DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

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2006/ELOG-596(DT)
2004/ED-30

March 21, 2006

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
State of Hawaii
State Office Tower, Room 702
235 South Beretania Street
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

Re: Chapter 343, Hawaii Revised Statutes
Final Environmental Assessment (EA)

Landowner/ Applicant:	Charles B. Wang
Agent:	PlanPacific (Robin Foster)
Location:	1368 Mokulua Drive – Kailua (Lanikai)
Tax Map Key:	4-3-4: 81
Request:	Shoreline Setback Variance
Proposal:	To allow (retain) a seawall constructed within the shoreline setback area.
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 and four copies of the Final EA. If you have any questions, please contact Dana Teramoto of our staff at 523-4648.

Very truly yours,

Henry Eng, FAICP, Director
Department of Planning and Permitting

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Attachments
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2006-04-08 OA PEA LANIKAI NON-CONFORMING SEAWALL

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FILE COPY

Final Environmental Assessment

Support Wall for Nonconforming Seawall

Lanikai, Oahu
TMK: 4-3-004: 081

Prepared by PlanPacific, Inc.

March 2006

Final Environmental Assessment

Support Wall for Nonconforming Seawall

Lanikai, Oahu
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March 2006

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Appendices

1. Project Summary

PROPOSED ACTION:	Build support wall to repair and reinforce nonconforming seawall damaged by storm waves (after-the-fact)
PROPERTY:	1368 Mokulua Drive, Lanikai, O'ahu Tax Map Key 4-3-004: 081 23,036 square feet, less eroded area = 17,461 s.f.
OWNER/APPLICANT:	Charles B. Wang
PLANNING & ZONING:	State Urban District Residential on Koolaupoko Sustainable Communities Plan Zoned R-10 Residential District
SPECIAL MANAGEMENT AREA, SHORELINE SETBACK:	Located within the SMA and the shoreline area, subject to the 40-foot shoreline setback
PERMITTING AGENCY:	Department of Planning and Permitting City & County of Honolulu
CONSULTED AGENCIES:	Department of Planning and Permitting, City & County of Honolulu; State Dept. of Land and Natural Resources
PERMITS REQUIRED:	Shoreline Setback Variance (after-the-fact) Variance from LUO height standard (after-the-fact) Building Permit (after-the-fact)
CHAPTER 343 ACTION:	Construction within the shoreline setback
ANTICIPATED DETERMINATION:	Finding of No Significant Impact (FONSI)

2. General Description of the Action

2.1 SITE DESCRIPTION AND BACKGROUND

The project site is a shoreline lot at 1368 Mokulua Drive, Lanikai, designated as TMK 4-3-004: 081. **Figure 1** shows the general location of the site. The area is zoned R-10 Residential. The tax map in **Figure 2a** also provides a key for photographs of the subject seawall, **Figure 2b.**

The recorded lot area is 23,036 square feet (s.f.). Subtracting the eroded seaward portion (5,575 s.f.), the net area of the lot is 17,461 s.f. The owner is Charles B. Wang, who also owns the adjoining lots to the north (TMK parcels 4-3-004: 80 and 108). The three lots are jointly developed (DPP File No. 2003/CUP-10).

The shoreline is defined by a nonconforming seawall located 77 to 88 feet inland of the seaward property boundary of record. According to a longtime Lanikai resident, the concrete base of the seawall was constructed in the early 1940s, and the concrete masonry unit (CMU) seawall was constructed in 1958.[1] In 1993, the owner obtained a Shoreline Setback Variance to install a chain-link fence on the top of the seawall (DPP File No. 93/SV-8).

As shown in the Site Plan in **Figure 4, Wall Plans (revised),** parcel 81 is occupied by a single-family dwelling set back about 200 feet from the shoreline and by portions of a second dwelling (the greater part of this dwelling lie on parcels 108 and 80). The makai portion of the second dwelling is sited within 50 feet of the shoreline, and the subject seawall provides this dwelling immediate protection from wave action.

The parcel immediately to the south (TMK 4-3-004: 099) is a flag lot that is only 109 feet deep. The house on parcel 99 lies within 45 feet of the seaward edge of the subject seawall.

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[1]Written testimony of Mollie Foti for The Lanikai Association, dated November 9, 1993, concerning an application for a Shoreline Setback Variance for a chain-link fence (93/SV-8).

The top of the subject seawall was damaged by severe and unusual storm surf that inundated the windward coast of Oahu during November 20-21, 2003. The storm waves cracked the CMU seawall; destroyed an upper section of the wall; and took out the chain-link fence, naupaka bushes, and approximately 30 cubic yards (c.y.) of soil. Some of the soil may have been lost through suction under the foundation of the wall.

Concerned that the seawall might fail catastrophically, the owner buttressed the foundation by piling rocks in the ocean at the base of the seawall. Upon further investigation, the seawall was deemed unsafe unless additional support could be built. In December, having consulted a structural engineer, the owner employed a contractor to build a support wall inland of the existing seawall. On January 4, 2004, with the support wall completed, the contractor removed the rocks that had been placed seaward of the seawall.

On December 8, 2003, the State Department of Land and Natural Resources (DLNR) issued a Notice and Order citing illegal placement of rocks within the Conservation District, seaward of the seawall (DLNR Violation OA-04-16). Provided with evidence that the rocks had been removed, the DLNR issued a letter on February 4, 2004, acknowledging that the Conservation District violation had been corrected.

On December 17, 2003, the DPP issued a Notice of Violation for constructing a concrete seawall within the Shoreline Setback and without having a building permit [DPP File No. 2003/NOV-12-111 (SV)]. In order to resolve this violation, the owner is currently applying for a Shoreline Setback Variance.

2.2 TECHNICAL CHARACTERISTICS

The owner is requesting after-the-fact approval for the construction of a concrete support wall to reinforce the existing nonconforming seawall and for the construction of a fence wall on top of the support wall.

The DLNR certified the shoreline on June 24, 2004, at the seaward face of the existing nonconforming seawall (see **Figure 3**). The wall jogs inland about 4.5 feet from the northern

side boundary, where it joins an existing retaining wall on adjoining parcel 108. This indentation formerly housed a concrete stairway down to the beach. Under a Minor Shoreline Structure Permit (File No. 1999/MSS-9), the owner removed the stairs and walled up the entry. The indentation has filled with rocks and is consistent in appearance with the sloping rock revetment that protects the shoreline of parcel 108 and the three lots to the north. (In 1990, the City granted Shoreline Setback Variances to allow the sloping revetment on four adjoining lots; the immediately adjoining parcel 108 was covered by 90/SV-5).

Plans for the subject wall are reproduced in **Figure 4**. The nonconforming seawall is of concrete and CMU construction. Its foundation sits at about Mean Sea Level (MSL). Before the storm, the top of the seawall was measured at +10.0 to 10.5 MSL.[2] The top sections were broken off during the storm and subsequent construction, so that the nonconforming seawall now rises only to about +5.8 MSL. The concrete footing of the seawall extends inland under ground five to six feet inland from the seaward face. (Note: As of preparation of the Final EA in March 2006, additional sections of the prior CMU wall have broken off. What remains is primarily the concrete foundation.)

The new concrete support wall has an L-shaped foundation that sits on top of the footing of the nonconforming seawall. The short leg of the "L" is keyed into the ground inland of the old footing. On this foundation, the support wall rises to a height of approximately +11.2 MSL. The entire structure is tied together by reinforcing steel bars. The top of the support wall has a splash lip to deflect high waves. On the south end, there is a flank wall extending about eight feet along the property boundary. A deep trench was excavated in order to build the support wall. Following construction, the trench was back-filled with clean sand wrapped with two layers of geotextile fabric.

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[2] Shoreline & Topographic Survey dated November 12, 1998, and certified by DLNR on January 12, 1999; James R. Thompson, Surveyor.

A 1.5-foot-high fence wall was added on top of the support wall, in order to provide safety and security. It is of concrete rubble masonry (CRM) construction and is faced with coral. The top of the fence wall stands at about +12.8 MSL, which is approximately three feet above the grade of the rear yard. The fence wall replaces the 42-inch-high chain-link fence that was destroyed by the storm. The top of the fence wall is slightly lower than the top of the pre-existing fence. A new chain-link fence was erected on top of the flanking wall along the southern side property boundary. It stands about six feet above grade.

