed.
34	1	8–14	Basal sand.
35	3	Block 3	Terrestrial fill material, mixed with calcareous sand to a depth of 11 cm below surface.

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Context	Phase	Unit	Description
36	3	Block 3	White sand, marbled with the underlying context 37 sediment in the bottom 8 cm.
37	2	Block 3	Paleosol.
38	1	Block 3	Basal sand.
39	3	Block 2	Terrestrial fill material.
40	2	Block 2	Paleosol.
41	1	Block 2	Basal sand.
42	3	10–19	Terrestrial fill material.
43	3	10–19	White sand.
44	2	10–19	Paleosol, poorly developed.
45	1	10–19	Basal sand.
46	3	10–20	Terrestrial fill material.
47	2	10–20	Paleosol, poorly developed.
48	1	10–20	Basal sand.
49	3	Block 1	Terrestrial fill.
50	2	Block 1	Paleosol, poorly developed.
51	1	Block 1	Basal sand.
56	2	8–13	Paleosol under terrestrial fill.
57	3	10–22	Terrestrial fill material.
58	1	10–22	Basal sand.
59	3	8–12	Terrestrial fill.
60	3	8–12	White sand.
61	2	8–12	Paleosol.
62	1	8–12	Basal sand.
63	3	8–13	Terrestrial fill material.
64	2	8–13	Paleosol.
65	1	8–13	Basal sand.
66	3	9–33	Terrestrial fill material.
67	2	9–33	Paleosol.
68	1	9–33	Basal sand.
69	3	9–34	Terrestrial fill material.
70	2	9–34	Paleosol.
71	1	9–34	Basal sand.

B Field Catalog

Catalog	Site	Unit	Context	Contents
1	4415 Kahala Ave.	10-18	1	Sediment.
2	4415 Kahala Ave.	10-18	2	Sediment.
3	4415 Kahala Ave.	10-18	3	Sediment.
4	4415 Kahala Ave.	9-28	4	Sediment.
5	4415 Kahala Ave.	9-28	5	Sediment.
6	4415 Kahala Ave.	9-30	6	Sediment.
7	4415 Kahala Ave.	9-30	7	Sediment.
8	4415 Kahala Ave.	9-30	8	Sediment.
9	4415 Kahala Ave.	9-30	9	Sediment.
10	4415 Kahala Ave.	9-31	10	Sediment.
11	4415 Kahala Ave.	9-31	11	Sediment.
12	4415 Kahala Ave.	9-31	12	Sediment.
13	4415 Kahala Ave.	9-29	13	Sediment.

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Catalog	Site	Unit	Context	Contents
14	4415 Kahala Ave.	9-29	14	Sediment.
15	4415 Kahala Ave.	9-29	15	Sediment.
16	4415 Kahala Ave.	9-29	16	Sediment.
17	4415 Kahala Ave.	9-32	17	Sediment.
18	4415 Kahala Ave.	9-32	18	Sediment.
19	4415 Kahala Ave.	9-32	19	Sediment.
20	4415 Kahala Ave.	9-32	20	Sediment.
21	4415 Kahala Ave.	8-8	21	Sediment.
22	4415 Kahala Ave.	8-8	22	Sediment.
23	4415 Kahala Ave.	8-9	23	Sediment.
24	4415 Kahala Ave.	8-9	24	Sediment.
25	4415 Kahala Ave.	8-10	25	Sediment.
26	4415 Kahala Ave.	8-10	26	Sediment.
27	4415 Kahala Ave.	8-11	27	Sediment.
28	4415 Kahala Ave.	8-11	28	Sediment.
29	4415 Kahala Ave.	8-11	29	Sediment.
30	4415 Kahala Ave.	8-15	30	Sediment.
31	4415 Kahala Ave.	8-15	31	Sediment.
32	4415 Kahala Ave.	8-14	32	Sediment.
33	4415 Kahala Ave.	8-14	33	Sediment.
34	4415 Kahala Ave.	8-14	34	Sediment.
35	4415 Kahala Ave.	block 3, 3N1E	37	Artifact.
36	4415 Kahala Ave.	block 3, 3N1E	37	Midden.
37	4415 Kahala Ave.	block 3, 2N1E	37	Midden.
38	4415 Kahala Ave.	block 3, 1N1E	37	Midden.
39	4415 Kahala Ave.	block 3, 1N2E	37	Midden.
40	4415 Kahala Ave.	block 3, 2N2E	37	Midden.
41	4415 Kahala Ave.	block 3, 1N3E	37	Midden.
42	4415 Kahala Ave.	block 3, 3N2E	37	Midden.
43	4415 Kahala Ave.	block 3, 2N3E	37	Midden.
44	4415 Kahala Ave.	block 3, 3N3E	37	Midden.
45	4415 Kahala Ave.	block 3, 1N4E	37	Midden.
46	4415 Kahala Ave.	block 3, 2N4E	37	Midden.
47	4415 Kahala Ave.	block 3, 3N4E	37	Midden.
48	4415 Kahala Ave.	block 2, 1N3E	40	Midden.
49	4415 Kahala Ave.	block 2, backhoe	40	Glass.
50	4415 Kahala Ave.	block 2, 1N2E	40	Midden.
51	4415 Kahala Ave.	block 2, 1N2E	40	Fish.
52	4415 Kahala Ave.	block 3, sondage	35	Sediment.
53	4415 Kahala Ave.	block 3, sondage	35	Sediment.
54	4415 Kahala Ave.	block 3, sondage	36	Sediment.
55	4415 Kahala Ave.	block 3, sondage	36	Sediment.
56	4415 Kahala Ave.	block 3, sondage	37	Sediment.
57	4415 Kahala Ave.	block 3, sondage	38	Sediment.
58	4415 Kahala Ave.	block 2, 1N1E	40	Midden.
59	4415 Kahala Ave.	10-19	42	Sediment.
60	4415 Kahala Ave.	10-19	43	Sediment.
61	4415 Kahala Ave.	10-19	44	Sediment.
62	4415 Kahala Ave.	10-19	45	Sediment.
63	4415 Kahala Ave.	block 2, 2N2E	40	Midden.
64	4415 Kahala Ave.	10-20	46	Sediment.
65	4415 Kahala Ave.	10-20	47	Sediment.
66	4415 Kahala Ave.	10-20	48	Sediment.
67	4415 Kahala Ave.	block 2, 2N3E	40	Midden.

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Catalog	Site	Unit	Context	Contents
68	4415 Kahala Ave.	block 2, 2N4E	40	Midden.
69	4415 Kahala Ave.	block 2, sondage	39	Sediment.
70	4415 Kahala Ave.	block 2, sondage	40	Sediment.
71	4415 Kahala Ave.	block 2, sondage	41	Sediment.
72	4415 Kahala Ave.	block 1, 1N1E	50	Midden.
73	4415 Kahala Ave.	block 1, 1N2E	50	Midden.
74	4415 Kahala Ave.	block 1, 1N2E	50	Midden.
75	4415 Kahala Ave.	block 1, 2N1E	50	Midden.
76	4415 Kahala Ave.	block 1, 1N3E	50	Midden.
77	4415 Kahala Ave.	block 1, 2N2E	50	Midden.
78	4415 Kahala Ave.	block 1, 2N3E	50	Midden.
79	4415 Kahala Ave.	block 1, 2N2E	50	Fe 1 contents.
80	4415 Kahala Ave.	block 1, 2N2E	52	Fe 1 sediment.
81	4415 Kahala Ave.	block 1, 2N2E	53	Fe 2 midden.
82	4415 Kahala Ave.	block 1, 2N2E	53	Fe 2 sediment.
83	4415 Kahala Ave.	block 1, 2N3E	54	Fe 3 sediment.
84	4415 Kahala Ave.	block 1, 2N3E	54	Fe 3 midden.
85	4415 Kahala Ave.	block 1, 2N2E	55	Fe 4 midden.
86	4415 Kahala Ave.	block 1, 2N2E	55	Fe 4 midden.
87	4415 Kahala Ave.	block 1, 2N3E	50	Midden.
88	4415 Kahala Ave.	8-13	56	Midden.
89	4415 Kahala Ave.	block 1	49	Sediment.
90	4415 Kahala Ave.	block 1	50	Sediment.
91	4415 Kahala Ave.	block 1	51	Sediment.
92	4415 Kahala Ave.	10-22	57	Sediment.
93	4415 Kahala Ave.	10-22	58	Sediment.
94	4415 Kahala Ave.	8-12	61	Midden.
95	4415 Kahala Ave.	8-12	59	Sediment.
96	4415 Kahala Ave.	8-12	60	Sediment.
97	4415 Kahala Ave.	8-12	61	Sediment.
98	4415 Kahala Ave.	8-12	62	Sediment.
99	4415 Kahala Ave.	8-13	63	Sediment.
100	4415 Kahala Ave.	8-13	64	Sediment.
101	4415 Kahala Ave.	8-13	65	Sediment.
102	4415 Kahala Ave.	9-33	66	Sediment.
103	4415 Kahala Ave.	9-33	67	Sediment.
104	4415 Kahala Ave.	9-33	68	Sediment.
105	4415 Kahala Ave.	9-34	69	Sediment.
106	4415 Kahala Ave.	9-34	70	Sediment.
107	4415 Kahala Ave.	9-34	71	Sediment.

C Artifact List

Material	Class	Period	Count	Wt.*	Whole	Notes
4415 Kahala Ave., 10-18, context 1						
lead	shot	historic	1	0.5		Diameter = 0.5 cm.
4415 Kahala Ave., 8-12, context 61						
ceramic	sherd	historic	1	0.4		Ivory glazed cream ware.

* Weight in grams.

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Material	Class	Period	Count	Wt.*	Whole	Notes
4415 Kahala Ave., block 1, 1N1E, context 50						
ceramic	sherd	historic	2	0.8		White ware with cobalt blue glaze, possibly from a teacup.
glass	sherd	historic	1	0.8		Clear glass, too small to carry information on the artifact class.
metal	fragment	historic	1	0.3		One small piece of metal.
4415 Kahala Ave., block 1, 1N3E, context 50						
glass	sherd	historic	1	0.2		
lead	bullet	historic	1	1.9	✓	30 grain, .22 caliber. Diameter = 0.6 cm.
4415 Kahala Ave., block 1, 2N1E, context 50						
glass	sherd	historic	2	0.2		Tiny sherds of clear glass.
metal	fragment	historic	2	0.3		Rusted pieces with turquoise paint adhering to one side.
metal	nail	historic	1	2.5		6d finishing nail.
4415 Kahala Ave., block 1, 2N2E, context 50						
glass	mirror	historic	2	2.5		Thickness = 0.6 cm.
4415 Kahala Ave., block 1, 2N3E, context 50						
basalt	flake?	traditional	1	25.3		Possible flake. No polish or other signs of working. Length = 3.4 cm; width = 4.3 cm; thickness = 1.5 cm.
ceramic	sherd	historic	2	5.1		White glazed white ware plate.
4415 Kahala Ave., block 2, 1N1E, context 40						
metal	fragment	historic	10	8.9		Rusted metal pieces.
4415 Kahala Ave., block 2, 1N3E, context 40						
glass	sherd	historic	3	1.9		Clear glass.
metal	fragment	historic	2	4.8		Rusted nails?
metal	tack	historic	1	0.3	✓	Length = 1.4 cm.
4415 Kahala Ave., block 2, 2N2E, context 40						
glass	bead	historic	1	0.5	✓	Red. Length = 0.6 cm; diameter = 0.8 cm.
hard rubber	fragment	historic	2	0.3		Small pieces of black hard rubber or plastic.
metal	fragment	historic	3	8.4		Rusted iron.
4415 Kahala Ave., block 2, 2N3E, context 40						
glass	sherd	historic	3	2.2		Small clear glass sherds.
4415 Kahala Ave., block 2, 2N4E, context 40						
glass	sherd	historic	1	0.5		Brown beer bottle.
4415 Kahala Ave., block 2, backhoe, context 40						
glass	sherd	historic	3	44.0		Clear glass, possibly from a vase.
4415 Kahala Ave., block 3, 3N1E, context 37						
glass	sherd	historic	1	10.3		Clear bottle glass.
4415 Kahala Ave., block 3, 3N3E, context 37						
ceramic	sherd	historic		9.8		Base sherd of white glazed white ware plate.

* Weight in grams.

D Invertebrate Faunal Categories

This appendix contains descriptions of the categories used in the identification and analysis of invertebrate faunal remains. The descriptions are listed alphabetically by taxon within class to facilitate reference.

Other

Charcoal Charcoal collected from the sieve.

Coral Pieces of coralline material of sufficiently large size that it is unlikely that they were deposited naturally.

Thermally-altered rock Relatively coarse-grained, non-vesicular volcanic rock ranging in size up to cobbles, either with or without characteristic heat stress attributes such as spall fracturing and discoloration.

Kukui Unburnt *Aleurites moluccana* nutshells.

Unidentified wood Unidentified wood collected from sieve includes bark.

Waterworn basalt Waterworn stones of all sizes.

Bivalvia

Bivalvia Members of indeterminate order and family.

***Brachidontes* sp.** A sedentary mussel, extremely abundant on limestone shorelines and found in lesser densities along basalt shores.

***Cardita* sp.** These bivalves occur in shallow water where they are attached to the undersurfaces of rocks.

***Isognomon* sp.** Members of the family Isognomonidae, or toothed peal shells, of which there are four species recognized in Hawai'i.

Mytilidae Primarily *Brachidontes crebristriatus*, which is ubiquitous around the shorelines of the main Hawaiian Islands. They are typically found at the o tide mark.

***Tellina* sp.** Members of the tellen genus *Tellina*, of which there are seven species recognized in Hawai'i.

Veneridae Members of the family Veneridae, of which five species are known in Hawai'i, one of which was introduced in the early twentieth century. Several species are sought after as food items.

Echinoidea

Echinoidea Sea urchin.

Gastropoda

***Cellana* sp.** Members of the limpet family, Patellidae, of which there are four species recognized in Hawai'i. Known as *'ōpihi* in Hawai'i, these shells were important food items and today command a premium price in markets.

***Cerithium* sp.** Cerithids are most common and abundant of shallow water mollusks.

Conus **sp.** Members of the cone shell family, of which 25 species in the genus *Conus* are recognized in Hawai'i.

Cymatium **sp.** Members of the triton genus, *Cymatium*, of which there are 12 species recognized in Hawai'i.

Cypraea **sp.** Members of the cowry genus, *Cypraea*, of which there are 33 species recognized in Hawai'i. Cowries were an important food item in traditional Hawai'i.

Drupa **sp.** Members of the muricid genus *Drupa*, of which there are four species recognized in Hawai'i.

Euplica **sp.** Columbellids are found in abundance on rocks, in tide pools, fringing reef, and shallow water.

Evalea **sp.** Pyramidellid shells are common in shallow water in tide pools and on fringing reefs. In habit, many pyramidellids are ectoparasitic on polychaete worms, bivalves and other gastropods.

Gastropoda No description.

Hastula **sp.** Terebrids are sand dwelling carnivores that are found in relatively shallow water in Hawai'i.

Hipponix **sp.** Members of the hipponicid genus *Hipponix*, of which three species are recognized in Hawai'i. These are small, limpetlike shells that live attached to rocks or other shells.

Land snail Various members of the order Pulmonata, which includes snails and slugs that have developed lungs.

Littorina **sp.** Members of the genus *Littorina*, of which there are four species in Hawai'i. Littorines are the most common mollusks of the high shoreline.

Nassarius **sp.** Members of the nassarid genus *Nassarius*, of which there are six species recognized in Hawai'i. These are small shells that live mainly on soft substrates.

Nerita **sp.** Members of the nerite genus, *Nerita*, of which there are three species in Hawaii. Nerites were important food items in traditional Hawai'i.

Strombidae No description.

Thaididae Members of the muricacean family Thaididae, of which there are 27 species recognized in Hawai'i..

Trochus intextus *T. intextus* commonly occurs in shallow, sandy areas studded with rocks.

Turbo sandwicensis This turban shell is common under rocks in shallow waters.

Turrinae The trurrids live in sand and on hard substrates.

Malacostrada

Crustacea Crab or lobster.

Unidentified

Unidentified Small pieces of marine shell, not further identifiable.

E Invertebrate Fauna and Other Materials

This appendix contains information in tabular form on the weights in grams of 50 categories of cultural and non-cultural remains. A note after the table indicates columns that represent non-cultural remains.

In order to fit the printed page, the information has been broken into five tables. Row totals are given on the fifth table.

To save space, column heads are indicated by number. A key for column heads is presented at the end of each table.

Part 1 of 5

Unit	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Context 37											
block 3, 1N1E											
block 3, 1N2E											
block 3, 1N3E											
block 3, 1N4E											
block 3, 2N1E											
block 3, 2N2E			45.3								
block 3, 2N3E											
block 3, 2N4E	1.3							1.8		0.8	
block 3, 3N1E											
block 3, 3N2E	0.4										
block 3, 3N3E											
block 3, 3N4E	1.1										
Context 40											
block 2, 1N1E											
block 2, 1N2E	2.8										
block 2, 1N3E	0.2	1.2	0.4								
block 2, 2N2E											
block 2, 2N3E											
block 2, 2N4E											
Context 50											
block 1, 1N1E	0.5										0.4
block 1, 1N2E	1.7						0.3				
block 1, 1N3E			35.1					4.7	5.2		0.3
block 1, 2N1E	0.6										
block 1, 2N2E	3.7				139.4	0.8				0.3	
block 1, 2N3E	19.3				658.0					16.0	4.2
Context 53											
block 1, 2N2E	0.2										
Context 54											
block 1, 2N3E										0.3	
Context 55											
block 1, 2N2E	0.5			19.1							
Context 61											
8-12											

NOTE: Column headings are as follows: (0) Charcoal; (1) Unidentified wood; (2) Waterworn basalt; (3) Coral; (4) thermally-altered rock; (5) Kukui; (6) Bivalvia; (7) *Isognomon* sp.; (8) *Tellina* sp.; (9) Echinoidea; and (10) *Cellana* sp.