2.3 ECONOMIC AND SOCIAL CHARACTERISTICS

The proposed project would not generate any new jobs or increase the resident population of the area. It would provide short-term construction employment and related State tax revenues. The cost of the work was $90,000.

2.4 CULTURAL AND HISTORIC CHARACTERISTICS

The property is fully used for residential purposes and is not currently used for cultural or religious practices. Public access to the shoreline from the public road would not be affected by this project.

2.5 ENVIRONMENTAL CHARACTERISTICS

The shoreline of the property has had a seawall for about 46 years. It is at the northern end of a line of vertical seawalls that defines the shoreline of the southern (Waimanalo) end of the Lanikai coast. The immediately neighboring lot to the south, TMK 4-3-004: 99, has a vertical seawall that extends slightly seaward of the Wang seawall.

To the north are four parcels protected by a sloping revetment (TMKs 4-3-004: 108, 88, 79 and 78). The revetment was constructed in 1990, after each lot had obtained a Shoreline Setback Variance. The toe of the revetment on adjoining parcel 108 extends approximately along the same line as the Wang seawall.

Erosion progressed to the north during the 1990s. During the mid-'90s, the stretch of beach just north of the revetment was occupied by SEAbags, installed to provide emergency protection. Four of those lots have since acquired permanent shore protection in the form of vertical seawalls. With the exception of one lot that continues to be protected by SEAbags, the 12 lots to the north of the revetment are now all protected by permanent structures.

The subject property does not contain unique or endangered species of plants nor significant faunal habitat.

3. Description of the Affected Environment, Impacts and Mitigation

3.1 DESCRIPTION OF THE SURROUNDING AREA

Lanikai is a fully-developed residential community occupying a narrow coastal strip of land, bounded by the slopes of Kaiwa Ridge. Zoned R-10 Residential, the area is subdivided into residential lots which are generally 10,-20,000 square feet in size and developed with single-family dwellings. The area is characterized by warm temperatures and average annual rainfall of 40-50 inches.

To the north, the subject property adjoins four lots that are protected by a continuous sloping rock revetment (TMKs 4-3-004: 108, 88, 79 and 78). The southern edge of the property abuts a residential lot that also has a nonconforming seawall (TMK 4-3-004: 099).

3.2 SOILS, TOPOGRAPHY AND DRAINAGE

The soils are classified as Jaucas sand, according to the Soil Survey (USDA Soil Conservation Service, 1972). Jaucas soils consist of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean. The permeability of Jaucas sand is described as 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. The available water capacity is 0.5 to 1.0 inch per foot of soil. Workability is slightly difficult because the soil is loose and lacks stability for use of equipment. The topography is slopes slightly toward the front of the lot. The elevation inland of the seawall varies from +9.0 to +9.9 MSL. The elevation toward the front of the lots is +7.6 to +7.9 MSL.

Rainfall drains directly onto the ground and is quickly absorbed by the sandy soils. As shown on the Flood Insurance Rate Map, the seaward portion of the property lies in the AE zone, with a regulatory flood elevation of +6.0 feet MSL.

3.3 SHORELINE CHARACTERISTICS AND COASTAL PROCESSES

This section summarizes information contained in a Coastal Engineering Evaluation prepared by Edward K. Noda and Associates, Inc. (EKNA) in 1997 for the neighboring Dilks property (see **Appendix A**). In its letter of March 22, 2004, EKNA states that the Evaluation is applicable to the subject property. Section 2.0 of the Coastal Engineering Evaluation describes the characteristics of the Lanikai shoreline and coastal processes. Section 3.0 discusses historic beach and shoreline changes in Lanikai. Section 6.0 of the Coastal Engineering Evaluation assesses potential littoral impacts of a seawall – i.e., impacts on the beach.

Lanikai Beach has been undergoing net long-term erosion over the past 30+ years. The coastal reaches at both the northern and southern ends of Lanikai are devoid of dry beach, and beach erosion is progressing from the southern end northward towards the middle of the beach. Various types of seawalls and revetments protect about 1,500 of shoreline property south of Alala Point (bordering Kailua Bay), and about 2,500 feet north of Wailea Point (bordering Waimanalo Bay). A narrow beach remains along about 3,000 feet of shoreline in the middle of Lanikai. A review of historical records and the 1989 study report, *Hawaii Shoreline Erosion Management Study: Overview and Case Study Sites*, shows that all but a few Lanikai shoreline lots have shoreline protection structures of some kind. (Prepared by Edward K. Noda and Associates and DHM, the 1989 report includes a case study of the Kailua-Lanikai coast.) At present, shore protection structures located in the middle segment of Lanikai are buried in sand. Recent field inspection by PlanPacific staff confirmed these observations.

The near shore wave approach patterns are complex due to interactions between the wave trains and the irregular offshore reefs and islands. In general, within the Lanikai littoral cell, net transport of sand is predominantly northward from Wailea Point during the summer months, due to easterly tradewind-generated waves and southeasterly swells, and predominantly southward from Alala Point during the winter months, due to North Pacific

swell. This accounts for the greater loss of beach at the endpoints of the Lanikai littoral cell and the greater stability of the beach in the middle of the littoral cell.

In 1990, a sloping rock revetment was built to protect the four shoreline lots immediately to the north of the subject property. Between 2001 and 2004, seawalls have been built to protect five of the six lots north of the revetment. The remaining lot continues to be protected by SEAbags. The City Department of Planning and Permitting published Environmental Assessments and granted Shoreline Variances authorizing the construction of the four new shore protection structures.

Consistent with the conclusions stated in Section 6.0 of the Coastal Engineering Evaluation (see **Appendix A**), adding a foundation to the existing seawall would not alter the existing littoral processes affecting the site. The erosion occurring along the Lanikai shoreline can be described as "passive erosion," in contrast to "active erosion" that is induced or accelerated by shore protection structures. Passive erosion occurs when a protective structure is built and erosion continues, eroding adjacent unprotected shoreline mauka landward beyond the structure. The result would be loss of beach in front of the shore protection structure, as the water deepens and the shoreface profile migrates landward. While the northward erosion trend may continue, all shoreline lots in the vicinity are protected by either permanent or temporary structures and therefore will not be affected by passive erosion.

3.4 RECREATIONAL RESOURCES

There is a public beach right-of-way one lot to the south. Owned by the Lanikai Community Association, the beach access is located on TMK parcel 4-3-004: 097. However, no dry beach remains at the right-of-way, and consequently it is little used.

The Association owns a series of rights-of-way that provide good public access to those sections of the Lanikai shoreline where dry beach remains. There is no public beach park in Lanikai.

Erosion has reduced such activities as jogging and sunbathing along this section of Lanikai Beach. The waters off Lanikai are excellent for swimming, sailing, kayaking, and canoeing. There is also some use of motorboats and windsurfing, but Kailua Beach provides better conditions and access for these activities. There is some pole fishing from boats and from the shore, but reef fish populations have diminished over the years. Spear-fishing and snorkeling is practiced among the coral heads farther offshore. There are a few spots for board-surfing around the Mokulua Islands.

3.5 FLORA AND FAUNA

Lanikai Beach is not a habitat for rare, threatened or endangered species, although Hawaiian Stilts occasionally forage along the waterline. Green Sea Turtles graze and loaf in the waters off Lanikai, as they do in Kailua Bay and Waimanalo Bay. The action is not expected to affect terrestrial or aquatic life.

3.6 VISUAL RESOURCES

The shoreline offers a 180-degree view up the beach to the north, towards the ocean and the Mokulua Islands, and south to Wailea Point. The appearance of the beach would be improved by the removal of the rock blanket from the shoreline.

3.7 ARCHAEOLOGICAL AND HISTORIC RESOURCES

No archaeological features exist on the subject property, and no negative impacts are anticipated. If any archaeological, cultural, or historic materials are discovered, construction work will be stopped and the State Historic Preservation Division will be notified.

3.8 WATER QUALITY

As stated in the Coastal Engineering Evaluation (see **Appendix A**), potential water quality impacts during construction would be temporary and minor because (a) the work would be conducted entirely landward of the shoreline and (b) the existing seawall and rock blanket would be left in place during construction, thereby minimizing potential discharge of material

to the ocean. The project requires only limited dewatering. Wastewater would be retained onsite and would not be discharged to State waters.

3.9 FLOOD HAZARD

According to the Flood Insurance Rate Map, the seaward one-third of the property lies within Flood Zone AE. The Base Flood Elevation (BFE) is shown as six (6) feet. The ground elevation at the site varies between +9.0 to +9.9 MSL, which exceeds the BFE. The City's Flood Hazard ordinance does not regulate fences and walls, unless they lie within a Floodway or a Coastal High Hazard District. The remaining two-thirds of the property lies in Flood Zone X, which is outside the 500-year flood plain.

3.10 NOISE

Construction of the foundation and repair of the boat ramp would generate noise from the use of heavy equipment, but the work would be confined to daylight hours and would be relatively short-term. Construction activities would comply with *Hawaii Administrative Rules, Chapter 11-46, Community Noise Control*, administered by the State Department of Health.

3.11 AIR QUALITY

Air quality impacts attributed to the proposed action would include exhaust emissions and dust generated by short-term, construction-related activities. These impacts would be minimal because of the limited extent of the project and sandy soils. Construction activities would be conducted in compliance with State air pollution control regulations contained in *Hawaii Administrative Rules, Chapter 11-60.1-33, Fugitive Dust.*

3.12 ROADS AND UTILITIES

The proposed action would have no effect on existing roadways, traffic, or parking; except for short-term construction-related traffic. The action would also have no effect on water

supply, wastewater systems, drainage facilities, solid waste disposal, electrical power, or communications services.

3.13 PUBLIC SERVICES

The proposed project would not result in any change in the demand or supply of public services, including police and fire protection and school, medical and recreation facilities.

3.14 SUMMARY OF SHORT-TERM AND LONG-TERM MITIGATION MEASURES

As indicated above, the project would cause no significant long-term impact to recreational, biological or scenic resources. The owners' contractor will take appropriate action to mitigate noise and dust impacts from short-term construction activities.

3.15 SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The emergency action to reinforce the seawall also prevented further subsidence of the subject property and thus further limits the potential movement of sand seaward. Consistent with the findings stated in the Coastal Engineering Evaluation, the proposed project is not anticipated to create any significant long-term impact on littoral processes along Lanikai Beach.

3.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Resources to be committed are limited to rock, other construction materials, and human effort. The project would be paid for with private funds.

4. Consideration of Alternatives

The Coastal Engineering Evaluation (**Appendix A**) discusses various alternatives to the construction of a seawall, including beach nourishment, an offshore breakwater, and a sloping rock revetment (see Sections 4.0 and 5.0). In the present case, a seawall has protected the lot for 46 years.

Sloping Revetment. It is theoretically possible to remove the nonconforming seawall and replace it with a sloping revetment, designed to tie into revetment that protects the adjoining lot to the north. The toe of the revetment would be placed no less than three feet below Mean Sea Level (-3.0 MSL) and would rise at a 2:1 slope – 2 horizontal to 1 vertical – to the elevation of the rear yard, about +10.0 MSL. With a four-foot-wide crest at the top, the structure would occupy an area at least 30 feet deep across the shoreline frontage of the lot.

Changing the form of shore protection along this relatively small stretch of coast (the lot is 77 feet wide) would provide little or no benefit to the shoreline environment. Moreover, construction would be difficult and would impose risks to the dwellings on either side. A substantial amount of sand and soil would have to be excavated and disposed of offsite. Construction activity would come within 10 feet of the residence on parcel 108 and within five feet of the residence on parcel 99, with the result that it could affect the slab foundations of both. Because of the proximity of these residences, retaining walls would be needed on either side of the revetment.

This alternative was considered but rejected due to (a) the risks to the neighboring residences and the environment and (b) the lack of benefit to the shoreline environment.

No Action. If the Department of Planning and Permitting were to find that reinforcing the nonconforming shore protection is not warranted, then presumably it would require removal of the support wall and other improvements. In that case, the owner would seek to repair the nonconforming wall to its prior condition.

The emergency action taken to install the support wall inland of the existing nonconforming seawall prevented catastrophic failure of the structure. Removal of the support wall – particularly the underground portions – would very likely destabilize the seawall. If the seawall were to fail in the future, it would no doubt cause hundreds of cubic yards of soil to fall into the ocean. This would result in substantial pollution and turbidity. If the wall were to fail, the owner would no doubt apply for permits to replace it with another shore protection structure.

The "no action" alternative is no more feasible today than it was at the time when storm waves first damaged the nonconforming seawall. Loss of the seawall would lead to large-scale erosion not only of the Wang's rear yard but also of the adjoining parcel 99. This erosion could undermine both the seawall protecting parcel 99 and the residence on that property.

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

HRS Chapter 205A sets forth objectives and policies for coastal zone management in Hawaii, as well as delegating regulatory authority over 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 (from HRS Section 205A-2):

> Provide recreational opportunities accessible to the public by:
>
> > "protecting unique coastal resources" (i.e., sand beaches); and
> >
> > "providing and managing adequate public access to and along the shoreline."
>
> Protect beaches for public use and recreation by "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 taken the dry beach area and a portion of the homeowner's yard. A shore protection structure will prevent the further erosion of sediments from the private property and therefore the further nourishment of the beach from that property. In the present case, the property has had a shore protection structure for 40 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 instances where there is a hardship and therefore provides a variance procedure. Under HRS Section 205A-46(9), a variance may be granted where shoreline erosion would cause hardship if the shore protection structure were not allowed.

Maintaining the existing nonconforming seawall will have no effect on the existing shoreline, coastal resources, or public access along the shoreline.

6. List of Approvals and Permits Required

In addition to a Shoreline Setback Variance, the project also requires a variance to exceed the maximum height of a retaining wall under Section 4.40 of the Land Use Ordinance (LUO) . If the Shoreline Variance is approved, then the applicant will also obtain an after-the-fact Building Permit.

7. Determination of Significance

According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact would result from the development. 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 or cultural resources.**

   Approval of the construction would not affect littoral processes, nor would it change the pattern of continuing coastal erosion on the south end of Lanikai Beach. The construction would not affect public access to the shoreline. The subject property does not contain any known biological or cultural resources.

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

   In accordance with the zoning, the subject property is committed to private residential use. The proposed project would preserve beneficial uses of the privately owned land. The project would affect beach resources inasmuch as it would extend the life and effectiveness of the existing seawall, thus continuing to prevent the erosion of sand from the property onto the public beach. If erosion continues, then the area of dry beach in this reach of the Lanikai shoreline would continue to decrease. If accretion occurs, then sand would accumulate seaward of the seawall, forming dry beach for public use.

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 development is consistent with the Environmental Policies established in Chapter 344, HRS. The proposed construction would not affect the State's natural resources and would not lower the total quality of life for Hawaii residents. While the project does not support the guideline of preserving shorelines free of manmade improvements, it is consistent with the longstanding history of government decisions approving shore protection structures in Lanikai. On the middle section of Lanikai Beach, the beach has accreted despite the presence of shore protection structures.

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

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

5. **Substantially affects public health.**

The proposed project would not affect public health.

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

The proposed project does not involve substantial secondary impacts.

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

It is not anticipated that the proposed project would degrade environmental quality.

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 for larger actions. It continues a 70-year history of episodic construction of shore protection along various reaches of Lanikai Beach. It is unclear whether or not the building of shore protection

structures in Lanikai has had a considerable cumulative effect on the environment. Seawalls built 20-30 years ago in the central section of Lanikai have since been entirely covered by sand that extends to a wide dry beach.

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

There are no endangered plant or animal species located 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, but these impacts would be negligible. Water quality may be temporarily affected by construction.

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 waters.

The proposed construction is expressly designed to preserve residential structures from the effects of coastal erosion and will also provide some protection from storm waves or tsunami. It is not expected to increase the 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.

The proposed project would not affect any public scenic vistas or view planes identified by the county or state.

13. Requires substantial energy consumption.

The proposed project and its construction are small-scale and would not require substantial energy consumption after construction is complete.

8. Anticipated Determination

Based on the findings of this Environmental Assessment, 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.