Part 2 of 5

Unit	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
Context 37											
block 3, 1N1E											
block 3, 1N2E										1.5	
block 3, 1N3E										1.6	
block 3, 1N4E										1.3	
block 3, 2N1E											
block 3, 2N2E										0.2	
block 3, 2N3E										0.2	0.4
block 3, 2N4E	2.6			4.4	1.7					0.3	
block 3, 3N1E										0.4	
block 3, 3N2E											
block 3, 3N3E										1.5	
block 3, 3N4E											
Context 40											
block 2, 1N1E											
block 2, 1N2E										0.7	
block 2, 1N3E										0.2	
block 2, 2N2E							1.2			0.3	0.3
block 2, 2N3E							1.8			3.1	
block 2, 2N4E								1.5		1.3	0.5
Context 50											
block 1, 1N1E										11.2	
block 1, 1N2E										1.4	0.6
block 1, 1N3E					6.8	0.4				0.4	
block 1, 2N1E										1.9	6.2
block 1, 2N2E		0.6	0.3	13.2						2.7	
block 1, 2N3E				14.2	1.8				1.1	3.4	4.6
Context 53											
block 1, 2N2E				0.3						0.2	
Context 54											
block 1, 2N3E				0.8	0.6						0.1
Context 55											
block 1, 2N2E							0.7				
Context 61											
8-12										0.4	0.3

NOTE: Column headings are as follows: (11) *Conus* sp.; (12) *Littorina* sp.; (13) *Nassarius* sp.; (14) *Nerita* sp.; (15) *Turbo sandwicensis*; (16) Crustacea; (17) Charcoal; (18) Unidentified wood; (19) Coral; (20) Bivalvia; and (21) *Brachidontes* sp. Columns 17 through 21 represent non-cultural material.

Part 3 of 5

Unit	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
Context 37											
block 3, 1N1E						0.2				0.8	0.2
block 3, 1N2E				0.8		0.5	0.1				
block 3, 1N3E	0.2					0.4					
block 3, 1N4E		1.4				1.3					
block 3, 2N1E		1.1									
block 3, 2N2E		0.3				0.7	0.1				

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Continued from previous page

Unit	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
block 3, 2N3E		1.2				0.3	0.2				
block 3, 2N4E											
block 3, 3N1E		1.0									
block 3, 3N2E		0.1					0.1		1.0		
block 3, 3N3E		0.4				0.8	0.4				
block 3, 3N4E						0.7					
Context 40											
block 2, 1N1E		0.4									
block 2, 1N2E	0.2	0.5					0.3				3.4
block 2, 1N3E				0.5			3.2	0.2	0.2		
block 2, 2N2E		0.6					0.4				0.4
block 2, 2N3E		1.5			3.0	0.5	0.5				2.1
block 2, 2N4E		2.0			2.3	0.7	2.0				9.9
Context 50											
block 1, 1N1E		2.4		1.1		4.4					2.0
block 1, 1N2E		4.1		2.6	1.9	9.7	0.4		2.1		
block 1, 1N3E	0.3					8.4			3.1		
block 1, 2N1E						11.2	0.4		6.1		9.9
block 1, 2N2E		7.9	0.5		3.3	7.0	0.6		20.0		21.1
block 1, 2N3E		2.4		1.2	14.0				17.6		26.7
Context 53											
block 1, 2N2E											
Context 54											
block 1, 2N3E		1.4									
Context 55											
block 1, 2N2E						0.3					
Context 61											
8-12	0.3	0.2		1.4			0.3				

NOTE: Column headings are as follows: (22) ; (23) *Isognomon* sp.; (24) Mytilidae; (25) *Tellina* sp.; (26) Veneridae; (27) Echinoidea; (28) *Cellana* sp.; (29) ; (30) *Conus* sp.; (31) *Cymatium* sp.; and (32) *Cypraea* sp. Columns 22 through 32 represent non-cultural material.

Part 4 of 5

Unit	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
Context 37											
block 3, 1N1E			4.8			1.7				0.9	
block 3, 1N2E			3.1							0.7	
block 3, 1N3E			1.5			1.0				0.7	
block 3, 1N4E		0.5	3.2							3.6	
block 3, 2N1E			3.0			3.1				2.3	
block 3, 2N2E			4.0			1.8				3.2	0.1
block 3, 2N3E			2.2			1.8				3.3	
block 3, 2N4E		0.3	2.5			3.6					
block 3, 3N1E			3.7			1.7				3.2	
block 3, 3N2E			3.6			2.5				2.7	
block 3, 3N3E			7.2	0.6		3.7				3.3	
block 3, 3N4E		0.4	2.7			3.6				2.3	
Context 40											

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Continued from previous page

Unit	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)
block 2, 1N1E			0.4			0.9				0.9	
block 2, 1N2E			1.0			4.8				3.3	
block 2, 1N3E	0.2		2.5			8.4				4.4	
block 2, 2N2E		0.8	2.0		1.8	4.6				3.5	
block 2, 2N3E			1.7			13.5				10.6	
block 2, 2N4E			2.4			10.0				7.3	0.8
Context 50											
block 1, 1N1E		0.6				6.1	1.9			5.2	0.1
block 1, 1N2E		1.0	0.2			6.8				7.1	
block 1, 1N3E		0.3				4.0	0.3			4.9	
block 1, 2N1E			0.2			6.5	0.3	0.3	0.7	11.0	
block 1, 2N2E	1.8	0.4	0.2			7.8					
block 1, 2N3E	3.2		0.1			7.7					0.2
Context 53											
block 1, 2N2E											
Context 54											
block 1, 2N3E						0.3					
Context 55											
block 1, 2N2E						0.6				0.3	
Context 61											
8-12						1.6				2.4	

NOTE: Column headings are as follows: (33) *Drupa* sp.; (34) *Euplica* sp.; (35) *Evalea* sp.; (36) Gastropoda; (37) ; (38) *Hipponix* sp.; (39) Land snail; (40) *Littorina* sp.; (41) *Nassarius* sp.; (42) *Nerita* sp.; and (43) Strombidae. Columns 33 through 43 represent non-cultural material.

Part 5 of 5

Unit	(44)	(45)	(46)	(47)	(48)	(49)	Total
Context 37							
block 3, 1N1E					9.7		18.3
block 3, 1N2E					7.0	0.2	13.9
block 3, 1N3E					3.4		8.8
block 3, 1N4E					20.8		32.1
block 3, 2N1E			0.5		11.3		21.3
block 3, 2N2E					13.9		69.6
block 3, 2N3E					5.7		15.3
block 3, 2N4E					10.7		30.0
block 3, 3N1E				0.9	16.0		26.9
block 3, 3N2E			0.1		7.6	0.5	18.6
block 3, 3N3E		0.8			8.4		27.1
block 3, 3N4E					21.3		32.1
Context 40							
block 2, 1N1E					0.4		3.0
block 2, 1N2E		0.9			1.2		19.1
block 2, 1N3E		0.4			3.1	1.0	26.1
block 2, 2N2E			1.6		1.5		19.0
block 2, 2N3E			5.1		1.4		44.8
block 2, 2N4E		0.4	5.8		7.6	7.7	62.2
Context 50							

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Continued from previous page

Unit	(44)	(45)	(46)	(47)	(48)	(49)	Total
block 1, 1N1E			2.2		0.3	4.1	42.5
block 1, 1N2E		0.3	2.4		0.6	1.5	44.7
block 1, 1N3E							74.2
block 1, 2N1E		1.4	0.8		0.6	1.2	59.3
block 1, 2N2E			3.5		2.7	1.2	239.0
block 1, 2N3E	1.2		8.6		1.9		807.4
Context 53							
block 1, 2N2E							0.7
Context 54							
block 1, 2N3E							3.5
Context 55							
block 1, 2N2E							21.5
Context 61							
8-12					13.3		20.2

NOTE: Column headings are as follows: (44) Thaididae; (45) *Trochus intextus*; (46) *Turbo sandwicensis*; (47) ; (48) Crustacea; and (49) Unidentified. Columns 44 through 49 represent non-cultural material.

F Vertebrate Faunal Categories

This appendix contains descriptions of the categories used in the identification and analysis of vertebrate faunal remains. The descriptions are listed alphabetically by taxon within class to facilitate reference.

Aves

Medium Bird Member(s) of indeterminate order and family in the general size range of shearwater and petrel, tropicbird, night-heron, duck, hawk, junglefowl (= chicken), moorhen and coot, curlew, gull, owl, crow, and so on; in Hawai'i, probably no passeriform other than *Corvus hawaiiensis* (Hawaiian Crow) would be included but a number of native or historically introduced species of up to a half-dozen orders could potentially be.

Small Bird Member(s) of indeterminate order and family up through the general size of storm-petrel, quail, plover, sparrow, myna, thrush, and so on; in Hawaii probably a large amount of the material represents passeriforms but smaller species of three or four other orders could well be included, also.

Mammalia

Medium Mammal Member(s) of indeterminate order and family in the general size range of human, porpoise, seal, pig, deer, and goat/sheep; in Hawai'i, native or introduced species of at least four orders could potentially be included.

***Rattus* sp.** Comprises material presumably all representing this genus but that could not be assigned to either the Polynesian-introduced *Rattus exulans* (Polynesian Rat)

or the historically introduced *R. norvegicus* (Norway Rat) and *R. rattus* (Roof Rat), usually because of either its fragmentary nature or its relative immaturity.

Small Mammal Member(s) of indeterminate order and family up through the general size of medium pteropodid, *Rattus* sp., and mongoose; in Hawai'i, Polynesian- or historically-introduced species of at least three orders could potentially be included.

Osteichthyes

Albulid Member(s) of the family Albulidae (Bonefishes), of which there are two species reported for Hawai'i; usually found near shore in open sand-bottomed areas, and reaching about 90 cm in length.

Diodontid Member(s) of the family Diodontidae (Spiny Puffers), of which two species of the genus *Diodon*, ranging from 35–70 cm in maximum length, are by far the most abundant in Hawaiian inshore waters, the single remaining species reported for Hawai'i (genus *Chilomycterus*, 50 cm in length) apparently being quite rare here; all of these species are suspected of possessing an intrinsic poison although the flesh is apparently eaten without ill effects.

Fish Material of indeterminate class and family, although essentially always a bony fish rather than shark or ray.

Labrid Member(s) of the family Labridae (Wrasses), which is the largest family of fishes in Hawai'i with over 40 species; predominately inshore forms, most of them fairly small but with a few larger forms reaching about 50 cm in length.

Scarid Member(s) of the family Scaridae (Parrotfishes), of which the genera *Calotomus* (two? species) and *Scarus* (four or five species) are essentially the only two expected to occur in Hawai'i, both being typically inshore groups, and including one or two species that may reach 70 cm in length.

G Vertebrate Faunal Counts

This appendix contains information in tabular form on the counts of 18 categories of cultural and non-cultural remains. A note after the table indicates columns that represent non-cultural remains.

In order to fit the printed page, the information has been broken into two tables. Row totals are given on the second table.

To save space, column heads are indicated by number. A key to the column heads is presented at the end of each table.

Part 1 of 2

Unit	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Context 37												
block 3, 1N1E												
block 3, 1N2E		1				2						
block 3, 1N3E											2	
block 3, 1N4E											8	

Continued on next page

Continued from previous page

Unit	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
block 3, 2N1E												
block 3, 2N2E						1				19		
block 3, 2N3E		48				105	1					
block 3, 2N4E						51				5		
block 3, 3N1E											2	
block 3, 3N2E										7		
block 3, 3N3E									7			
block 3, 3N4E												
Context 40												
block 2, 1N1E												
block 2, 1N2E		15				6						
block 2, 1N3E					1						9	
block 2, 2N2E											23	
block 2, 2N3E										74		
block 2, 2N4E											48	
Context 50												
block 1, 1N1E	7					15						
block 1, 1N2E												
block 1, 1N3E						44				89		
block 1, 2N1E						78		1				
block 1, 2N2E			11			62						
block 1, 2N3E				17	1	416						
Context 53												
block 1, 2N2E						2						
Context 54												
block 1, 2N3E						4						
Context 55												
block 1, 2N2E												
Context 61												
8-12												5

NOTE: Column headings are as follows: (0) Medium Bird; (1) small and/or medium bird; (2) Medium Mammal; (3) small to medium Mammal; (4) Albulid; (5) Fish; (6) Labrid; (7) Scarid; (8) Medium Bird; (9) small and/or medium bird; (10) Small Bird; and (11) small to medium Vertebrate. Columns 8 through 11 represent non-cultural material.

Part 2 of 2

Unit	(12)	(13)	(14)	(15)	(16)	(17)	Total
Context 37							
block 3, 1N1E	2						2
block 3, 1N2E							3
block 3, 1N3E							2
block 3, 1N4E					15		23
block 3, 2N1E		2					2
block 3, 2N2E							20
block 3, 2N3E							154
block 3, 2N4E							56
block 3, 3N1E							2
block 3, 3N2E							7

Continued on next page

Continued from previous page

Unit	(12)	(13)	(14)	(15)	(16)	(17)	Total
block 3, 3N3E					10		17
block 3, 3N4E					35		35
Context 40							
block 2, 1N1E					3		3
block 2, 1N2E	1						22
block 2, 1N3E	1				7		18
block 2, 2N2E			1		19		43
block 2, 2N3E					8		82
block 2, 2N4E		12			90		150
Context 50							
block 1, 1N1E							22
block 1, 1N2E					64	1	65
block 1, 1N3E							133
block 1, 2N1E							79
block 1, 2N2E	10			2			85
block 1, 2N3E							434
Context 53							
block 1, 2N2E							2
Context 54							
block 1, 2N3E							4
Context 55							
block 1, 2N2E					1		1
Context 61							
8-12							5

NOTE: Column headings are as follows: (12) Rattus sp.; (13) Small Mammal; (14) Albulid; (15) Diodontid; (16) Fish; and (17) Scarid. Columns 12 through 17 represent non-cultural material.

Glossary

Entries for Hawaiian words are excerpted or paraphrased, where possible, from the *Hawaiian Dictionary* [24], or from Lucas [21].

ʻāheahea An endemic shrub or small tree, *Chenopodium oahuense.*

ʻakoko A member of the genus *Chamaecyse* spp., which includes 15 endemic shrubs and small trees.

ʻili A land section, next in importance to *ahupuaʻa* and usually a subdivision of an *ahupuaʻa.*

ʻilima An indigenous shrub, *Sida fallax.*

ʻōʻiō The bonefish, *Albula* sp.

ahupuaʻa Traditional Hawaiian land division usually extending from the uplands to the sea.

alaheʻe A native tree, *Canthium odoratum*, found primarily in dry areas.

hōʻawa A native tree of the genus *Pittosporum.*

kahu Honored attendant, guardian, nurse, keeper of *ʻunihipili* bones, regent, keeper, administrator, warden, caretaker, master, mistress; pastor, minister, reverend, or

preacher of a church; one who has a dog, cat, pig, or other pet.

kiawe The algaroba tree, *Prosopis* sp., a legume from tropical America, first planted in 1828 in Hawaii.

kolomona A native shrub, *Cassia gaudichaudii.*

konohiki Head man of an *ahupua'a* land division under the chief; land or fishing rights under control of the *konohiki*; such rights are sometimes called *konohiki* rights. See also *ahupua'a.*

kukui The candlenut, *Aleurites moluccana.*

māhele Land division of 1848.

mauka Inland, upland, toward the mountain.

olomea An endemic shrub or small tree, *Perrottetia sandwicensis.*

paleosol A soil of the past, often buried.

phasing A general name given to the arrangement of the stratification of the site into a stratigraphic sequence, and the division of the sequence into phases and periods: another name for periodization.

pipipi A marine shell, *Nerita picea*, common in the intertidal zone.

pulu A soft, glossy, yellow wool on the base of tree-fern leaf stalks. It was used to stuff matresses and pillows and at one time was exported to California. Hawaiians stuffed bodies of their dead with it after removing vital organs.

sequence A sequence is a succession of events, as opposed to chronology which is the dating of such events.

significance A quality of a historic property that possesses integrity of location, design, setting, materials, workmanship, feeling, and association. The qualities are set out in SHPD administrative rule §13–275–6, *Evaluations of Significance.*

significant See significance.

sondage A small, deep trench designed to expose a stratigraphic profile for investigation.

suitable dating material An identified sample of wood charcoal, selected to include short-lived species, twigs, or sapwood collected from a context that is in a clearly defined association with a confidently identified traditional Hawaiian cultural feature.