FIGURES

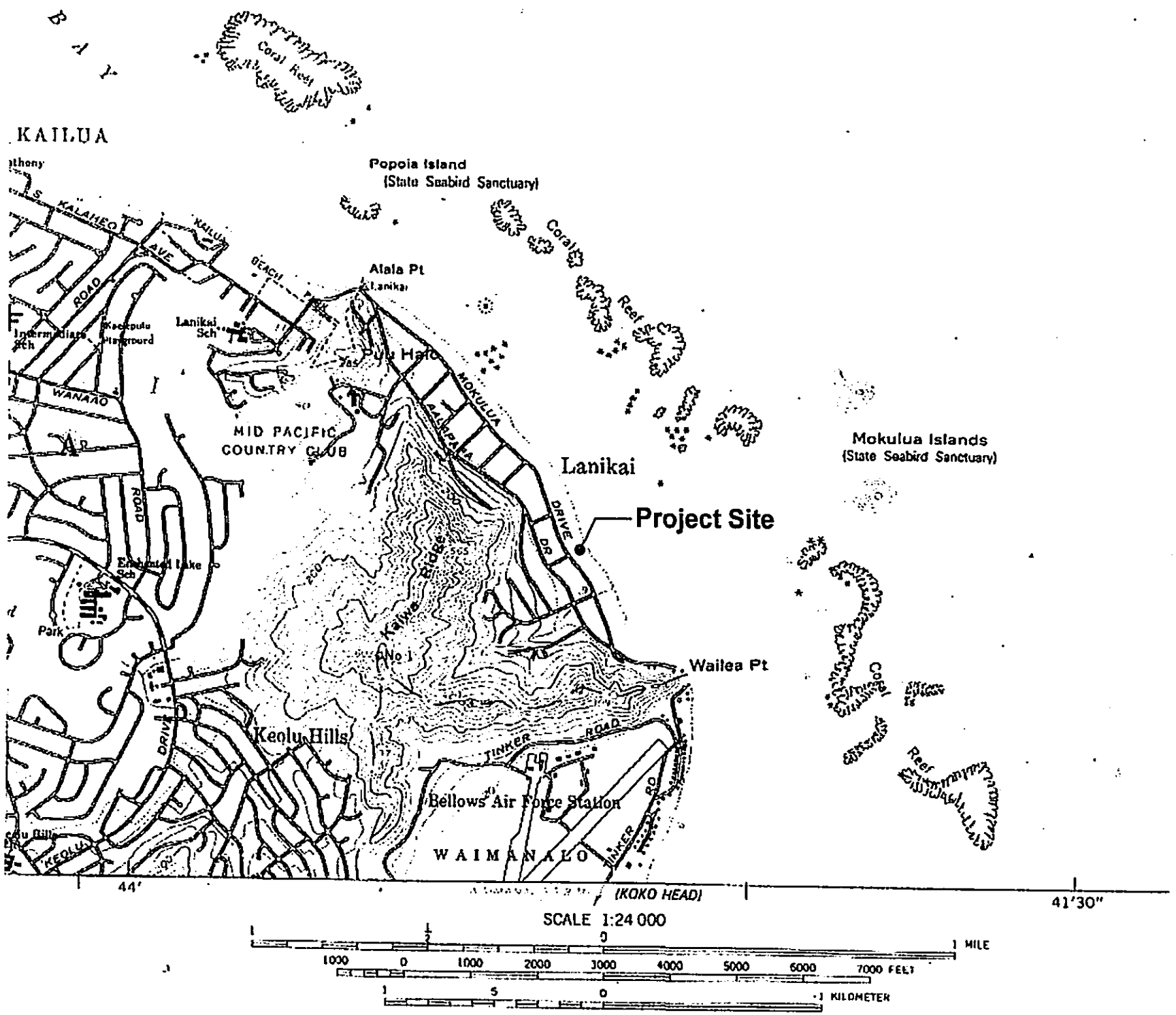


FIGURE 1
Location Map

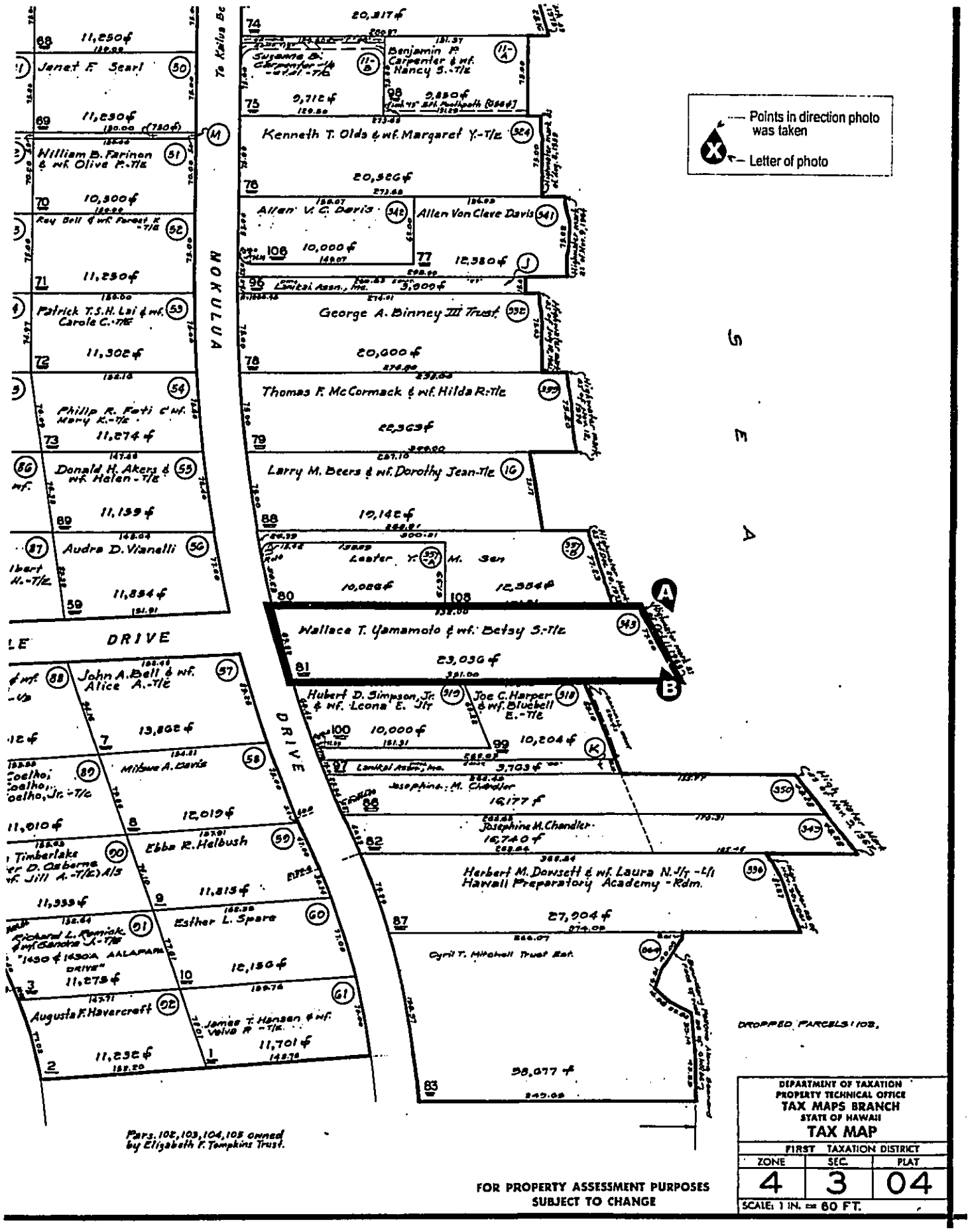


FIGURE 2a
Tax Map and Photo Key

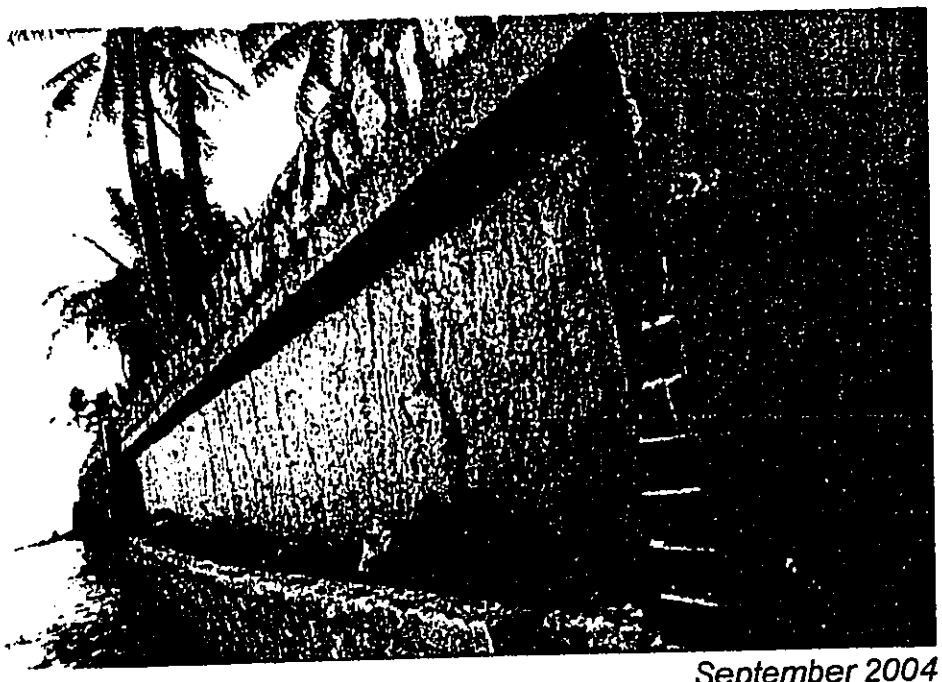


Photo A

September 2004

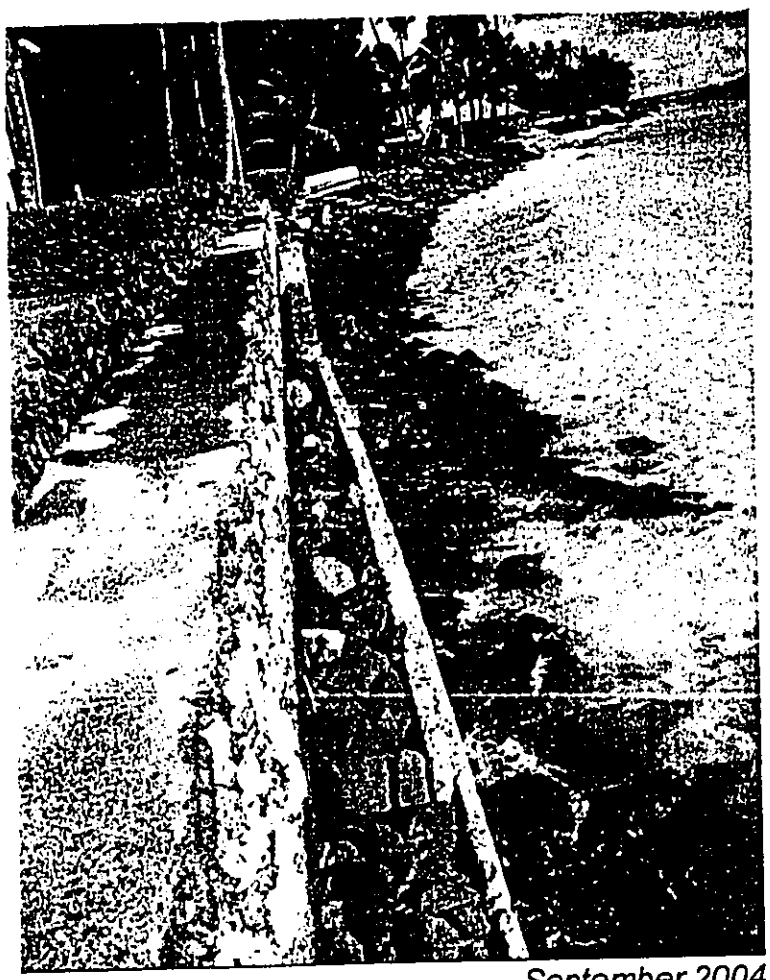


Photo B

September 2004

FIGURE 2b
Photos

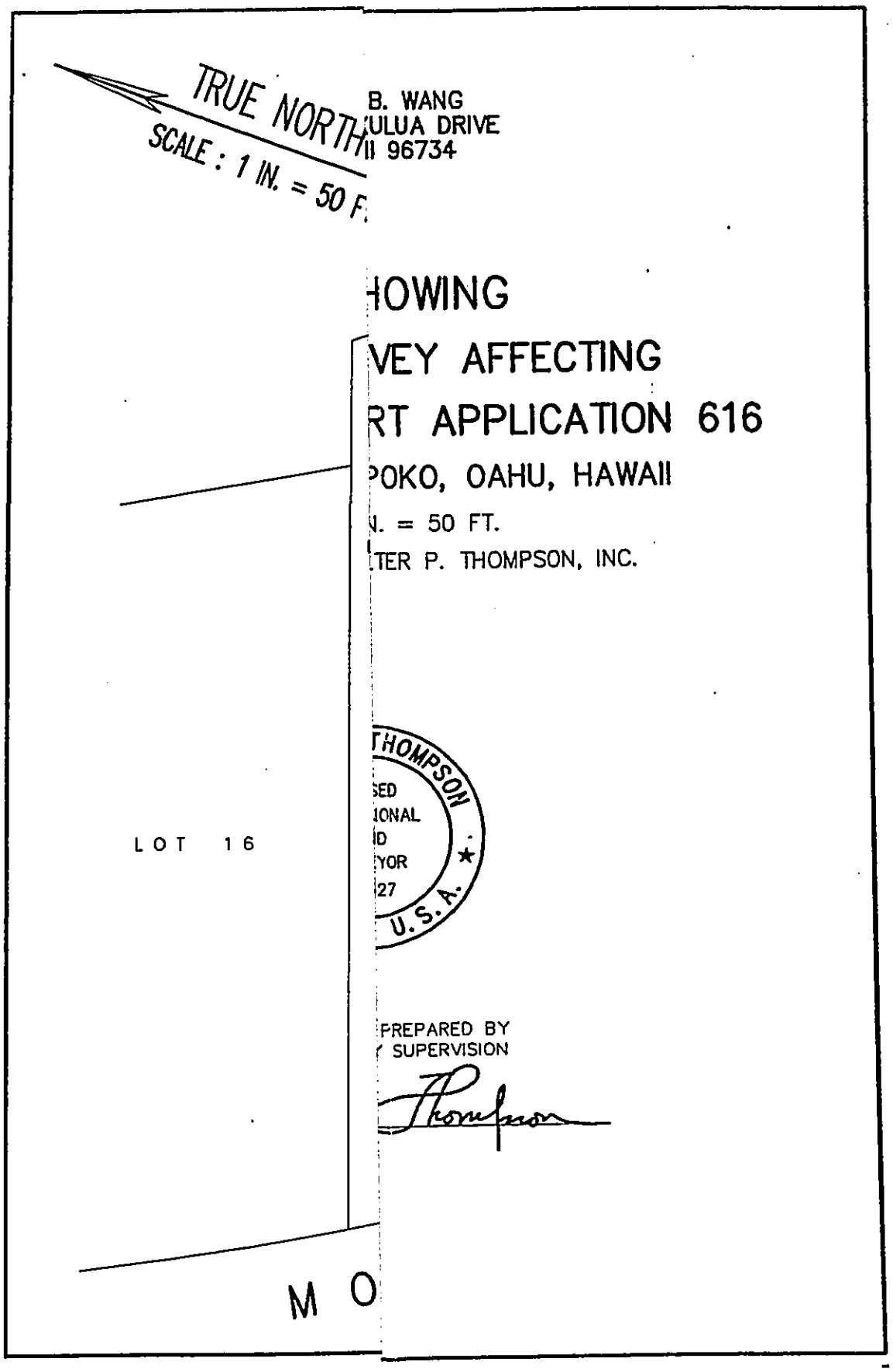


FIGURE 3
Certified Shoreline Survey

CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

OWNER: CHARLES B. WANG
1360 MOKULUA DRIVE
KAILUA, HI 96734

LONG
ROCKS

VED

MAP SHOWING
SHORELINE SURVEY AFFECTING
LOT 343, LAND COURT APPLICATION 616
AT KAILUA, KOOLAUPOKO, OAHU, HAWAII

SCALE : 1 IN. = 50 FT.

MAY 5, 2004 WALTER P. THOMPSON, INC.

JAMES R. THOMPSON
LICENSED
PROFESSIONAL
LAND
SURVEYOR
No.3627
HAWAII, U.S.A.

The shoreline as delineated in red is hereby certified as the shoreline as of

JUN 24 2004.

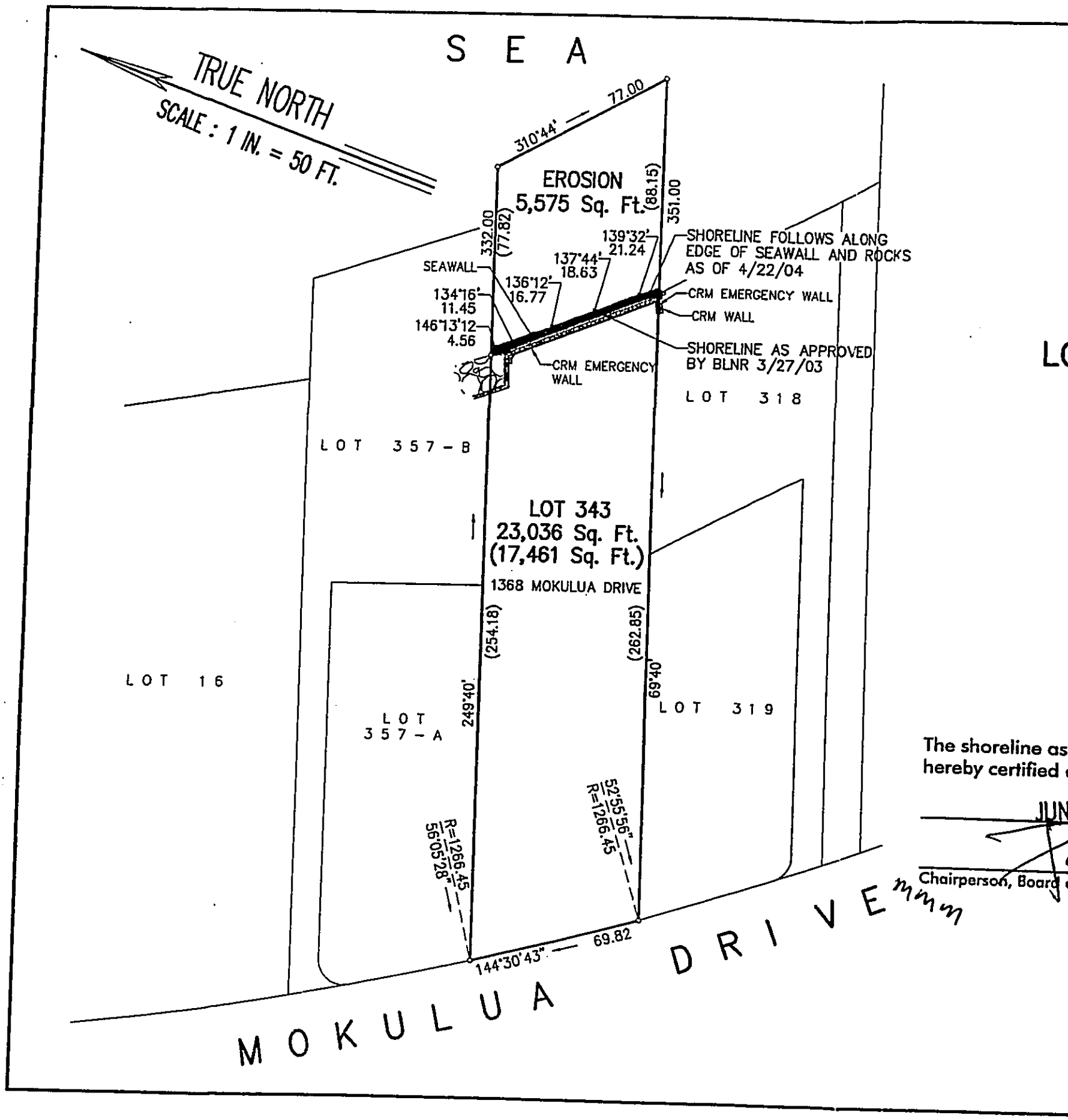
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Chairperson, Board of Land and Natural Resources

James R. Thompson

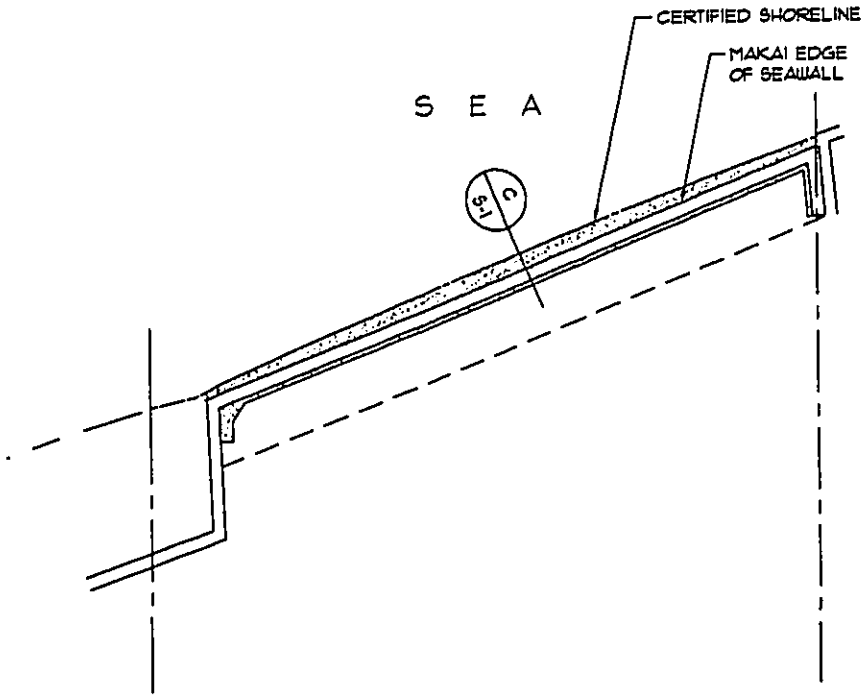
E mmm

FIGURE 3
Certified Shoreline Survey



The shoreline as
hereby certified

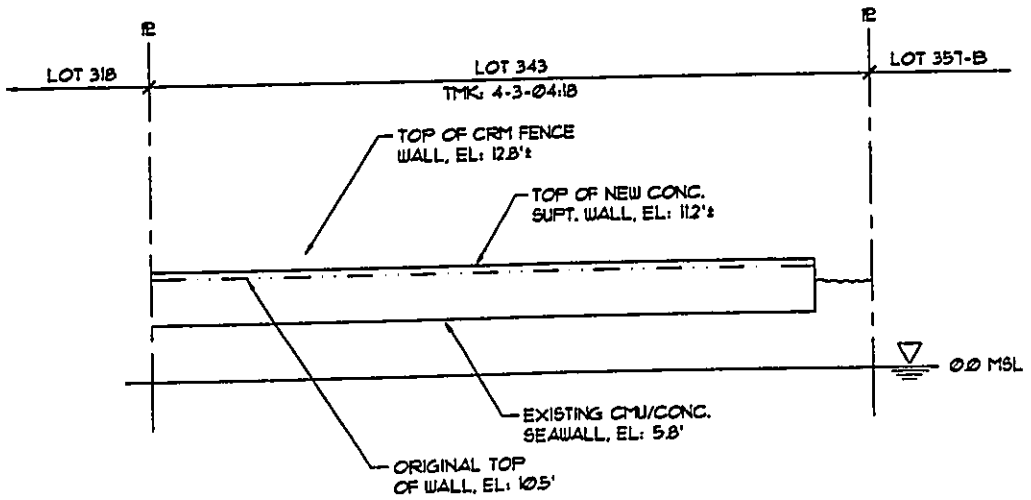
Chairperson, Board

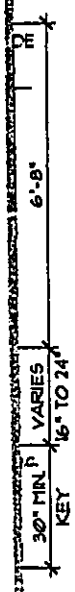


WALL LAYOUT PLAN

B / S-1

SC: 1"=10'





ELEVATION OF SEAWALL LOOKING MAUKA

D / S-1

SC: 1"=10'

FIGURE 4 Wall Plans (revised)

REVISIONS

THOMAS Y. TANIMURA LICENSED PROFESSIONAL ENGINEER No. 4926-S HAWAII U.S.A.