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Appendix F

Letter from State Historic Preservation Division

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

May 4, 2007

LOG NO: 2007.0906
DOC NO: 0704amj14
Archaeology

Dr. Tom Dye
T.S. Dye & Colleagues, Archaeologists, Inc.
735 Bishop Street, Suite 315
Honolulu, HI 96813

Dear Dr. Dye:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Inventory Survey of a Residential Parcel on Kahala Avenue
Waikīkī Ahupua'a, Kona District, Island of O'ahu
TMK: (1) 3-5-003:008, 009 & 010

Thank you for the opportunity to review the aforementioned document, which we received on March 16, 2007. The report describes an archaeological inventory survey conducted at three contiguous, ocean-front parcels to be developed with residential structures.

No new historic properties were documented during the survey, which consisted of twenty (20) shovel test units and 24 m^2 in areal excavation, in addition to fifty-one (51) shovel test units excavated earlier by PCSI, Inc. (Collins and Clark 2006). Site 50-80-14-5320, consisting of the re-interred human remains of three (3) individuals discovered during previous construction on the parcel in the 1990s, was rediscovered by a combination of backhoe and hand-excavation.

You have recommended, prior to any future construction on parcel 8, that a plan to protect Site 5320 during construction must be developed and approved by our office. You have also recommended that plans to stabilize the existing seawall will have no effect on historic properties. We concur with both of these recommendations.

The report is accepted in fulfillment of §13-276, HAR, in accordance with §13-284, HAR.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

amj:

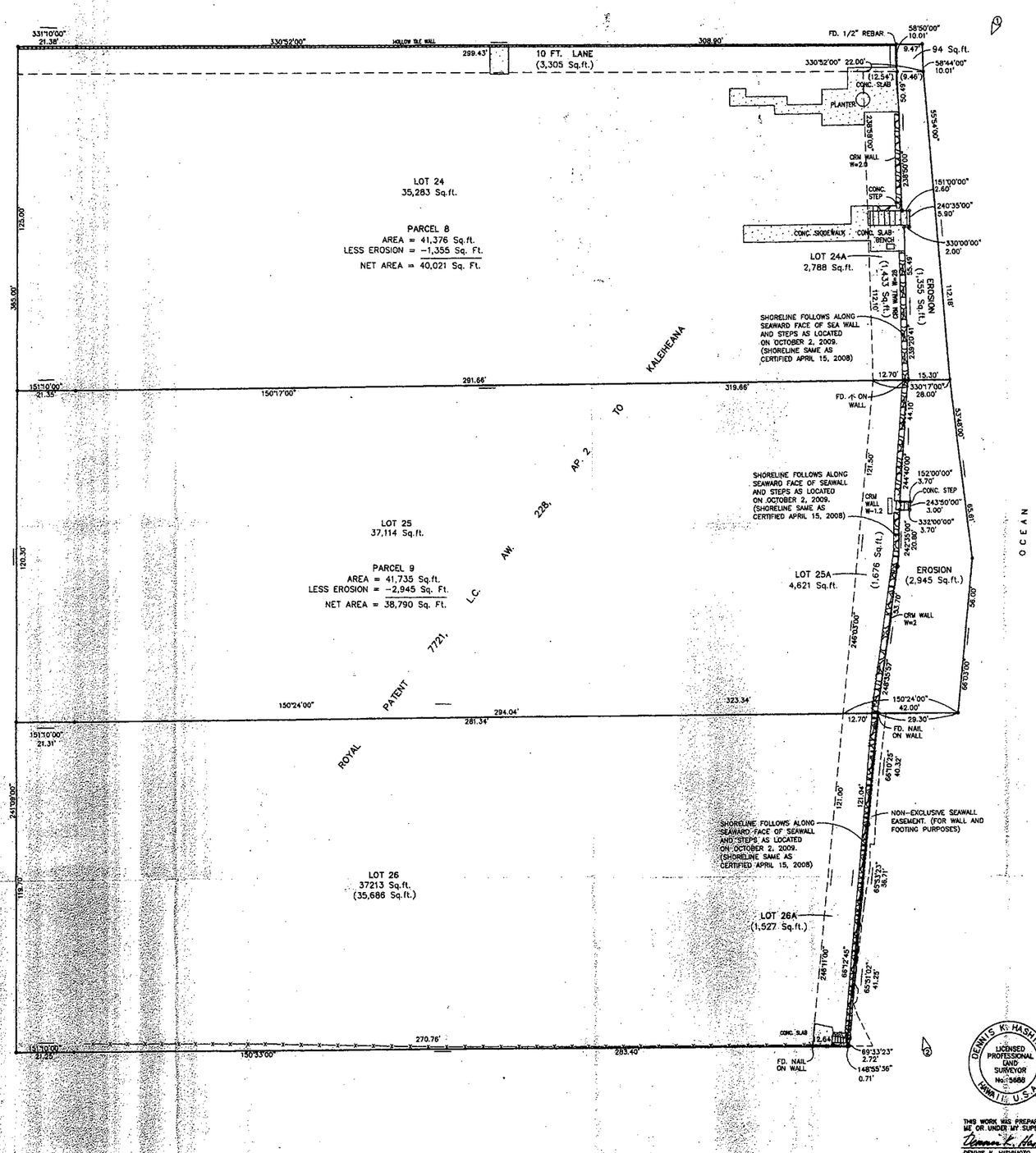
Appendix G

Certified Shoreline

The shoreline as delineated in red is hereby certified as the shoreline as of
APR - 1 2010

Chairperson, Board of Land and Natural Resources

N
TRUE NORTH
1" = 20'



DENNIS K. HASHIMOTO
LICENSED PROFESSIONAL LAND SURVEYOR
No. 5688
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

DENNIS K. HASHIMOTO
EXPIRATION DATE: 4/30/08

10 40
0 20 60

SHORELINE SURVEY
LOTS 24 & 24A, 25 & 25A, & 26 & 26A OF THE KAHALA SUBDIVISION
R.P. 7721, L.C. Aw. 228, Ap. 2 TO KALEIHEANA
At Kahala, Honolulu, Oahu, Hawaii
Tax Map Key: 3-5-03:08, 09, & 10
Date: OCTOBER 2, 2009
Address: 4433, 4423, & 4415 Kahala Avenue
Owner: WF Coastal Properties, LLC
Fied Book: 411:54, 440:54, & Data collector
Job #03677

Appendix H

Coastal Engineering Evaluation Report

Coastal Engineering Evaluation for 4415 Kahala Avenue TMK: 3-5-059:10

Barham Trust

January 2006

Prepared for:

PlanPacific, Inc.
345 Queen Street, Suite 802
Honolulu, HI 96813

Submitted by:

Sea Engineering, Inc.
Makai Research Pier
Waimanalo, Hawaii 96795

#5-78

Table of Contents

List of Figures

COASTAL ENGINEERING EVALUATION
FOR
4415 KAHALA AVENUE

1.0 INTRODUCTION

This coastal engineering assessment has been prepared as part of a project to repair a seawall fronting a shoreline lot in Kahala on the south shore of Oahu. The project site is located east of Diamond Head at 4415 Kahala Avenue, between Elepaio St. and Kala St. Three adjacent properties at 4415, 4423, and 4433 Kahala Avenue (TMK 3-5-059, parcels 10, 9, and 8, respectively) are proposed for development. Although similar protective seawalls front all three properties, repairs are necessary at only the western-most lot (parcel 10). The regional location of the project is shown in Figure 1-1. Figures 1-2 and 1-3 are aerial photographs of the site.

The project site is approximately one mile east of Diamond Head Beach Park, and approximately 1,000 feet east of the Black Point Peninsula. The lots are located on Kahala Beach, a 2-mile reach bordered by Black Point on the west and Wailupe Peninusla on the east. While much of Kahala Beach has a narrow sand beach, the western portion, including the project site, has only isolated sandy areas, and is mostly characterized by bare reef and rocks fronting the properties. All of the properties in the region are fronted by seawalls. Figure 1-4 is a photograph of the project reach at 4415 Kahala Avenue. The seawall fronting the property is 12 to 36 inches lower than adjacent walls. Figure 1-5 shows the general deterioration that has occurred behind the wall due to erosion of back fill material. The back fill probably leaked out through voids at the base of the wall.

A typical section for seawall repair is shown in Figure 1-6. Repairs vary somewhat at different sections of the wall, however all construction for the repairs will take place on the landward side of the wall.

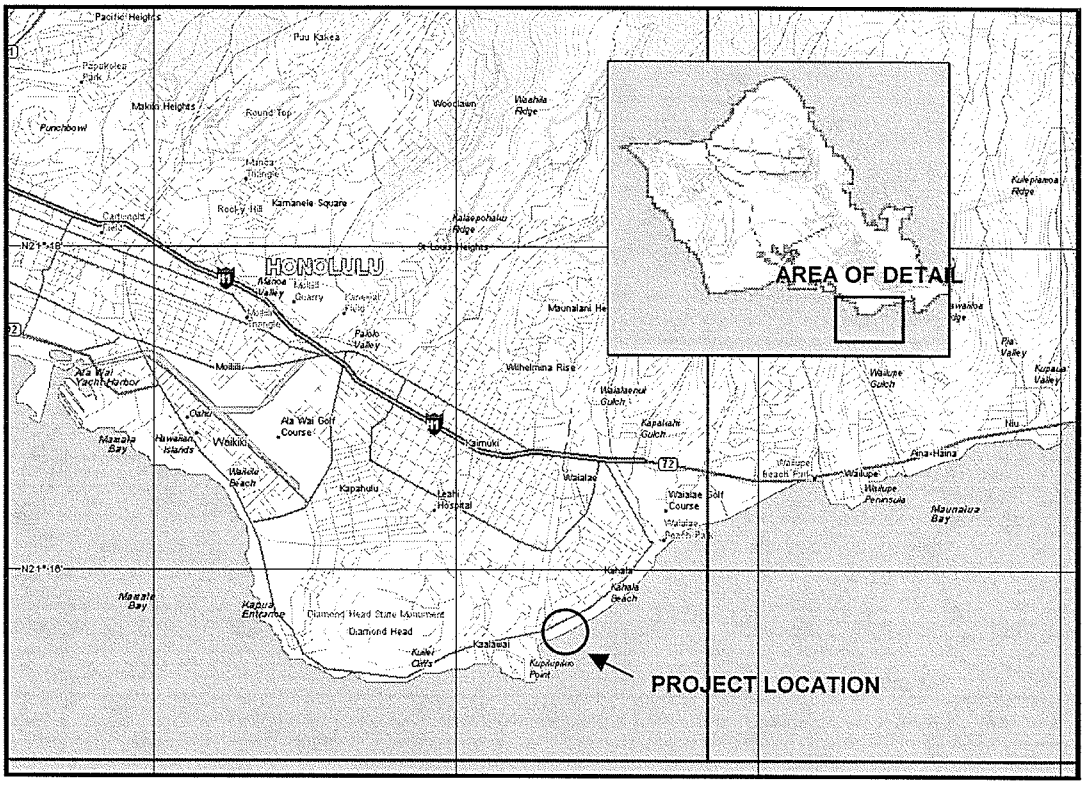


Figure 1-1. Project Location on the island of Oahu

Figure 1-2. Aerial Photograph of the Project Site (1)

Figure 1-3. Aerial Photograph of Project Site (2) showing the project reach and profile locations (from Google Earth)

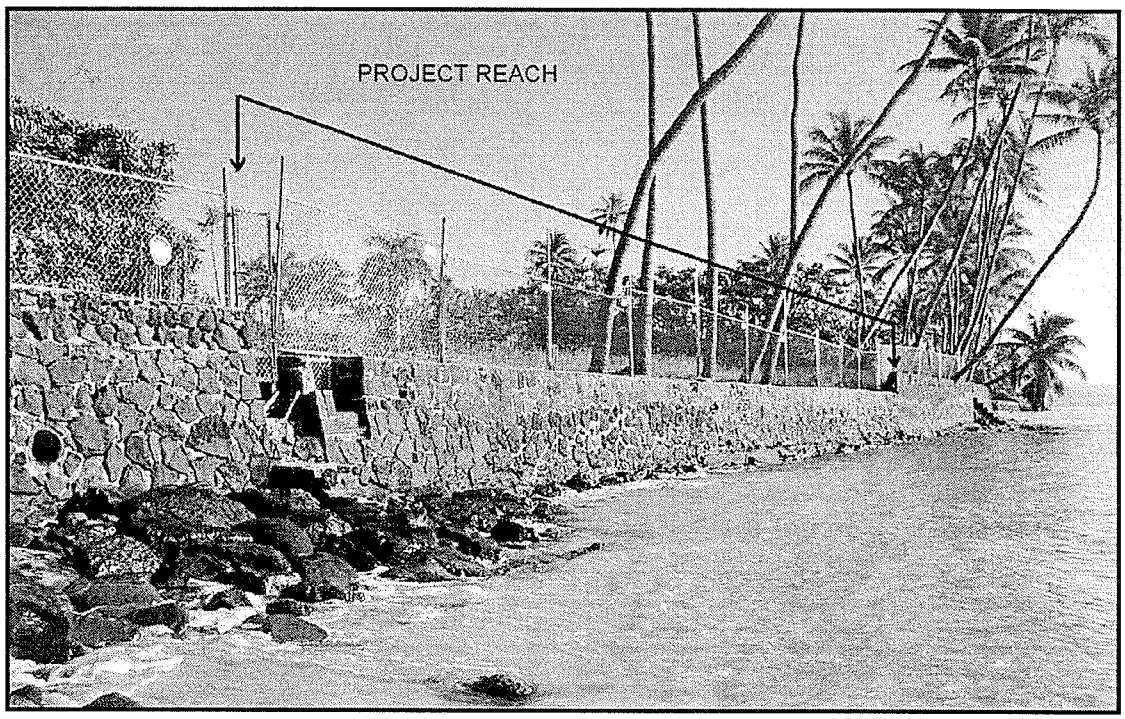


Figure 1-4. Project Reach

Figure 1-5. Sinkhole formation behind the seawall

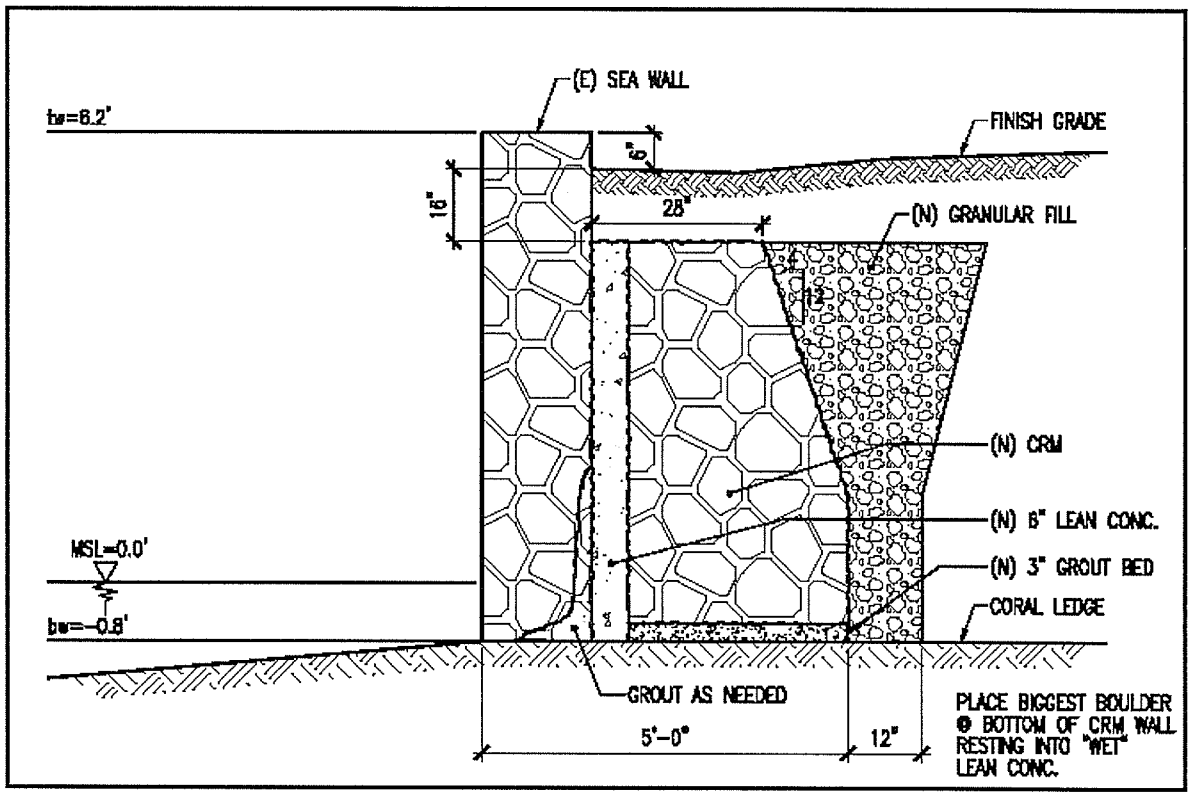


Figure 1-6. Typical seawall repair (*N* indicates new work)

2.0 SITE INVESTIGATIONS

2.1 Shoreline Description

The project shoreline is characterized by a wide fringing limestone reef flat over 850 feet in width. The reef flat widens to about 1500 feet at the eastern end of Kahala Beach. The shoreline is hardened by protective seawalls for at distance of at least 1000 feet on either side of the project site. Very little sand has accumulated along the shore in this area, existing as small pockets that are mostly covered during higher tide levels. Although public rights of way allow access to the beach, without sand cover the substrate in front of the seawalls and out on the reef flat is difficult to negotiate without protective foot wear. A storm drain exits the Elepaio Street public access, about 200 feet west of the project site. Traces of the excavation across the reef flat for the drain can be seen in Figure 1-3. However, at present the drain outlet is at the shoreline as the previous configuration was prone to clogging with sand.

Figure 2-1 is a photograph looking west toward Black Point from a point between the project site and the Elepaio Street public beach access. All properties in the vicinity are fronted by vertical or near-vertical seawalls. Sand areas are sparse and of limited extent. Basalt boulders and

cobbles exist intermittently in this area – they are probably derived from the lava flow that forms the headland at Black Point.

Figure 2-2 is a photograph looking east from the project site along Kahala Beach. The substrate here is extremely difficult to walk on without footwear. Again all properties in view are fronted by shore protection structures.

No appreciable sand deposits were observed onshore or offshore during the site visit. In general, there appears to be very little sand available in the region for beach building processes.

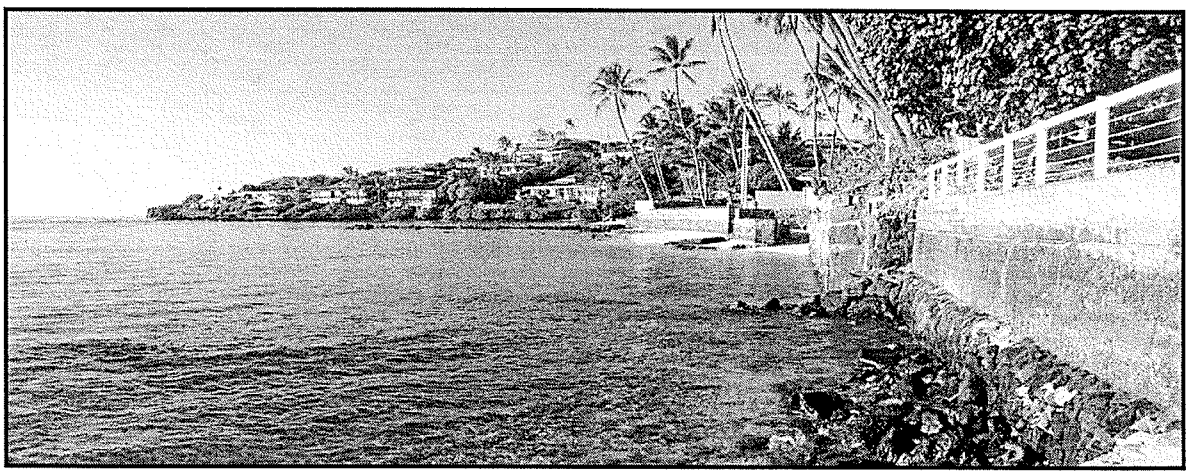


Figure 2-1. View looking west toward Black Point

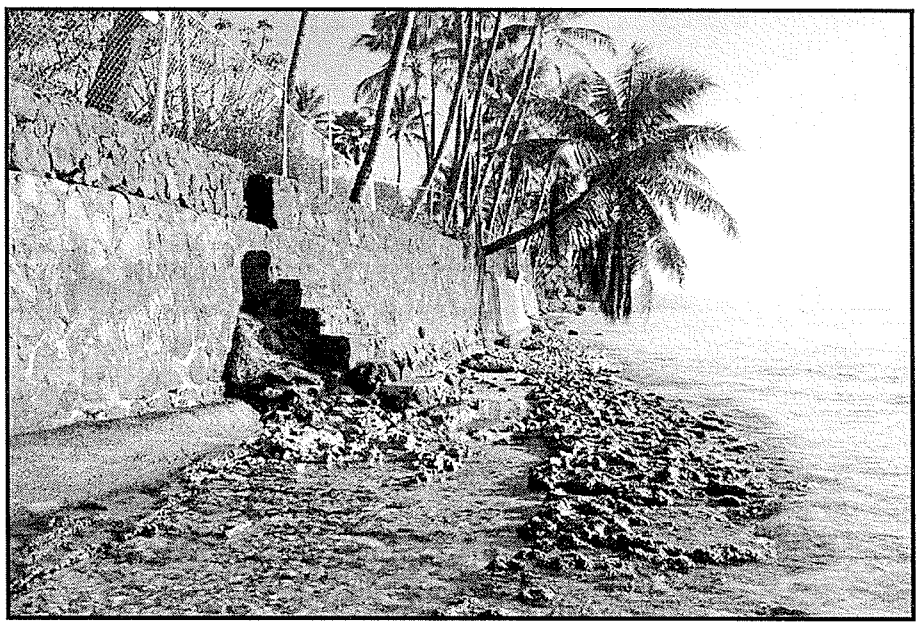


Figure 2-2. View looking east from the project site.

2.2 Beach Profiles

Three beach profiles were taken at the project site, at either end and at the middle of the property shoreline, extending 200 feet offshore. The locations of the profiles are shown in Figure 1-3. The profiles are shown in Figure 2-3. All profiles are similar, showing a near vertical seawall with an elevation just over 6 feet msl, some form of hard rock adjacent to the wall, a short sandy section less than 50 feet in width, and a wide expanse of limestone reef without appreciable elevation change. The sand is typically a few inches or less in thickness. The limestone reef flat has a typical relief less than 0.5 feet. Some areas in the reef flat appear to have been excavated on the order of 1 foot. These areas can be seen in the aerial photographs (e.g. Figure 1-3) and are often delineated by straight excavation edges and corners. The reef flat elevation is typically about –1.5 feet msl 50 feet offshore, and grades to about -2.5 feet at 200 feet offshore.

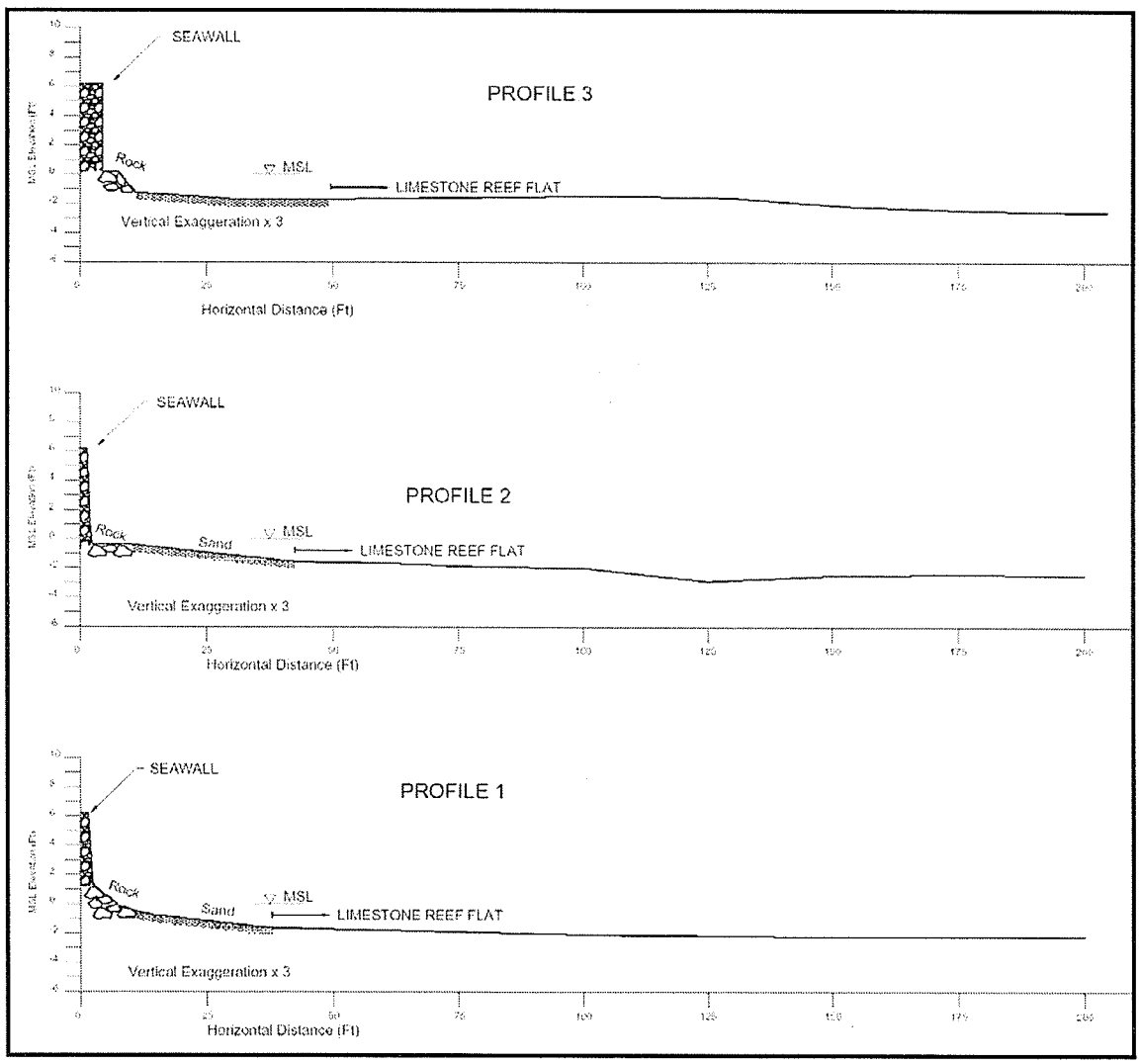


Figure 2-3. Beach profiles

2.3 Shoreline History

Hwang (1981) used historical aerial photograph analysis to assess shoreline change around Oahu, based on movement of the vegetation line between 1949 and 1979. Sea Engineering, Inc. (1988) updated Hwang's work through 1988 for the City and County Department of Land Utilization (now Department of Planning and Permitting). Transect locations from the 1988 SEI study are shown in Figure 2-4. Transect data are shown in Figure 2-5.

The SEI study shows transects on either side of the project site. Transect 5, west of the site, showed a net erosion of 8 feet between 1949 and 1988. Transect 4, east of the site showed a net accretion of 3 feet during the same time period. There does not appear to have been a statistical regional trend of erosion or accretion during the study period at the west end of Kahala Beach, although the prolific seawall construction indicates a probable erosion hazard.

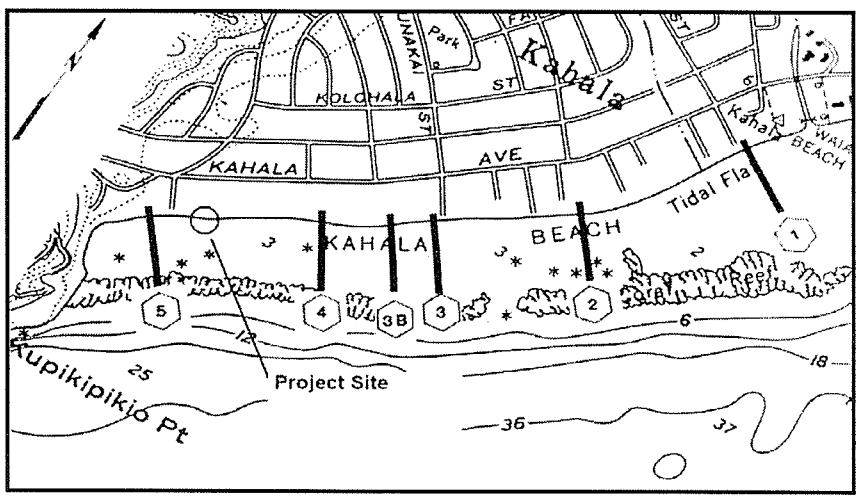


Figure 2-4. Erosion study transect locations (SEI 1988)

Table 26 - Kahala Beach. Changes in the Vegetation Line in Feet.

	Transect Number					
Observation Period	**1**	**2**	**3**	**3B**	**4**	**5**
Feb 16, 1949 - Jan 20, 1961	12	14	0	*	*	*
Jan 20, 1961 - Aug 29, 1967	3	16	2	*	0[1]	-2[1]
Aug 29, 1967 - Jan 04, 1971	-4	-26	0	*	2	-3
Jan 04, 1971 - Apr 13, 1975	-11	27	9	*	1	1
Apr 13, 1975 - Feb 02, 1988	21	-20	3	-20	0[2]	-4
Net Change - Vegetation Line	21	11	14	-20	3	-8
Range - Vegetation Line	21	31	14	20	3	8

* *No Data*
[1] *Change from 1949 - 1967*
[2] *To seawall*
Net change is the total change in the position of a beach index line between the earliest and most recent observation year
Range is the difference between the observed extremes in the position of a beach index line.
Transect locations and historical data from Hwang, Table 36

Figure 2-5. Transect data

2.4 Biology

The following description of the flora and fauna on the fringing reef flat off Kahala Beach is from Aecos (1979:

> The inner reef flat off Kahala Beach is dominated by algae, which cover around 40% of hard bottom areas. Seventeen species are noted, with *Acanthophora spicifera, Dictypta acutiloba, Dictoyota Liagora* (sp.), and *Lyngbya majuscula* most abundant. *Halimeda discoidea, Liagora* (sp.), *Hypnea cervicornis,* and *Laurencia* (sp.) are common. Two of the more popular edible seaweeds, *Gracilaria burspastoris* and *G. coronipifolia*, occur in low abundance. Corals contribute less than one percent bottom cover, although coral cover increases and algal cover decreases seaward across the reef. *Pocillopora damicornis* is the most commonly encountered species. Only eight species of fishes are recorded on the shallow ref platform. *Stethojulis balteata* and *Acanthurus triostegus* are the most often encountered species. Large fishes, especially surgeonfishes, are abundant along the reef face. Seaward of the reef margin, coral cover reaches 30%, with *Porites lobata* the dominant form present.

2.5 Coastal Use

Despite the inhospitable substrate, the reef flat fronting Kahala Beach is used by wading fishermen, seaweed collectors, and spearfishermen. There are surfing breaks at the edge of the reef flat in the general vicinity (at Black Point and Hunakai Road), but not directly off the project site. The area in front of the project site is not used for sunbathing or swimming as there is no sand beach and the water is shallow.

3.0 OCEANOGRAPHIC SETTING

3.1 General Description

Kahala Beach is located on the south shore of the island of Oahu. It is primarily a residential area, with one beach front hotel, the Kahala Mandarin, located approximately one mile east of the project site. The region is a relatively flat coastal plain, elevated approximately 6 to 8 feet above mean sea level (MSL) at the shoreline. Kahala Beach is separated from the beaches in the vicinity of Diamond Head by the rocky peninsula of Black Point. Also known by the Hawaiian name *Lae o Kupikipiki o*, Black Point is a headland formed by a relatively young basaltic lava flow.

3.2 Oceanographic Conditions

Wind

The prevailing winds are the northeast tradewinds, which wrap around the east side of the island and blow side-onshore in the project area. The tradewinds are typically present 80 percent of the time during the summer season from April to November, with wind speeds of 10 to 20 mph. During the winter months there is a general weakening of the tradewind system and the

occurrence of southerly and westerly winds (Kona winds) due to both frontal systems passing through the islands and local low-pressure systems.

Waves

The general Hawaiian wave climate can be described by four primary wave types: 1) tradewind waves generated by the prevailing northeast winds; 2) North Pacific swell produced by mid-latitude low pressure systems; 3) southern swell generated by mid-latitude storms of the southern hemisphere; 4) Kona storm waves generated by local low pressure storm systems. In addition, the islands are affected by waves generated by nearby tropical storms and hurricanes.

Tradewind waves occur throughout the year, but the other wave types have seasonal distributions. North Pacific swell and Kona storm waves typically occur from October through March during the northern hemisphere winter. Conversely, southern swell typically occurs from April through September during the southern hemisphere winter. Hurricanes and tropical storms are also summer and fall phenomena. The project coastline faces south-southeast and is directly exposed to southern swell and Kona storm waves. The site is obliquely exposed to tradewind waves that wrap around the island from the east, and completely sheltered by the island from most north Pacific swell.

Tradewind waves result from the strong and steady tradewinds blowing from the northeast quadrant over long fetches of open ocean. Typical deepwater tradewind waves have periods of 5 to 10 seconds and heights of 3 to 10 feet.

Southern swell is generated by storms in the southern hemisphere and is most prevalent during the summer months. These waves are typically long and low, with periods of 12 to 20 seconds and deepwater wave heights of 2 to 6 feet. Southern swell is fairly common, occurring nearly 25 percent of the time during a typical year. They approach the Kahala area directly, and represent the greatest source of wave energy reaching the project site.

Kona storm waves occur at random intervals during the winter months, and approach from the sector south through west. The site can therefore be directly exposed to this wave type. Some winter seasons have several Kona storms; others have none. Wave heights are dependent upon the storm intensity, but deepwater heights can exceed 15 feet.

The infrequent offshore passage of hurricanes can generate large waves that affect the west coast of Hawaii. Many recorded tropical storms and hurricanes have approached the Hawaiian islands during the past 35 years. Most of these storms passed well to the south of the islands, but there have been notable exceptions. Hurricane Nina (1957) passed within 200 miles of the islands, Dot (1959) passed over Kauai, Iwa (1982) passed within 30 miles of Kauai, and Iniki (1992) passed directly over Kauai. These hurricanes generated waves that affected the entire island chain. For example, although the largest waves from Hurricane Iwa directly impacted Kauai, the estimated deepwater wave height off the west coast of Hawaii was 14 feet. In the event that a large hurricane passes near the coast, model hurricane scenarios predict deepwater wave heights over 30 feet.