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

Repair Seawall at 1368 Mokulua Drive

TAX MAP KEY : 4 - 3 - 04 : 81

TANIMURA & ASSOCIATES, INC.
CONSULTING STRUCTURAL ENGINEERS
925 Bethel Street, Suite 309 • Honolulu, Hawaii • 96813

GENERAL NOTES, SITE PLAN
WALL LAYOUT PLAN
SECTION

DRAWN TT
DATE 12/14/05
SCALE AS NOTED
SHEET S-1

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE BUILDING CODE OF THE HONOLULU CITY AND COUNTY (LATEST).

2. ALL WORK SHALL BE PERFORMED MAUKA OF THE CERTIFIED SHORELINE.

3. BACKFILL SHALL CONSIST OF CLEAN SAND. WRAPPED WITH A GEOTEXTILE FABRIC SUCH AS MIRAFI FILTERWEAVE.

4. THE NEW WALL SHALL BE POSITIVELY TIED-IN AT EACH END TO THE RETURN WALLS OF THE ADJOINING PROPERTIES.

REINFORCED CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO ACI 318-95.

2. ALL CONCRETE SHALL BE NORMAL WEIGHT (150 PCF) WITH AGGREGATES CONFORMING TO ASTM C-33. UNLESS OTHERWISE NOTED, THE MINIMUM COMPRESSIVE STRENGTHS OF CONCRETE AT 28 DAYS AND MAXIMUM AGGREGATE SIZES SHALL BE AS FOLLOWS:

	STRENGTH	AGGREGATE SIZE
ALL	5000 PSI	3/4"

3. MAXIMUM WATER-CEMENT RATIO SHALL NOT EXCEED 0.40. CONCRETE SHALL CONTAIN 5% SILICA FUME BY WEIGHT OF CEMENT AND 3 GALLONS OF CALCIUM NITRITE PER CUBIC YARD. IN ADDITION, TREMIE CONCRETE SHALL CONTAIN 10 FLUID OUNCES OF THE LIQUID ANTI-WASHOUT ADMIXTURE, RHEOMAC UW 450 PER 100 POUNDS OF CEMENTITIOUS MATERIAL. THE USE OF A SUPERPLASTICIZING ADMIXTURE IS RECOMMENDED FOR THE PUMP MIX.

4. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60.

5. UNLESS OTHERWISE NOTED, SPLICES, LAPS, DOWEL EXTENSIONS AND EMBEDMENTS SHALL BE 45 BAR DIAMETERS MINIMUM.

6. ALL REINFORCING BARS MARKED CONTINUOUS (CONT.) ON THE PLANS SHALL BE LAPPED 40 BAR DIAMETERS MINIMUM.

7. STAGGER ALL SPLICES WHERE POSSIBLE.

8. REBARS SHALL BE SUPPORTED, BENT AND PLACED AS PER "MANUAL OF STANDARD PRACTICE FOR DETAILING CONCRETE STRUCTURES" ACI 315 (LATEST).

10. MINIMUM COVER IN INCHES FOR REBARS FOR CAST-IN-PLACE CONCRETE SHALL BE 3".

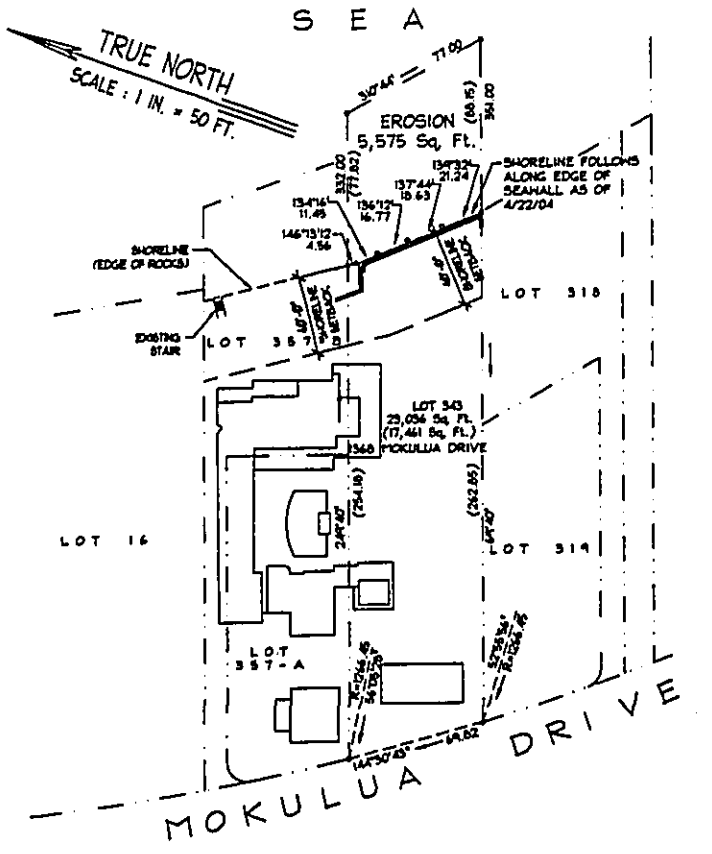
11. AT TIME CONCRETE IS PLACED, REINFORCING SHALL BE FREE FROM MUD, OIL, LAITANCE OR OTHER COATINGS ADVERSELY AFFECTING BOND CAPACITY.

GRAPHIC SCALES:

0' 50' 100' 150'
1" = 50'

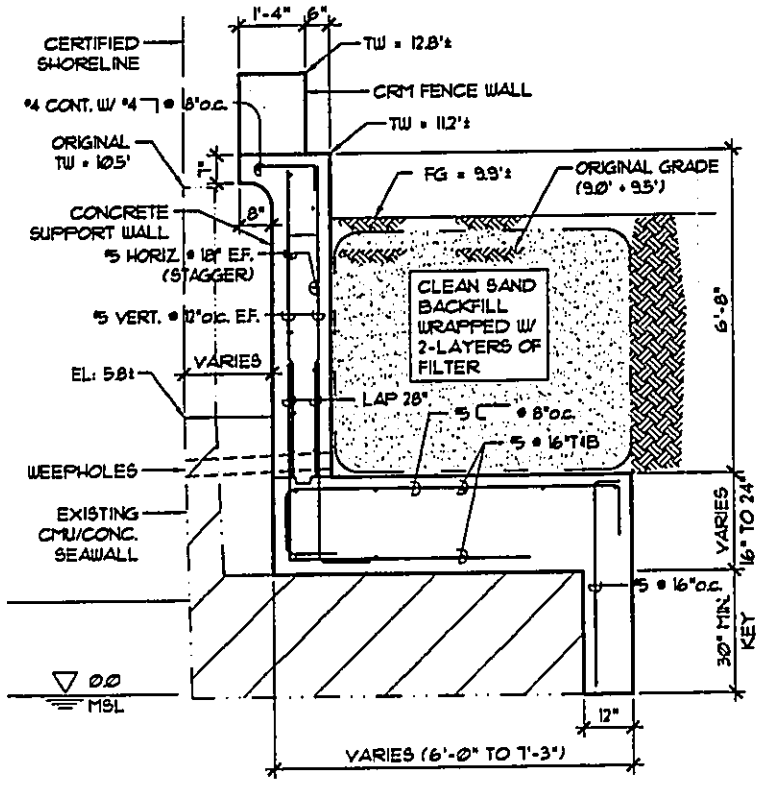
0' 10' 20' 30'
1" = 10'

0' 1' 2' 3' 4' 5' 6'
1/2" = 1'-0"



SITE PLAN
SC: 1"=50'

A
S-1



SECTION
SC 1/2" = 1'-0"

C
B-1

LOT 318

ELEVA
SC: 1"=10'

Appendix A

EKNA Services, Inc.

Engineers
and
Environmental
Consultants

Engineering
Planning
Surveys
Computer
Modeling

615 Piikoi Street
Suite 300
Honolulu, Hawa
96814-3139

Telephone:
(808) 591-8553
Facsimile:
(808) 593-8551

CN 2465

October 13, 2004

Mr. Eric G. Crispin, AIA
Director of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment (DEA)
Shoreline Setback Variance for Seawall Repairs
1368 Mokulua Drive - Lanikai
TMK: 4-3-004:081

Dear Mr. Crispin,

At the request of Mr. Robin Foster of PlanPacific, Inc., I have reviewed the subject DEA and after-the-fact repairs to the seawall on the subject property owned by Charles B. Wang at 1368 Mokulua Drive in Lanikai. Following are my comments:

The existing CMU seawall that was constructed on the subject property prior to 1960 was severely damaged during the November 2003 storm. A new support wall was constructed on the landward side of the old wall to prevent wave overwash and erosion of soil from the property. Substantial pollution of nearshore waters would have resulted from erosion damage and loss of property should the old wall have continued to sustain catastrophic damage. About 6 feet height of the old wall and its foundation remain to stabilize the base of the new support wall.