Nearshore Wave Heights
As deepwater waves propagate toward shore, they begin to encounter and be transformed by the ocean bottom. The process of *wave shoaling* generally steepens the wave and increases the wave height. The phenomenon of *wave refraction* will cause wave crests to bend and may locally increase or decrease the wave heights. *Wave breaking* occurs when the wave profile shape becomes too steep to be maintained. This typically occurs when the ratio of wave height to water depth is about 0.8, and is a mechanism for dissipating the wave energy.

The wide and shallow fringing reef flat that fronts Kahala Beach forces larger waves to break far offshore. The waves that reach the shoreline are limited by the water depth, so that larger waves will reach the shoreline during high water level conditions.

Tides
The tides in Hawaii are semi-diurnal with pronounced diurnal inequalites; i.e. two tidal cycles per day with unequal water level ranges. The following tide levels have been established for the Honolulu area by the National Ocean Service:

Tide Level	Feet (MSL)
Highest Water (2/14/1967)	2.4
Mean Higher High Water	0.9
Mean Sea Level	0.0 (Reference Datum)
Mean Lower Low Water	-0.8
Lowest Water (4/30/1911)	-2.2

Hurricanes
Tropical cyclones originate over warm ocean waters, and they are considered hurricane strength when they generate sustained wind speeds over 64 knots (74mph). Hurricanes form near the equator, and in the central North Pacific usually move toward the west or northwest. During the primary hurricane season of July through September, Hurricanes generally form off the west coast of Mexico and move westward across the Central Pacific. These storms typically pass south of the Hawaiian Islands, and sometimes have a northward curvature near the islands. Late season hurricanes follow a somewhat different track, forming south of Hawaii and moving north toward the islands. Two hurricanes have actually passed through the Hawaiian islands in the past 25 years: hurricanes Iwa in 1982, and Iniki in 1992, both passing near or over the island of Kauai. These storms caused high surf and wave damage on the south and west shores of all the islands.

The *Windward Oahu Hurricane Vulnerability Study* (Sea Engineering, 1990) indicates that a theoretical model hurricane approaching from the south to southwest could result in deepwater waves 34 feet high with periods of 13 seconds.

Still Water Level Rise
Storms and large waves produce storm surge and wave setup that results in elevated water levels at the shoreline. During prevailing, annual conditions this water level rise can be on the order of a foot above the tide level. However, during extreme events, the still water level rise can be

significantly greater. During Hurricane Iniki, water level in Honolulu Harbor rose approximately 1.5 feet above normal levels. An extreme wave condition can raise the water level on the order of 2.5 feet or more.

Tsunami

The south shore of Oahu area was inundated by the tsunamis of 1946, 1952, 1957, and 1960 with flood heights of 5, 3, 4, and 6 feet, respectively (Loomis, 1976). These measurements were off the Aina Haina area, about 3 miles east of the project site.

4.0 ALTERNATIVES CONSIDERED

Alternatives to the proposed seawall repair include no action, beach nourishment, a sloping rock revetment, geotextile sand-filled bags, or reconstruction and reinforcement of the existing wall.

4.1 No-Action

The no-action alternative would result in the gradual deterioration of the existing seawall. Sinkhole expansion will gradually undermine the wall, and may ultimately result in structural failure. No-action would have no appreciable effect on the beach environment until eventual failure of the wall, although back fill material will gradually leak out into the nearshore area. If allowed to occur, failure of the wall would cause erosion of the project shoreline, endanger adjacent properties, and would scatter debris along the shoreline. During high wave events the erosion would be particularly severe, and cause high turbidity in the nearshore waters.

4.2 Beach Nourishment

There appears to be a general lack of sand both at the shoreline and offshore at the project site. With sand available, it is possible that beaches would form naturally in the area. However, sand placed locally on the beach at the project site would be part of a large regional system, and would probably not stay in place unless accompanied by groin structures to minimize movement. Beach nourishment in this area is conceivable only on a grand scale as part of a larger regional effort.

Finding an appropriate source of beach sand has become a major problem for beach nourishment projects in the Hawaiian Islands. Sand from fossil dunes is presently available from the island of Maui, however it is fine-grained and only appropriate on sheltered beaches.

Beach nourishment is therefore not a practical solution for the project.

4.3 Revetment

A revetment is a sloping, un-cemented structure built of wave resistant material. The most common method of revetment construction is to place an armor layer of stone, sized according to the design wave height, over an underlayer and filter designed to distribute the weight of the armor layer and to prevent loss of fine shoreline material through voids in the revetment. Properly designed and constructed rock revetments are durable, flexible, and highly resistant to wave damage. One major advantage of revetments is that the rough porous rock surface and relatively flat slope of the structure will tend to absorb wave energy, reduce wave reflection, and help to promote accretion of sand on a sandy beach.

Revetments in Hawaii are typically built on a 1.5-2 horizontal to 1 vertical slope to ensure stability. Conditions at the project site would call for a revetment to extend from about +7 feet to about –1 foot. This would require a horizontal footprint of about 12 feet.

A rock revetment would require demolition of the existing sea wall and would require excavation into the limestone substrate for placement of the revetment toe. A sloping revetment would have to be inset into the property, causing loss of useable land, and would be difficult to interface with adjacent vertical structures.

4.4 Sand Bags

In recent years, the state and counties have granted permission for property owners to place large geotextile sandbags (*Seabags*) on the beach fronting their property as emergency measures to prevent erosion. While they are expedient, they are several reasons why they are not appropriate here:

- They are aesthetically un-pleasing.
- They become slippery with algae growth under repeated inundation and are therefore hazardous.
- They are difficult to fill and place, especially in the quantity needed at this site.
- Like a revetment, they need to be stacked on a slope, and would therefore require a broad footprint.
- They are susceptible to vandalism and are, at best, a temporary solution.

Placing bags in front of the existing wall would require encroachment on State land.

4.5 Preferred Alternative, Seawall Repair

A seawall is a vertical or sloping concrete or concrete-rock-masonry wall used to protect the land from wave damage and erosion. A seawall, if properly designed and constructed, is a proven, long lasting, and relatively low maintenance shore protection method. Seawalls also have the advantage of requiring limited horizontal space along the shore. Seawalls are not flexible structures, and their structural stability is dependent on the stability of their foundations. Seawalls adjoin the project site on both sides.

Seawalls tend to reflect incoming waves rather than absorb them. This characteristic makes them a less attractive erosion solution on many sandy shorelines as the reflected waves can scour the sand in front of the walls. However, it appears that the lack of sand at the project site is a regional problem and is not a direct result of the presence of seawalls.

Repair of the existing seawall is the preferred alternative. Except for beach nourishment, all alternatives considered result in shoreline hardening. Beach nourishment is a realistic option only if undertaken as a joint project by the larger community. Repairs to the existing seawall will not change the existing environment, and is the least invasive option of all the solutions considered.

5.0 PROJECT IMPACTS

Impacts are addressed in terms of the following significance criteria as presented in *A Guidebook for the Hawaii State Environmental Review Process*, prepared by the State Office of Environmental Quality Control, 1997.

(1) *"Irrevocable commitment to loss or destruction of any natural or cultural resource."* There is no significant flora or fauna which would be lost due to repair of the seawall. No threatened or endangered species would be impacted by the project. No known cultural resources are located on the property.

(2) *"Curtails the range of beneficial uses of the environment."* There will be no impact on public access to the shoreline. There will be no significant change in lateral access along the shore. There will be no impact to fishing on the reef flat seaward of the project site.

(3) *"Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS."* State waters will not be impacted by the project in any way.

(4) *"Substantially affects the economic or social welfare of the community or state."* The project would have no adverse social or economic impact to the state. The seawall will have some positive economic impact to the applicant by preventing erosion and loss of land.

(5) *"Substantially affects public health."* The project has no adverse public health impacts.

(6) *"Involves substantial secondary impacts."* The project will have no impact on public services or facilities.

(7) *"Involves a substantial degradation of environmental quality."* The project will have no significant adverse environmental impacts nor will it degrade environmental quality. It will not degrade water quality, nor impact marine flora and fauna. The proposed seawall is visually consistent with the existing protected shore on both sides of the project site.

(8) *"Has cumulative impacts."* The seawall would be a stand-alone project, with no cumulative impacts or commitment for larger actions.

(9) *"Substantially affects a rare, threatened, or endangered species or it habitat."* The affected environment will be unchanged by the project.

(10) *"Detrimentally affects air or water quality or ambient noise levels."* No debris, petroleum products, or other construction-related substances or materials will be allowed to flow, fall, leach or otherwise enter the coastal waters. All construction material will be free of contaminants or pollutants. Best Management Practices will be adhered to during construction to minimize environmental pollution and damage. There will be some

additional noise above ambient during construction resulting from equipment operation (trucks, back hoe, concrete operations).

(11) *"Affects or is likely to suffer damage by being in an environmentally sensitive area such as a flood plain, tsunami zone, beach or erosion prone area, or coastal waters."* The seawall may be subject to prevailing wave conditions at the shoreline, particularly during summer season high surf or Kona storms. The seawall will provide erosion and storm wave protection.

(12) *"Substantially affects scenic vistas and viewplanes identified in county or state plans or studies."* Project site scenery will remain unchanged.

(13) *"Requires substantial energy consumption."* No significant energy would be expended by construction of the revetment, nor would it entail any long-term commitment to energy use.

6.0 REFERENCES

AECOS, Inc., 1979, *Oahu Coral Reef Inventory*, prepared for the U.S. Army Corps of Engineers, Pacific Ocean Division, Fort Shafter, Hawaii.

Hwang, Dennis, 1981, *Beach Changes on Oahu as Revealed by Aerial Photographs*, Hawaii Institute of Geophysics, University of Hawaii.

Loomis, Harold G., 1976, *Tsunami Wave Runup Heights in Hawaii*, Hawaii Institute of Geophysics, University of Hawaii.

Sea Engineering, Inc., 1989, *Oahu shoreline Study, Part 1, Data on Beach Changes (1988),* prepared for City and County of Honolulu, Department of Land Utilization.

Sea Engineering, Inc., 1990, *Windward Oahu Hurricane Vulnerability Study – Determination of Coastal Inundation Limits*, prepared for the State of Hawaii, Civil Defense and the U.S. Army Corps of Engineers, Honolulu Engineer District.

Appendix I

Comments to the Draft EA and Responses

LIST OF COMMENT LETTERS TO THE DRAFT EA

Agency/Organization	Date of Letter	Date of Response Letter	Date of Addendum Letter
City and County of Honolulu, Dept. of Planning and Permitting	4/7/06	4/22/10	NA
Office of Hawaiian Affairs	4/5/06	2/11/10	4/22/10
State of Hawaii, Dept. of Land and Natural Resources, Historic Preservation Division	4/3/06	1/13/10	4/22/10
State of Hawaii, Office of Environmental Quality Control	4/13/06	4/18/06	4/20/10
State of Hawaii, Land Use Commission	3/6/06	2/8/10	4/22/10
U.S. Army Corps of Engineers	4/6/06	2/11/10	4/28/10
Waialae/Kahala Neighborhood Board No. 3	4/7/06	2/8/10	4/22/10

Copies of the comment letters, responses, and follow-up letters begin on the next page and follow the order set in the table above.

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4432 • FAX: (808) 527-6743
DEPT. INTERNET: www.honoluludpp.org • INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

(AM)

April 7, 2006

Mr. Chris Pramoulmetar
Plan Pacific, Inc.
345 Queen Street, Suite 802
Honolulu, Hawaii 96813

Dear Mr. Pramoulmetar:

Re: Chapter 343, Hawaii Revised Statutes (HRS)
Draft Environmental Assessment (DEA)
Project Name: Barham Trust Shoreline Setback Variance
File No.: 2006/ED-3
Location: 4433, 4423 and 4415 Kahala Avenue - Kahala
Tax Map Key: 3-5-3: 8, 9 and 10

We are forwarding comments from the State Land Use Commission, State Historic Preservation Division, and Waialae/Kahala Neighborhood Board No. 3 regarding the subject draft environmental assessment (DEA). Please respond directly to the commenter, and include all comment letters and responses to the letters in the final environmental assessment.

In addition, enclosed herein are the Department of Planning and Permitting's comments on the DEA.

Department of Planning and Permitting:

1. Section 1, Project Summary, page 1: This section should indicate that the Environmental Assessment (EA) has been prepared in compliance with the Environmental Impact Statement (EIS) regulations of Chapter 343, Hawaii Revised Statutes. Also, the Final EA should state that the subject property is within a Lower-Density Residential area on the Primary Urban Center Development Plan (PUC DP, June 2004) Land Use Map (PUC-East). It should also be noted that the subject property's current DP land use designation is not a site-specific designation, but rather an illustration of text policies. Please include and list the agent of the project in this section.

2. Section 2.1, Site Description and Background, page 2: Please reconcile the discrepancy between the total lot area indicated in the assessment (i.e., 115,902 square feet) and the City's computation and tax map, which indicate that the total area of the three (3) lots is 120,319 square feet (41,376 square feet for Parcel 8; 41,730 square feet for Parcel 9 and 37,213 square feet for Parcel 10).

3. Section 2.1, Site Description and Background, page 2: Please clarify how Conditional Use Permit No. 2005/CUP-65, which was approved on September 12, 2005 to jointly develop parcels 8, 9 and 10, will be amended. Ordinarily, construction of three dwellings on a single, residential-zoned lot in the Special Management Area (SMA) is not permitted without the approval of a cluster housing permit or site development plan, park dedication, and SMA use permit (major).

4. Section 2.1, Site Description and Background, page 2: The temporary chain-link fence may qualify for a Minor Shoreline Structure (MSS) permit provided that it does not exceed six (6) feet in height and its individual post foundations are no more than four (4) inches in diameter or width. A site plan showing the location of the fence relative to the shoreline, and elevation and cross-section drawings will be required. The MSS permit may be processed concurrently with the SV application.

5. Section 2.2.2, Various Improvements, page 4: Is there a landscape plan that shows improvements within the 40-foot shoreline setback area? Will grading and/or grubbing work be required for the landscape improvements and other structures within the shoreline setback area?

6. Section 2.2.2, Various Improvements, page 4: Clarify whether the new 7.5-foot high rock wall is protecting a cut and/or contains a fill by providing scaled cross-section drawings that show existing and finished grades, and the new wall relative to the required yard and property line. Please be advised that a retaining wall that protects a cut and contains fill and exceeds a total of six (6) feet in height measured from the intersection of the wall and the existing or finish grade, whichever is lower, within the required yard, will require approval of a Zoning Adjustment pursuant to the Land Use Ordinance (Section 21-2.140, Revised Ordinances of Honolulu).

7. Section 3.1, Surrounding Area, page 5: Is there documentation to indicate when the adjacent seawalls were constructed, or that they were constructed at the same time as the seawalls on Parcels 8, 9 and 10?

8. Section 3.4, Water and Air, page 6: Please identify and discuss the measures (i.e., silt fencing) that will be undertaken to prevent discharge of materials into the environment. Discuss the impacts, if any, that drainage of the drywells and bath will have on the ocean environment.

9. Section 3.7, Flood Hazard, page 6: Please delineate the flood district boundary on a site plan and describe how the project will comply with the flood requirements.

10. Section 3.9, Historical/Cultural/Archaeological, page 7: This section should be revised to reflect comments from the State Historic Preservation Division.

11. Section 3.10, Recreational, page 7: The information in this section pertaining to the public beach right-of-way immediately adjacent to Parcel 8 is incorrect. The Draft EA identifies this right-of-way as Tax Map Key 3-5-3: 40. However, as shown in Figure 2 of the Draft EA, Parcel 40 has been dropped and is now part of Parcel 8. This suggests that the right-of-way is private and taxed with Parcel 8. Please clarify if this was part of a subdivision action and whether there is public access (i.e., agreement) across this strip of parcel that is part of Parcel 8. The Final EA should describe if access to the beach is presently available along the eastern edge of Parcel 8, and if so, how it will be affected by the proposed project. The closest public right-of-way to the east of the project site is Tax Map Key 3-5-3: 41 which is located makai of Kala Place. Please correct this section in the Final EA.

12. Section 3.11, Visual Resources, page 7: Please expand your discussion to include the impacts on scenic vistas as noted in the City and County's Coastal View Study.

13. Please expand on the three (3) standards of hardship criteria stipulated in ROH, Chapter 23-1.8(3)(A), ROH, to include all proposals. Discuss why it is not feasible to locate the drywells and shower bath outside of the shoreline setback. Has the applicant considered open-work metal or wood fencing as an alternative for the protection of his property? How does retention of and addition of a veneer to the side yard wall, as well as extending the concrete landing on Parcel 8, meet the criteria for granting a variance?

    If the stairs are being repaired at less than 50 percent of its replacement cost, then an SV will not be required for the repair work. A cost estimate will be required as evidence to show that the repair work does not exceed 50 percent of its replacement cost.

14. The SV application should include a current certified shoreline survey.

Should you have any questions, please contact Ann Matsumura of our staff at 523-4077.

Very truly yours,

Henry Eng, FAICP, Director
Department of Planning and Permitting

HE:cs
Encls.

cc: Barham Trust
Office of Environmental Quality Control

doc429209

PLANPACIFIC

April 22, 2010

Mr. David Tanoue, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

Dear Mr. Tanoue,

Chapter 343, Hawai'i Revised Statutes, Environmental Assessment
Project Name: WF Coastal Properties Shoreline Setback Variance
(formerly known as Barham Trust Shoreline Setback Variance
File No.: 2006/ED-3
Location: 4433, 4423 and 4415 Kahala Avenue, Kahala
TMKs: 3-5-003: 8, 9, and 10

In 2006, PlanPacific submitted a Draft Environmental Assessment (EA) on behalf of the property owner for proposed improvements to the shoreline setback area of the three contiguous shoreline parcels referenced above. The Draft EA was published in *The Environmental Notice* dated March 8, 2006 for public review and comments. Your department provided comments and forwarded comments from other agencies and organizations to us in a letter dated April 7, 2006.

Shortly after we received your comment letter, the then owner, Barham Trust, decided to sell the properties. Today, the current owner, WF Coastal Properties, LLC, is continuing the environmental review process in preparation for a Shoreline Setback Variance application. Consultation with your staff informed the project team that this continuance is acceptable. The proposed improvements within the shoreline setback area of the three properties have changed very little from those of the previous owner. The main component was the structural reinforcement of the deteriorating existing seawall on parcel 10. This has been expanded to include the structural reinforcement of the existing seawalls on parcels 8 and 9 as well, to the extent that such structural reinforcement is required, based on the structural condition of the seawalls on the respective parcels. The proposed method of reinforcement for all walls is similar to what was described for parcel 10 in the Draft EA.

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

A comparison of proposed improvements within the shoreline setback area between the 2006 proposal and the proposal today is listed on the following table.

2006 Proposed Improvements Described in the Draft EA	2010 Proposed Improvements
Parcel 10	
Create a new subterranean support structure for the existing seawall to prevent further undermining and eventual failure of the wall (See Wall Retrofit—Type I)	Same
Re-vegetation of the soil as soon as construction is completed	Same
Removal of 5 palm trees to enable construction of the proposed seawall improvement	Same
Removal of a concrete tile block landing	Same
Removal of a concrete pad	Same
Construction of a sidewall	Modified to open sideyard fence
Repair existing stairs incorporated into seawall	Same
Fortify existing deteriorating seawall (See Wall Retrofit—Type II)	Same
Parcel 9	
Removal of the stairs incorporated into the seawall. Fill opening to complete the seawall (See Wall Retrofit—Type V)	Same
--	Create a new subterranean support structure for the existing seawall to prevent further undermining and eventual failure of the wall (See Wall Retrofit—Type I)
--	Fortify existing deteriorating seawall (See Wall Retrofit—Type II)
Parcel 8	
Removal of a large concrete-like surface	Same
Removal of 2 observation decks and associated walkways	Same
Application of a moss rock veneer to the existing sidewall	Deleted. Existing fence/walls in the setback area will be demolished and replaced with a new sideyard fence
Installation of a footbath and shower pole	Deleted
Expansion of a concrete pad at top of seawall stairs	Deleted
Repair existing stairs incorporated into seawall	Same
--	Create a new subterranean support structure for the existing seawall to prevent further undermining and eventual failure of the wall (See Wall Retrofit—Type I)
--	Fortify existing deteriorating seawall (See Wall Retrofit—Type II)
--	Application of moss rock veneer to the existing seawall (See Wall Retrofit—Type IV)
All 3 Parcels	
Grading to improve drainage and flood hazard characteristics	Same
Add 2 drywells at the corner of parcels 8 and 10 to capture draining storm water	Deleted (drywells relocated to outside of the setback area)
--	Patch holes and fill cracks on existing seawalls
--	Install new open fence along the top of the seawalls
--	Wall Cap Repair (See Wall Retrofit—Type III)

Our responses to your letter addressing the Draft EA are in the order of your comments and as follows:

DPP Comment 1: *Section 1, Project Summary, page 1.*
Response: The information you recommend has been included in the Final EA.

DPP Comment 2: *Section 2.1, Site Description and Background, page 2.*
Response: The Final EA has been corrected.

DPP Comment 3: *Section 2.1, Site Description and Background, page 2.*
Response: It is our understanding that during the time between your comment letter and now, a new joint development application has been submitted and approved. The new joint development is for parcels 8 and 9 only.

DPP Comment 4: *Section 2.1, Site Description and Background, page 2.*

Response: The temporary chain-link fence will be removed and replaced with a metal open fence. We will apply for a Minor Shoreline Structure permit concurrently as you suggest.

DPP Comment 5: *Section 2.2.2, Various Improvements, page 4.*
Response: A landscape plan showing improvements within the 40-foot shoreline setback area is included in the Final EA. Grading and grubbing will be required for the proposed improvements.

DPP Comment 6: *Section 2.2.2, Various Improvements, page 4.*
Response: The new CRM fence wall is no longer a part of the proposed action.

DPP Comment 7: *Section 3.1, Surrounding Area, page 5.*
Response: We are not aware of any such documentation aside from DPP's Seawall Inventory. A review of available building permit files at the DPP file center yielded no documentation.

DPP Comment 8: *Section 3.4, Water and Air, page 6.*
Response: The drywells have been relocated outside of the shoreline setback area. The foot bath has been eliminated from the plan. The contractor will adhere to Hawaii Administrative Rules regarding clean air and clean water, maintain Best Management Practices, and secure permits, if required, from the Department of Health prior to construction activities in the shoreline area.

DPP Comment 9: *Section 3.7, Flood Hazard, page 6.*
Response: A new figure has been added to the Final EA that delineates the flood district boundary across all three parcels.

DPP Comment 10: *Section 3.9, Historical/Cultural/Archaeological, page 7.*
Response: An archaeological inventory survey was conducted by T.S. Dye & Colleagues, Archaeologists, Inc. and completed on March 7, 2007. The survey located and verified State burial site number 50-80-14-5320. Information about the existing burial, State Historic Preservation Division comments, and the archaeological inventory survey is included in the Final EA. The complete archaeological inventory survey report is included as an appendix in the Final EA.

DPP Comment 11: *Section 3.10, Recreational, page 7*
Response: Parcel 40 has been deleted as you point out. Research on parcel 40 reveals that it was a utility easement in favor on Hawaiian Electric Company, Inc. This utility easement was cancelled through the Cancellation of Grant of Easement recorded in the Bureau of Conveyances on October 26, 2005. The land underlying parcel 40 is part of parcel 8. There is no record that parcel 40 served as a public beach right-of-way. Corrections have been made to the Final EA.

DPP Comment 12: *Section 3.11, Visual Resources, page 7.*
Response: The City's Coastal View Study describes the area as "primarily residential in character and coastal views are limited to quick glimpses across a few coastal parks, at scenic lookout points or where the highway rises to climb over the Koko Head land form." It recognizes a significant road view "from Diamond Head Road in the area of the Diamond Head lookouts" and significant stationary views of the coast from the Diamond Head lookouts and the shoreline at Waialae Beach Park. These viewplanes will not be affected by the proposed project. This information has been added to the Final EA.

DPP Comment 13
Response: The plan has been changed to relocate the drywells outside of the shoreline setback area, to eliminate the shower bath entirely, and to use open-work metal fencing along the sides of the property. It has also changed in that it no longer proposes to expand existing concrete pads. A summary of changes is shown in the table on page 2:

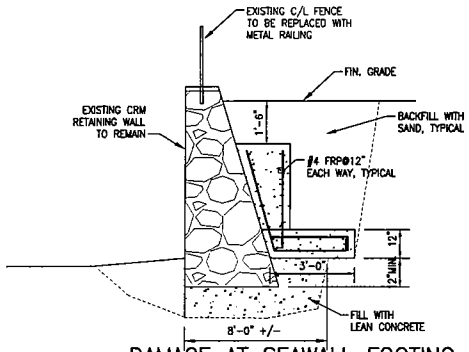
DPP Comment 14
Response: A current certified shoreline survey will be included in the variance application. An application for a new survey was submitted in November 2009 and approved as File No. OA-1338.

If you have further questions or concerns, please contact me at 521-9418 ext. 16. Thank you very much.

Sincerely,

Lisa L. Imata
Associate

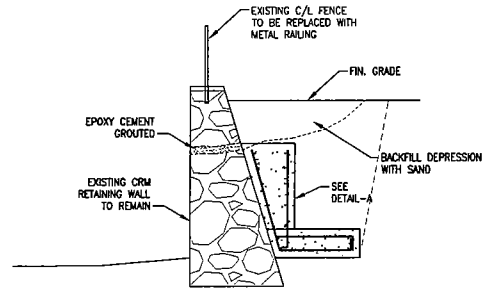
Enclosure



DAMAGE AT SEAWALL FOOTING

A WALL RETROFIT – TYPE I

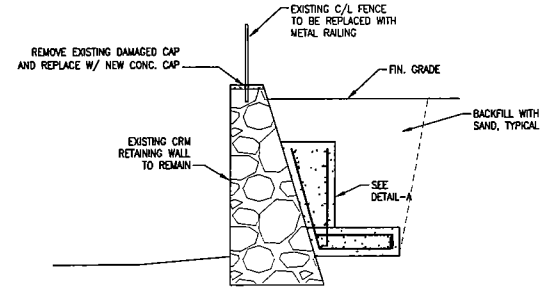
SCALE: 1/2" = 1'-0"



DAMAGE THRU SEAWALL

B WALL RETROFIT – TYPE II

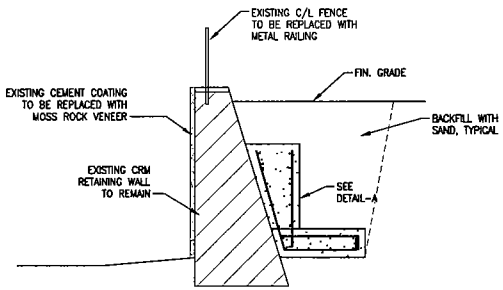
SCALE: 1/2" = 1'-0"



WALL CAP REPAIR

C WALL RETROFIT – TYPE III

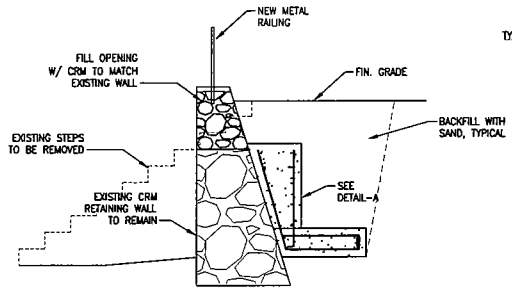
SCALE: 1/2" = 1'-0"



WALL FACE REPAIR

D WALL RETROFIT – TYPE IV

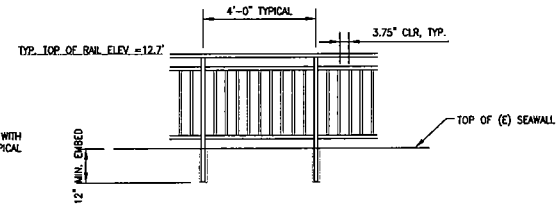
SCALE: 1/2" = 1'-0"



REMOVE STEPS

E WALL RETROFIT – TYPE V

SCALE: 1/2" = 1'-0"



F GUARDRAIL ELEVATION

SCALE: 1" = 1'-0"

NOTE TO CONTRACTOR:

1. CONTRACTOR IS RESPONSIBLE TO EXAM THE EXISTING SEAWALL CONDITION AND VERIFY ALL DAMAGE INCLUDING LENGTH AND SIZE OF THE EXISTING SEAWALL.

XIANG YEE LICENSED PROFESSIONAL ENGINEER No. 6373-S HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

SIGNATURE 4/26/2010 DATE

IMH ENGINEERING INC
Consulting Structural Engineer · Construction Management
1914 South King Street, No. 205 Honolulu, Hawaii 96826
Phone (808) 392-2388 Fax (808) 356-1328
E-Mail xiangyee@hawaiiantel.net or imh@hawaii.rr.com

PROJECT: SEA WALL RETROFIT
KAHALA AVENUE
HONOLULU, HAWAII

SHEET TITLE: TYPICAL SEAWALL REPAIR DETAILS AND SECTIONS

REV.	DATE	DESCRIPTION

DESIGNED BY XY
DRAWN BY CADD
CHECKED BY XY
PROJECT NO. 06149
DATE APRIL 6, 2010

SHEET No. S-4

OF SHEETS

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD06/2280

April 5, 2006

Henry Eng, FAICP
Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

ATTN: Ann Matsumura

RE: Request for comments on the Draft Environmental Assessment and Application to reinforce a 121-foot-long Concrete Rubble Masonry seawall, and other alterations within the Shoreline Setback for 4433, 4423, and 4415 Kahala Avenue; Kahala, O'ahu; TMKs: 3-5-003:008, 009, 010

Dear Henry Eng,

The Office of Hawaiian Affairs (OHA) is in receipt of your February 16, 2006, request for comments on the above project, which would allow Barham Trust to receive a Shoreline Setback Variance for the improvement of an existing, nonconforming seawall and other improvements within the Shoreline Setback Area. The applicant proposes to build three, new single-family dwellings within this lot, which is defined by three non-conforming seawalls, and for which shoreline certifications are pending. Because the main, existing wall does not extend to the solid substrate, the applicant seeks to reinforce the seawall from the mauka side to restrict any further subsidence. The applicant also seeks to demolish remnants of old structures. OHA offers the following comments.

Kahala is an active shoreline that is regularly used for public access and gathering rights, particularly fishing. Please note that Native Hawaiian traditional and customary gathering, access and use rights should not be restricted – even during the demolition and construction processes – except as necessary to ensure safety. If such safety-related restrictions are put in place, alternate access routes must be provided.

We would further request that best management practices be required for all ground disturbances within the shoreline to protect the nearshore resources from runoff and siltation. OHA does not generally support any construction in the shoreline, but understands that this is a pre-existing structure and that the Board of Land and Natural Resources has already approved a 55-year term, non-exclusive easement for the encroaching portions of the seawall. Provided that the only new construction is mauka of the existing encroachment, and is only to preserve the existing encroachment, OHA's concerns are somewhat mitigated.

Thank you for the opportunity to comment. If you have any further questions or concerns please contact Heidi Guth at (808) 594-1962 or e-mail her at heidig@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

PLANPACIFIC

February 11, 2010

Mr. Clyde Nāmu'o, Administrator
Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawai'i 96813

Dear Mr. Nāmu'o,

Environmental Assessment for WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance) at 4433, 4423 and 4415 Kahala Avenue, Kahala Ahupua'a, Kona District, Island of O'ahu TMKs: 3-5-003: 8, 9, and 10

This letter is in response to comments from your office on the Draft Environmental Assessment (EA) for a shoreline setback variance for 4433, 4423, and 4415 Kahala Avenue, as referenced above. The Draft EA was published a few years ago in *The Environmental Notice* dated March 8, 2006 for public review and comments. Your office provided comments to the DPP in a letter dated April 5, 2006.

We would like to point out that not long after your comment letter was received, the then owner, Barham Trust, decided to sell the properties. Today, the current owner, WF Coastal Properties, LLC, is continuing the environmental review and shoreline setback variance application process. The proposed improvements within the shoreline setback area of the three properties have changed very little from those of the previous owner. The main component is the structural reinforcement of the deteriorating existing seawall on parcel 10. This has not changed – it is still the main component and the proposed method of reinforcement (creating a solid base underneath and reinforcement on the landward or mauka side of the seawall) is still the same.

We would like to add that the State Historic Preservation Division (SHPD) noted that there is a burial site existing on parcel 8 (SIHP No. 50-80-14-5320) and that the parcels are in a moderate- to high-

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
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probability area for encountering burials. SHPD stated that for these reasons, an archaeological inventory survey is warranted for the proposed project.

Pursuant to the SHPD letter, an archaeological inventory survey was conducted by T.S. Dye & Colleagues, Archaeologists, Inc. and completed on March 7, 2007. The survey located and verified State site number 50-80-14-5320. Information about the existing burial, the archaeological inventory survey, and changes to the project are included in the Final EA. The complete archaeological inventory survey report can also be found in the Final EA appendices.

Per your comments, please note that work within the shoreline setback area has been further reduced and that the proposed work on the existing nonconforming seawalls will not affect existing public access routes or traditional gathering activities for Native Hawaiians.

Thank you for your review and comments to the Draft Environmental Assessment. If you have further questions or concerns, please contact me at 521-9418 ext. 16. Thank you.

Sincerely,

Lisa L. Imata
Associate

PLANPACIFIC

April 22, 2010

Mr. Clyde Nāmu'o, Administrator
Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawai'i 96813

Dear Mr. Nāmu'o,

Environmental Assessment for WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance) at 4433, 4423 and 4415 Kahala Avenue, Kahala Ahupua'a, Kona District, Island of O'ahu TMKs: 3-5-003: 8, 9, and 10

This letter is an addendum to our letter of February 11, 2010. We had previously stated that the main component of the above mentioned EA is the structural reinforcement of the deteriorating existing seawall on parcel 10. It is now proposed that structural reinforcement extend to the existing seawalls on parcels 8 and 9 as well. A second look at the condition of each seawall by a structural engineer has resulted in the recommendation to include all three walls. The proposed method of reinforcement is similar to what was described for parcel 10 in the Draft EA and will be described in the Final EA.

In response to your letter of March 4, 2010, an archaeological inventory survey was submitted to and accepted by the Department of Land and Natural Resources, Historic Preservation Division in 2007. A copy of their letter is enclosed for your reference.

The Final EA has not yet been completed or submitted; however, we intend to submit the Final EA and Shoreline Setback Variance application within the next few weeks.

We understand OHA's general position on construction in the shoreline setback area, its guardianship role for traditional and customary Hawaiian rights, and deep respect for iwi kūpuna. Best management practices will be implemented and short- and long-term protective measures for the burial site, as approved by the Historic Preservation Division, will also be established.

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

If you have further questions or concerns, please contact me at 521-9418 ext. 16. Thank you.

Sincerely,

Lisa L. Imata
Associate

Enclosure

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

May 4, 2007

Dr. Tom Dye
T.S. Dye & Colleagues, Archaeologists, Inc.
735 Bishop Street, Suite 315
Honolulu, HI 96813

LOG NO: 2007.0906
DOC NO: 0704amj14
Archaeology

Dear Dr. Dye:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Archaeological Inventory Survey of a Residential Parcel on Kāhala Avenue
Waikīkī Ahupua'a, Kona District, Island of O'ahu
TMK: (1) 3-5-003:008, 009 & 010

Thank you for the opportunity to review the aforementioned document, which we received on March 16, 2007. The report describes an archaeological inventory survey conducted at three contiguous, ocean-front parcels to be developed with residential structures.

No new historic properties were documented during the survey, which consisted of twenty (20) shovel test units and 24 m^2 in areal excavation, in addition to fifty-one (51) shovel test units excavated earlier by PCSI, Inc. (Collins and Clark 2006). Site 50-80-14-5320, consisting of the re-interred human remains of three (3) individuals discovered during previous construction on the parcel in the 1990s, was rediscovered by a combination of backhoe and hand-excavation.

You have recommended, prior to any future construction on parcel 8, that a plan to protect Site 5320 during construction must be developed and approved by our office. You have also recommended that plans to stabilize the existing seawall will have no effect on historic properties. We concur with both of these recommendations.

The report is accepted in fulfillment of §13-276, HAR, in accordance with §13-284, HAR.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

amj:

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

April 3, 2006

Mr. Henry Eng
Department of Planning and Permitting
City & County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

LOG NO: 2006.0890
DOC NO: 0603CM105
Archaeology

Dear Mr. Eng:

SUBJECT: Chapter 6E-42 Historic Preservation Review [Private] – Draft Environmental Assessment for Shoreline Setback Variance 4433, 4423 and 4415 Kahala Avenue – Kahala Kahala Ahupua'a, Kona District, Island of O'ahu TMK (1) 3-5-003:008, 009 & 010

Thank you for the opportunity to comment on the aforementioned project. We received a cover letter and Draft Environmental Assessment (DEA) on February 24, 2006. Thank you for consulting us on this project, which, contrary to the DEA, is located in a moderate- to high-probability area for encountering burials. In fact, a burial site (SIHP No. 50-80-14-5320) containing three individuals has been documented on parcel 8 (details presented below).

The applicant (Barham Trust) seeks approval for a proposal to construct a new support structure inland of an existing seawall to stabilize the wall and to prevent undermining and failure of the seawall. The scope of work for this proposed undertaking includes excavation behind (*mauka* of) the seawall. The new support structure will be entirely subterranean.

The applicant also proposes various other improvements within the shoreline setback across the three lots. You have summarized these multiple improvements, which will not be reiterated here. Suffice it to say that these improvements will include grading and excavation up to several feet below the ground surface at various locations on all three parcels.

According to the DEA (p.7):

> [a] letter November 22, 2004 was sent to the State Historic Preservation Division requesting any comments or concerns pertaining to excavation and improvement of the existing seawall. No response has been received implying that subject area does not support any historical or archaeological sites.

> The fact that single-family residences were previously constructed and demolished on the subject property confirms the unlikelihood of encountering historical or archaeological sites or artifacts.

The State Historic Preservation Division (SHPD) has previously commented on various projects associated with these parcels:

First, in a letter (LOG NO: 19252, DOC NO: 9703EJ26) to IARII, Inc. dated April 2, 1997, we reviewed a draft report, later accepted (Erkelens and Tomonari-Tuggle 1997, *Archaeological Investigations at 4433 Kahala Avenue, Honolulu, Hawai'i*, SHPD Rpt. No. O-1695) in a letter (LOG NO: 19453, DOC NO: 9705EJ04) dated May 12, 1997, documenting the inadvertent discovery of human remains during construction activities at a residence at 4433 Kahala Avenue (parcel 8). In addition to the burials, which were removed and later re-interred, two pre-Contact (traditional Hawaiian) pit features were also documented in parcel 8.

Second, in a letter (LOG NO: 29795, DOC NO: 0205EJ07) to Mr. Randall K. Fujiki, Department of Planning and Permitting (City & County of Honolulu) dated May 7, 2002, we commented on a previous version of this DEA (*Draft Environmental Assessment, Shoreline Setback Variance for Seawall at 4415 Kahala Avenue, Honolulu, Hawaii, TMK: (1) 3-5-003:010*). In the letter, we stated:

> "...human burials have been recorded during construction activities two parcels to the east of this (at TMK: 3-5-003:008), and at additional properties along Kahala Avenue. All burial sites recorded were located in Jaucas sand deposits such as those that underlie this parcel. Therefore, if future development of the parcel is proposed, we request that we be given the opportunity to review these plans prior to any ground disturbance in order to determine the effect such plans would have on significant historic sites."

For these reasons, an archaeological inventory survey is warranted prior to the issuance of permits for the proposed undertaking. The SHPD website contains a listing of local firms (http://www.hawaii.gov/dlnr/hpd/archcon.htm). We recommend archaeological consultants contact us, or, alternatively, prepare a basic inventory survey plan (which can be forwarded to us for review) *before* starting the work, in order to ensure that the study meets the requirements of HAR Chapter 13-276. For example, given the relatively small size of the project area, and the nature of the proposed undertaking, it would be advisable to correlate the locations of the excavation units with the proposed construction excavation. In this way, the archaeological inventory survey could be conducted in an economical and efficient manner, while still fulfilling the basic requirements of HAR Chapter 13-276.

Thank for requesting our input on this proposal. Please call Dr. Chris Monahan at 808-692-8015 if you, or the applicant, has any questions about this letter.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

CM

PLANPACIFIC

January 13, 2010

Ms. Pua Aiu, Administrator
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, Hawai'i 96707

Dear Ms. Aiu,

Chapter 343, Hawai'i Revised Statutes, Environmental Assessment
Project Name: WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance)
Location: 4433, 4423 and 4415 Kahala Avenue
Kahala Ahupua'a, Kona District, Island of O'ahu
TMKs: 3-5-003: 8, 9, and 10
SHPD Log No.: 2006.0890
SHPD Doc. No: 0603CM105

This letter is in response to comments from your division on the Draft Environmental Assessment (EA) for a shoreline setback variance for 4433, 4423, and 4415 Kahala Avenue, as referenced above. The Draft EA was published in *The Environmental Notice* dated March 8, 2006 for public review and comments. Your department provided comments to the DPP in a letter dated March 30, 2006.

We would like to point out that not long after your comment letter was received, the then owner, Barham Trust, decided to sell the properties. Today, the current owner, WF Coastal Properties, LLC, is continuing the environmental review and shoreline setback variance application process. The proposed improvements within the shoreline setback area of the three properties have changed very little from those of the previous owner. The main component is the structural reinforcement of the deteriorating existing seawall on parcel 10. This has not changed – it is still the main component and

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
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the proposed method of reinforcement (creating a solid base underneath and reinforcement on the landward or mauka side of the seawall) is still the same.

A comparison of proposed improvements between the 2006 proposal and the proposal today is listed below:

2006 Proposed Improvements Described in the Draft EA	2010 Proposed Improvements
Parcel 10	
Create a new subterranean support structure landward of the existing seawall to prevent further undermining and eventual failure of the wall.	Same
Re-vegetation of the soil as soon as construction is completed	Same
Removal of 5 palm trees to enable construction of the proposed seawall improvement	Same
Removal of a concrete tile block landing	Same
Removal of a concrete pad	Same
Construction of a sidewall	Deleted
Repair existing stairs incorporated into seawall	Same
Fortify existing deteriorating seawall	Same
--	Construct new sideyard fence
Parcel 9	
Removal of the stairs incorporated into the seawall. Fill opening to complete the seawall.	Same
Parcel 8	
Removal of a large concrete-like surface	Same
Removal of 2 observation decks and associated walkways	Same
Application of a moss rock veneer to the existing sidewall	Deleted. Existing in the setback area will be demolished and replaced with a new sideyard fence.
Installation of a footbath and shower pole	Deleted
Expansion of a concrete pad at top of seawall stairs	Deleted
Repair existing stairs incorporated into seawall	Same
All 3 Parcels	
Grading to improve drainage and flood hazard characteristics	Same
Add 2 drywells at the corner of parcels 8 and 10 to capture draining storm water	Deleted (drywells relocated to outside of the setback area)
--	Install new open fence along the top of the seawall

Your division stated that there is a burial site existing on parcel 8 (SIHP No. 50-80-14-5320) and that the parcels are in a moderate- to high-probability area for encountering burials. Your division stated that for these reasons, an archaeological inventory survey is warranted for the proposed project.

Following your letter, an archaeological inventory survey was conducted by T.S. Dye & Colleagues, Archaeologists, Inc. and completed on March 7, 2007. The survey located and verified State site number 50-80-14-5320. It also shed some light on earlier work,

particularly an interpretation by Erkelens and Tomonari-Tuggle, which you reference in your letter. Information about the existing burial, the archaeological inventory survey, and changes to the project will be included in the Final EA. The complete archaeological inventory survey report will also be included in the Final EA appendices.

If you have further questions or concerns, please contact me at 521-9418 ext. 16. Thank you very much.

Sincerely,

Lisa Imata

Lisa L. Imata
Associate

PLANPACIFIC

April 22, 2010

Ms. Pua Aiu, Administrator
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, Hawai'i 96707

Dear Ms. Aiu,

Chapter 343, Hawai'i Revised Statutes, Environmental Assessment
Project Name: WF Coastal Properties Shoreline Setback Variance
(formerly known as Barham Trust Shoreline Setback Variance)
Location: 4433, 4423 and 4415 Kahala Avenue
Kahala Ahupua'a, Kona District, Island of O'ahu
TMKs: 3-5-003: 8, 9, and 10

This letter is an addendum to our letter of January 13, 2010. We had previously stated that the main component of the above mentioned EA is the structural reinforcement of the deteriorating existing seawall on parcel 10. It is now proposed that structural reinforcement extend to the existing seawalls on parcels 8 and 9 as well. A second look at the condition of each seawall by a structural engineer has resulted in the recommendation to include all three walls. The proposed method of reinforcement is similar to what was described for parcel 10 in the Draft EA and will be described in the Final EA. For your information, we intend to submit the Final EA and Shoreline Setback Variance application within the next few weeks.

If you have further questions or concerns, please contact me at 521-9418 ext. 16. Thank you very much.

Sincerely,

Lisa L. Imata
Associate

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

LINDA LINGLE
GOVERNOR OF HAWAII

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

April 13, 2006

Mr. Henry Eng
Ms. Ann Matsumura
Department of Planning and Permitting
City and County of Honolulu
650 S. King Street, 7th Floor
Honolulu, HI 96813

Barham Trust
331 N. Maple Drive, No. 200
Beverly Hills, CA 90210

Mr. Chris Pramoulmeta
Plan Pacific, Inc.
345 Queen Street, Suite 802
Honolulu, HI 96813

Dear Messrs. Eng, and Pramoulmeta, Ms. Matsumura, and Barham Trust:

Having reviewed the draft environmental assessment for the Barham Trust Shoreline Setback Variance situated at Kahala in the judicial district of Honolulu, Tax Map Key (1st) 3-5-3, parcels 8 through 10, the Office of Environmental Quality Control offers the following comments for your review and response.

1. ***Early Assessment and Consultation***: Section 11-200-9(b)(1), Hawai'i Administrative Rules requires the approving agency to require the applicant to seek the advice and input of the lead county agency responsible for implementing the county's general plan in which the proposed action is to occur, and to consult with other agencies having jurisdiction or expertise as well as citizen groups and individuals which the approving agencies reasonably believes to be affected. Section 11-200-10 (3) notes that the environmental assessment must identify agencies, citizen groups, and individuals consulted. Please describe the early assessment and consultation process and identify those parties contacted prior to the preparation of the environmental assessment document.
2. ***After the Fact Projects***: After-the-fact projects should not be continued.
3. ***Cultural and Historic Characteristics***: On page 5, the draft environmental assessment notes that "[t]he residential properties are not currently used for cultural or religious practices." The statutory requirement (Chapter 343, HRS) to address cultural impacts necessitates that you examine the direct, indirect and cumulative impacts the proposed action described in the environmental assessment with have on cultural resources and practices and historic artifacts in the locale where the action has been undertaken (i.e., Kahala and environs). Please disclose what cultural resources (i.e., surfing sites, fishing sites, religious sites, native medicinal herbs,

etc.) and contemporary cultural practices (i.e., gathering, surfing, fishing, etc.) are present in the environmental setting. After doing so, please assess what direct, indirect and cumulative impacts the proposed action will have on those resources and practices and artifacts.

Thank you for the opportunity to comment. If there are any questions, please contact Mr. Leslie Segundo, Environmental Health Specialist, at (808) 586-4185.

Sincerely,

GENEVIEVE SALMONSON
Director

April 18, 2006

Genevieve Salmonson
State of Hawaii
Office of Environmental Quality Control
235 S. Beretania St.
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Subject: Response to Comments: Barham Trust Environmental Assessment
TMK: 3-4-003:008, 009, & 010

Thank you for your comments regarding the Draft Environmental Assessment (DEA) for improvements of a nonconforming seawall and various other improvements within the shoreline setback area. The following are responses to your comments.

1) ***Early Assessment Consultation***: According to your letter, the Hawaii Administrative Rules Chapter 11 requires the applicant to seek the advice of agencies and groups who may be affected by the project. Section one of the Draft EA, under Consulted Agencies, states that the City and County of Honolulu Department of Planning and Permitting and the State Department of Land and Natural Resources (DLNR) were contacted regarding the DEA. Letters were sent to above agencies as well as the State Historic Preservation Division and U.S. Army Corps of Engineers, Honolulu requesting any comments or concerns about the proposed project. No response was received from the State Historic Preservation Division. The County Planning Department chose to withhold comments until plans and drawings were submitted. The Army Corps of Engineers was concerned about work taking place below the mean high water mark. No work is proposed below the mean high water mark. The DLNR was concerned about certifying the shoreline. Applications for shoreline certification have been submitted to and accepted by the DLNR and are awaiting approval. Section 1.0 of the DEA will list all agencies contacted.

2) ***After-the-Fact Projects***: There are no after-the-fact projects currently under way on the property. After-the-fact approval is requested for an existing wall on parcel 8 that was constructed within the setback area without proper authorization.

3) ***Cultural and Historical Characteristics***: According to the Oahu Resource Atlas, Harbors Division (1981), there are four (4) coastal

cultural resources within 1000 feet of the project area. Those resources include seaweed collecting, throw net fishing, pole and line fishing, and torch fishing. All of these activities take place off-shore, and will not be impacted by the proposed project. Access to the beach and shoreline will be maintained via a public right-of-way located two parcels west of the project site. Access to the privately owned property is restricted to the public. A letter dated November 22, 2005 was sent to the State Historic Preservation Division (HPD) requesting any comments or concerns regarding the proposed project. No comment was received indicating that the HPD had no comments or concerns pertaining to historical artifacts or cultural resources. The Final EA will list the resources indicated by the Oahu Resource Atlas (1981).

Should you have further questions or concerns, please do not hesitate to contact me at 808-521-9418 ext. 15, or at chrisp@planpacific.com

Sincerely,

Chris Pramoulmetar
Planner

PLANPACIFIC

April 20, 2010

Katherine Puana Kealoha, Esq.
State of Hawai'i
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813

Dear Ms. Kealoha:

Barham Trust Draft Environmental Assessment of 2006
TMK: 3-4-003:008, 009, & 010

This letter is a follow up to our letter of April 18, 2006. Our letter of April 2006 was in response to OEQC comments to our Draft EA for proposed improvements within the shoreline setback area to the above mentioned parcels.

Since our last letter, Barham Trust has sold the properties to current owner, WF Coastal Properties, LLC. The current owner is now continuing the environmental review and shoreline setback variance application process. The proposed improvements within the shoreline setback area of the three properties have gone through minor changes from those of the previous owner, as described in the Draft EA. The main component is the structural reinforcement of the deteriorating existing seawalls on parcels 8, 9, and 10. Previously, reinforcement was only proposed for the existing seawall on parcel 10. The proposed method of reinforcement for all walls is similar to what was described for parcel 10 in the Draft EA.

We will be submitting the Final EA and Shoreline Setback Variance application to the City and County of Honolulu in the next few weeks and wanted to keep you informed. If you have any questions or concerns, please contact me at 521-9418 ext. 16. Thank you.

Sincerely,

Lisa L. Imata
Associate

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

LINDA LINGLE
GOVERNOR

ANTHONY J.H. CHING
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, Hawaii 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

March 6, 2006

Mr. Henry Eng, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Eng:

Subject: Draft Environmental Assessment (DEA) for Improvement of Nonconforming Seawall and Other Improvements within the Shoreline Setback Area
Kahala, Oahu, Hawaii
Tax Map Key: 3-5-03: 8, 9, and 10

We are in receipt of the DEA for the subject project transmitted by your letter dated February 16, 2006. We understand that the subject project involves the construction of a new support structure inland of the existing concrete rubble masonry (CRM) seawall fronting parcel 10 to stabilize the wall and prevent undermining and failure. The support structure, which will be a CRM wall, will be used for a portion of the existing seawall. Other portions of the existing seawall will be bolstered by a wedge of lean concrete. In addition to the support structure improvements, a new CRM (moss rock) fence wall along the parcel's western property line is proposed to match the existing fence wall along the eastern property line of parcel 8. Other improvements to parcel 10 call for the existing concrete slab and concrete block landing to be demolished and removed, while a small stairwell within the seawall will be repaired.

Proposed improvements to parcel 9 consist of the removal of the existing stairs in the seawall fronting the parcel and filling in the space with masonry. Finally, several changes will be made to parcel 8, including the addition of a moss rock veneer to the

existing concrete masonry unit wall, repair of the existing stairs, the removal of a large concrete pad and observation decks and associated walkways, the extension of the concrete landing, and the installation of a 75-square-foot footbath and shower. Landscaping will round out the list of improvements in the shoreline setback.

For your information, the subject parcel was placed within the State Land Use (SLU) Urban District on August 23, 1964. The coastal portion of the subject parcel having an elevation below the highwater mark as it existed at that time was designated within the SLU Conservation District. To the extent that the existing seawalls and other improvements may have affected the parcels' shoreline, information confirming their construction date(s) and the location of the shoreline as it existed in 1964 is needed. Such information could assist us in our determination as to whether all or a portion of the seawalls and/or other improvements are located within the State Land Use Conservation District. We suggest that a boundary interpretation request be submitted to our office with the above information to address this matter.

Thank you for the opportunity to comment on the subject DEA. Please feel free to contact Bert Saruwatari of my office at 587-3822, should you require clarification or any further assistance.

Sincerely,

ANTHONY J. H. CHING
Executive Officer

c: Office of Environmental Quality Control

PLANPACIFIC

February 8, 2010

Mr. Dan Davidson, Executive Officer
State Land Use Commission
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Davidson,

Chapter 343, Hawai'i Revised Statutes, Environmental Assessment
Project Name: WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance)
Location: 4433, 4423 and 4415 Kahala Avenue
Kahala Ahupua'a, Kona District, Island of O'ahu
TMKs: 3-5-003: 8, 9, and 10

This letter is in response to comments from your division on the Draft Environmental Assessment (EA) for a shoreline setback variance for 4433, 4423, and 4415 Kahala Avenue, as referenced above. The Draft EA was published in *The Environmental Notice* dated March 8, 2006 for public review and comments. Your department provided comments to the DPP in a letter dated March 6, 2006.

We would like to point out that not long after your comment letter was received, the then owner, Barham Trust, decided to sell the properties. Today, the current owner, WF Coastal Properties, LLC, is continuing the environmental review and shoreline setback variance application process. The proposed improvements within the shoreline setback area of the three properties have changed very little from those of the previous owner. The main component is the structural reinforcement of the deteriorating existing seawall on parcel 10. This has not changed – it is still the main component. No new construction will take place on state conservation lands. The previously proposed new CRM fence wall, extension of existing concrete landing, and new footbath have been deleted from the

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
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proposal.

A certified shoreline survey was completed in 2006 and is currently in the process of being updated. Thank you for your review of the Draft EA, suggestion and comments. If you have further questions or concerns, please contact me at 521-9418 ext. 16.

Sincerely,

Lisa L. Imata
Associate

PLANPACIFIC

April 22, 2010

Mr. Dan Davidson, Executive Officer
State Land Use Commission
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Davidson,

Chapter 343, Hawai'i Revised Statutes, Environmental Assessment
Project Name: WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance)
Location: 4433, 4423 and 4415 Kahala Avenue
Kahala Ahupua'a, Kona District, Island of O'ahu
TMKs: 3-5-003: 8, 9, and 10

This letter is an addendum to our letter of February 8, 2010. We had previously stated that the main component of the above mentioned EA is the structural reinforcement of the deteriorating existing seawall on parcel 10. It is now proposed that structural reinforcement extend to the existing seawalls on parcels 8 and 9 as well. A second look at the condition of each seawall by a structural engineer has resulted in the recommendation to include all three walls. The proposed method of reinforcement is similar to what was described for parcel 10 in the Draft EA and will be described in the Final EA.

A new certified shoreline survey was completed this month and it can be referenced by File Number OA-1338.

If you have further questions or concerns, please contact me at 521-9418 ext. 16.

Sincerely,

Lisa L. Imata
Associate

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

April 6, 2006

Regulatory Branch

File No. **POH-2005-634**

Henry Eng, FAICP, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96817

Dear Mr. Eng:

This responds to your request for review of the Draft Environmental Assessment (DEA) for proposed reinforcement of a 121-foot long concrete rubble masonry (CRM) seawall on Parcel 10, and other alterations within the shoreline setback, at 4433, 4423 and 4415 Kahala Avenue, Oahu (TMKs 3-5-3: 8, 9, and 10, respectively). We have reviewed the document with respect to the Corps' authority to issue Department of the Army (DA) permits under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) (Section 10) and Section 404 of the Clean Water Act (33 USC 1344) (Section 404).

Information in the DEA indicates that the proposed seawall reinforcement work at Parcel 10 would occur landward of the high tide line and that other work at the three seawalls, including maintenance or removal of seawall stairs, would occur landward of the mean high water line. The project would not include removal of rocks lying seaward of the walls.

Based on the information provided in the DEA, I have determined that the proposed activity would not involve any work or structures in or affecting navigable waters of the United States pursuant to Section 10, nor would it involve any discharge into waters of the United States pursuant to Section 404; therefore, a DA permit will not be required.

Should you have questions concerning this determination, please contact Mr. Peter Galloway by telephone at 438-8416 or by fax at 438-4060. Written inquiries should cite the file number and be sent to: Regulatory Branch (CEPOH-EC-R/P. Galloway); U.S. Army Engineer District, Honolulu; Building 230; Fort Shafter, Hawaii 96858-5440. A copy of this letter is being mailed to Plan Pacific, Inc.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

PLANPACIFIC

February 11, 2010

Mr. George P. Young, P.E.
Chief, Regulatory Branch
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawai'i 96858

Dear Mr. Young,

File No. POH-2005-634
Environmental Assessment for WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance) at 4433, 4423 and 4415 Kahala Avenue, TMKs: 3-5-003: 8, 9, and 10

This letter is in response to comments from your office on the Draft Environmental Assessment (EA) for a shoreline setback variance for 4433, 4423, and 4415 Kahala Avenue, as referenced above. The Draft EA was published a few years ago in *The Environmental Notice* dated March 8, 2006 for public review and comments. Your office provided comments to the City Department of Planning and Permitting in a letter dated April 6, 2006.

We would like to point out that not long after your comment letter was received, the then owner, Barham Trust, decided to sell the properties. Today, the current owner, WF Coastal Properties, LLC, is continuing the environmental review and shoreline setback variance application process. The proposed improvements within the shoreline setback area of the three properties have changed very little from those of the previous owner. The main component is the structural reinforcement of the deteriorating existing seawall on parcel 10. This has not changed – it is still the main component and the proposed method of reinforcement (creating a solid base underneath and reinforcement on the landward or mauka side of the seawall) is still the same.

Thank you for your review of the project and informing us that a DA permit, pursuant to Section 404, will not be required. If you have further questions or concerns, please contact me at 521-9418 ext. 16. Thank you.

Sincerely,

Lisa L. Imata
Associate

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

PLANPACIFIC

April 28, 2010

Mr. George P. Young, P.E.
Chief, Regulatory Branch
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawai'i 96858

Dear Mr. Young,

File No. POH-2005-634
Environmental Assessment for WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance) at 4433, 4423 and 4415 Kahala Avenue, TMKs: 3-5-003: 8, 9, and 10

This letter is an addendum to our letter of February 10, 2010. We had previously stated that the main component of the above mentioned EA is the structural reinforcement of the deteriorating existing seawall on parcel 10. Based on input received, particularly from the project's structural engineer, structural reinforcement to the existing seawalls will be applied to parcels 8 and 9 as well. The proposed method of reinforcement will be described in the Final EA. Further, the EA provides for application of a moss rock veneer to the existing seawall on parcel 8 so that it will match the walls on parcels 9 and 10 in appearance. The seawalls on parcels 9 and 10 are moss rock walls, while the seawall on parcel 8 is coated with gunite.

If you have any questions or concerns, please contact me at 521-9418 ext. 16. Thank you.

Sincerely,

Lisa L. Imata
Associate

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Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

WAIALAE/KAHALA NEIGHBORHOOD BOARD NO. 3
c/o NEIGHBORHOOD COMMISSION • 530 SOUTH KING STREET ROOM 400 • HONOLULU, HAWAII 96813
PHONE (808) 527-5749 • FAX (808) 527-5760 • INTERNET: http://www.honolulu.gov

April 7, 2006

Director Henry Eng
Director of Planning and Permitting
City and County of Honolulu
C/O Ms. Ann Matsumura
650 S. King Street
Honolulu, HI 96813
Fax: 527-6743

Dear Director Eng:

Re: Comment on Draft Environment Assessment for improvements (DEA) within the Special Management Area (SMA) and 40 foot Shoreline Setback Area at TMK 3-5-003: 8, 9 & 10, 4433, 4423 & 4415 Kahala Ave respectively.

During the March 16, 2006 regular meeting of the Waialae-Kahala Neighborhood Board the above referenced DEA was discussed. The proposed project and DEA raised concerns regarding the desirability of, and public's interest in, perpetuating non-conforming structures that may involve an irrevocable commitment to loss or destruction of a natural public trust resource. While the EA should not be merely a self-serving recitation of benefits and a rationalization of the proposed action, it appears the focus of the DEA is on the impact of the environment on the seawall rather than the long- term impacts of perpetuating a non-conforming seawall on the surrounding environment and community.

The Hawaii Supreme Court has held that "registered ocean front property is subject to the same burdens and incidents as unregistered land, including erosion... The precise location of the high water mark on the ground is subject to change and may always be altered by erosion. Because the land seaward of the upper reaches of the wash of the waves, including the beach, is a public trust resource, the state, as trustee, can restrain those activities that damage the resource. A private property owner does not have the right to impair public trust resources."

Each parcel described in the DEA is, and has been for sometime, vacant land with no existing structures (houses, pools, etc.). Erosion is only a problem needing mitigation where human developments along the coast are threatened by shoreline fluctuations.
Each parcel is nearly an acre in size and nearly 300 feet in depth. Apparently Bishop Estate's sub-division of oceanfront lots provided for very large parcels, compared with the non-oceanfront parcels in the rest of the Kahala subdivision, presumably in recognition of shoreline migration and potential erosion.

Parcel 10's proposed primary reinforcement structure, appears to be essentially another seawall behind the existing seawall, a very substantial and very permanent structure. The extent or percentage of seawall to be reinforced with a secondary seawall (or other reinforced support) is not specified. It could turn out to be 100 percent.

Alternatives discussed in the DEA include, no action. According to the DEA the "*no action*" alternative would result in the gradual deterioration of the existing seawall and, if the wall were allowed to fail, large amounts of soil and debris would spill into the nearshore area (Section 4.0 and Appendix 4.0). However, Section 3.3, *Soil and Topography*, states that the subsurface borings indicate the soils to be mostly *sand* and gravel, i.e. it appears beach sand, typically

locked up behind seawalls, is unavailable to the natural beach process. Section 3.10 *Recreational*, describes the near shore area as *little to no beach, even at low tide* and elsewhere describes the beach as *unused in its present situation*, and *lateral access being limited or restricted*. Remnants of a failed seawall could be assumed to be relatively temporary as compared to the permanence of the proposed actions.

While the DEA states that the proposed action *will not change the existing natural littoral processes of the area, nor the pattern of beach erosion, alter the shoreline, affect lateral public access, nor further degrade environmental quality and will not affect views from and along the shoreline*, the fact is the seawall does alter, affect, obstruct and impact, and this proposed project will substantially reinforce a non-conforming seawall. Therefore, it would seem that it could and perhaps should be considered, that the proposed action has a severe secondary long-term consequence in perpetuating the seawall.

The Waialae-Kahala Neighborhood Board is concerned that the proposed improvements set a precedent that conflicts with the county and state's long-term environmental policy and goals expressed in:

Chapter 23 of the Revised Ordinances of Honolulu;

a. "It is the primary policy of the city to protect and preserve the natural shoreline, especially sandy beaches; to protect and preserve public pedestrian access laterally along the shoreline and to the sea; and to protect and preserve open space along the shoreline. It is also a secondary policy of the city to reduce hazards to property from coastal hazards." (23.1.2);

Chapter 344 and Chapter 205A of the Hawaii Revised Statutes;

a. Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses;
b. Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities;
c. Promote open space in view of its natural beauty not only as a natural resource but also as an ennobling, living environment for its people.
d. To discourage all shoreline hardening that may effect access to, or alter littoral processes affecting the shoreline.

In consideration of ROH Chapter 23, HRS Chapters 205A, 343 and 344 the Waialae-Kahala Neigborhoood Board unanimously passed a resolution expressing concern that this project, in perpetuating a non-conforming use on vacant land, may have long term "significant effects" on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law of the community and State.

Yours truly,

Marie Richardson
for Lester Fukuda
Chair

Cc: Councilmember Charles Djou
Senator Sam Slom
Representative Barbara Marumoto
Representative Lyla Berg
Administrator Sam Lemmo DLNR/OCCL

PLANPACIFIC

February 8, 2010

Mr. Scotty Anderson, Chair
Waialae/Kahala Neighborhood Board No. 3
c/o Neighborhood Board Commission
530 South King Street, Room 406
Honolulu, Hawai'i 96813

Dear Chair Anderson,

Chapter 343, Hawai'i Revised Statutes, Environmental Assessment
Project Name: WF Coastal Properties Shoreline Setback Variance (formerly known as Barham Trust Shoreline Setback Variance)
Location: 4433, 4423 and 4415 Kahala Avenue
Kahala Ahupua'a, Kona District, Island of O'ahu
TMKs: 3-5-003: 8, 9, and 10

This letter is in response to comments from your board on the Draft Environmental Assessment (EA) for a shoreline setback variance for 4433, 4423, and 4415 Kahala Avenue, as referenced above. The Draft EA was published a few years ago in *The Environmental Notice* dated March 8, 2006 for public review and comments. The Waialae/Kahala Neighborhood Board No. 3 provided comments to the DPP in a letter dated April 7, 2006, signed by Marie Richardson for Lester Fukuda.

We would like to point out that not long after the Board's comment letter was received, the then owner, Barham Trust, decided to sell the properties. Today, the current owner, WF Coastal Properties, LLC, is continuing the environmental review and shoreline setback variance application process. The proposed improvements within the shoreline setback area of the three properties have gone through minor changes from those of the previous owner. The main component is the structural reinforcement of the deteriorating existing seawall on parcel 10. This has not changed. The proposed

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468
www.planpacific.com

method of reinforcement (creating a solid base underneath and reinforcement on the landward or mauka side of the seawall) is also still the same.

The minor revisions are as follows: the existing concrete pads will be removed instead of expanded, the foot shower is removed from the plan, and the drywells for drainage will be located outside of the shoreline setback area. Open fences are proposed on the sides as well as on top of the existing sea wall.

We understand that the Waialae/Kahala Neighborhood Board No. 3 is concerned about the proposed project, mainly the sea wall, because of the overall issues of "perpetuating a non-conforming use" and human impact on the shoreline. We have revised the EA to state your general concern; however, these are broad island-wide issues that go beyond this individual project. It also overlaps the issue of private property ownership rights.

The sea wall that is in need of repair, located on parcel 10, is not a stand-alone sea wall. Should it fail, it likely would lead to the erosion and failure of adjacent walls all along the coastline. There would be surrounding property owners, in addition to the current property owner, facing property loss and hardship. In addition, the sea walls eroding via wave action likely would result in a large amount of loose rocks and rubble on public lands.

The existing sea wall on the edge of the subject properties is of non-conforming status, which means it is legal. We maintain that the proposed action will not significantly impact the currently existing environmental conditions as the wall already legally exists and has since the 1960s. Any work related to it will be in compliance with State and City laws and rules. The Draft EA for the proposed project has been reviewed by the agencies that implement the City and State environmental policies that the Neighborhood Board No. 3 speaks of in its letter. Chapter 205A, Hawaii Revised Statutes, which you cite, discourages artificial shorelines, but also recognizes that it may be allowable in certain circumstances. The project is still up for further review by the City Department of Planning and Permitting, and will be subject to their decision and conditions.

Thank you for the Board's review of the Draft EA and for the comments and concern. If you have further questions, you can email me at limata@planpacific.com.

Sincerely,

Lisa L. Imata
Associate

PLANPACIFIC

April 22, 2010

Mr. Scotty Anderson, Chair
Waialae/Kahala Neighborhood Board No. 3
c/o Neighborhood Board Commission
530 South King Street, Room 406
Honolulu, Hawai'i 96813

Dear Chair Anderson,

Chapter 343, Hawai'i Revised Statutes, Environmental Assessment
Project Name: WF Coastal Properties Shoreline Setback Variance
(formerly known as Barham Trust Shoreline Setback Variance)
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If you have any questions or concerns, please contact me at 521-9418 ext. 16. Thank you.

Sincerely,

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