This portion of Lanikai Beach has been subject to erosion for over 35 years. As you know, Edward K. Noda and Associates, Inc. (presently EKNA Services, Inc.) is very familiar with the past history of shoreline changes, having provided coastal engineering services to numerous Lanikai homeowners, including Mr. John Dilks who owns two contiguous properties north of the applicants' lots (TMK: 4-3-04:74 and 4-3-05:61).

Because the work that has been completed did not change the character of the shore protection on the property, and the adjacent properties on both sides of the subject property are also protected with structures, there will not be any significant impact on the existing coastal processes. The Coastal Engineering Evaluation report prepared by EKNA for the Environmental Assessment to support the SSV for Mr. Dilks' seawall is also applicable and appropriate to the subject property. I have recommended to Mr. Foster that our report be included in entirety as an Appendix in his Environmental Assessment to provide the required coastal engineering information to support his SSV application.

Very truly yours,

Elaine E. Tamaye
President

cc: Mr. Robin Foster

Edward K. Noda
and
Associates, Inc.

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and
Environmental
Consultants

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Planning
Surveys
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Modeling

615 Piikoi Stree
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96814-3116

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COASTAL ENGINEERING EVALUATION FOR A SHORE PROTECTION STRUCTURE AT LANIKAI, OAHU, HAWAII (TMK:4-3-4:74 and 4-3-5:61)

Prepared by:

Edward K. Noda and Associates, Inc.
615 Piikoi Street, Suite 300
Honolulu, Hawaii 96814

(EKNA Control No. 1781)

December 1997
(Revised)

Coastal Engineering Evaluation
for a Shore Protection Structure at Lanikai, Oahu, Hawaii

1.0 LOCATION AND PROBLEM IDENTIFICATION

The project site is located along two (2) contiguous parcel shorefronts at Lanikai, at 1286 and 1302 Mokulua Drive (TMK: 4-3-4:74 and 4-3-5:61). Both parcels are owned by John Dilks. Figure 1 shows the general site location and Figure 2 provides portions of the Tax Map Key for both parcels.

Because of severe ongoing erosion to these two parcels, particularly during the 1995-1996 winter season, emergency sandbag protection was initiated in April 1996 and completed in May 1996. The SEAbags[1] were placed along the eroded escarpment to form a protective slope. Authorization for this work was obtained from the State of Hawaii Department of Land and Natural Resources (DLNR) and from the U.S. Army Corps of Engineers. Coordination with the City and County Department of Land Utilization was also undertaken.

Unusually large North Pacific swell during November 1996 caused severe shoreline erosion and wave overtopping damage to the windward Oahu coastline. While properties adjacent to the subject parcels suffered additional erosion damage, the emergency sandbag protection prevented significant additional damage to the shoreline embankment fronting the subject properties. However, damage and loss of individual SEAbags did occur, causing slumping of the protective structure and scouring at the crest. Significant wave overtopping also caused sand and water damage to the house and property.

Because the beach fronting this Lanikai coastline is continuing to erode, and because the SEAbag structure was intended as only a temporary emergency measure, the property owner desires to construct a permanent shore protection structure. In accordance with Ordinance No. 92-34 and the Shoreline Setback Rules and Regulations of the City and County of Honolulu, this coastal engineering evaluation is prepared in support of an application for a Shoreline Setback Variance for a permanent shore protection structure extending across the two subject parcels.

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[1]Trade name for large sand bags from Bulk Lift International, designed for beach erosion protection.

2.0 SHORELINE CHARACTERISTICS AND COASTAL PROCESSES

Lanikai's beaches have been undergoing net long-term erosion over the past 30 years or so. The coastal reaches at both the northern and southern end of Lanikai are devoid of dry beach, and beach erosion is progressing towards the middle section of this coastline. Various types of seawalls and revetments protect about 2,500 feet of shoreline reach northward of Wailea Point (at the south end of Lanikai) and about 1,500 feet of shoreline reach southward of Alala Point (at the north end of Lanikai). A narrow beach remains along about 3,000 feet of shoreline in the middle segment, but erosional processes are continuing to affect this reach with the starving of sediment from the endpoints of the Lanikai coast.

The project site is located at the southern boundary between the "unprotected" middle segment and "armored" southern end of Lanikai. Beach and shoreline erosion has been steadily progressing northward into the "unprotected" middle segment. Where a narrow dry beach (above the limits of typical wave uprush during high tide) fronted the project site about 7 years ago, now there is no dry beach as well as additional loss of about 10-20 feet of shorefront property. The shoreline escarpment is within about 10 feet of the house foundation on parcel 74, which prompted the owner to construct emergency SEAbag protection.

Figure 3 is a shoreline survey that was performed in February 1996 just prior to the placement of the SEAbags. The SEAbags were stacked against the shoreline embankment to prevent further erosion of the property which could lead to damage to the house foundation. If not for the SEAbags, the large winter waves of November 1996 would certainly have caused more serious damage to the house. Although significant wave overtopping and wave splash carried sand and water onto the property and dwelling, the SEAbags prevented significant additional shoreline erosion and potential undermining of the house foundation. However, in preventing significant additional erosion of the shoreline, the SEAbag protective structure did suffer damage from these storm waves, compromising the integrity of the structure. Storm wave damage, coupled with the ongoing problem of vandalism (bags intentionally or unintentionally cut by beach users and fishermen), had resulted in significant damage and loss of individual SEAbags within a 6-month period following the initial placement of the emergency structure. The owner subsequently replaced the damaged bags to restore the SEAbag revetment structure to its approximate original configuration.

Although the wave climate along the Lanikai shoreline is relatively mild because of the protection afforded by the shallow offshore fringing reefs and islands, ongoing beach erosion threatens properties and homes that are not fronted by wave protective structures. Typical nearshore wave heights are 1 foot or less, with typical maximum wave heights less than 2 feet. Extreme breaking wave height at the shoreline is estimated to be less than 4.8 feet at the project site.

Beaches protect the shoreline by dissipating wave energy through wave breaking and runup processes. However, as beaches narrow because of ongoing erosion processes, more wave energy reaches the shoreline or "fastlands" mauka of the beach, causing erosion damage to the private properties. Property owners typically lose substantial property area and are faced with increasing danger of losing houses and other improvements to erosion damage before they are compelled to expend substantial amounts of money to erect shore protection measures. As in this case for the subject project, combined loss to erosion of almost 3,000 square feet has occurred for the two parcels, and erosion is threatening the foundation of the house and pool.

The nearshore wave approach patterns are complex due to interactions between the wave trains and the irregular offshore reefs and islands. In general, within the Lanikai littoral cell, net transport is predominantly northward from Wailea Point during summer months due to easterly tradewind-generated waves and southeasterly swell that may reach this coastal area, and southward from Alala Point during winter months due to North Pacific swell. This accounts for the greatest loss of beach at the endpoints of the Lanikai littoral cell, and the greater stability of beach area within the middle segment. Because there is a deficit of sand at the southern end of Lanikai, there is little sand transport towards the project site during predominant easterly tradewind wave conditions. During periods of more northerly tradewind waves and in winter months when northerly swell can occur, southward longshore transport of sand from the beaches in the middle segment of Lanikai can result in some buildup of sand along the project reach. However, because winter North Pacific swell can be more energetic than typical tradewind waves, they can also cause more wave damage to properties that are already vulnerable to erosion damage because of narrow or non-existent dry beach area.

3.0 HISTORIC BEACH AND SHORELINE CHANGES

Data from a prior study[2] indicates that the southern end of the Lanikai shoreline has experienced considerable accretion and subsequent erosion over a long-term period from 1950 to the 1980s, while the middle segment has been relatively more stable. It is evident that the erosion trend is continuing at present, and progressing into the middle segment.

Between 1950 and 1970, the southern end of Lanikai accreted substantially, a maximum of about 200 feet near the Lanipo Drive drainage channel. Over a 2,500 feet length of shoreline north of Wailea Point, average accretion of the vegetation line was 50 feet and about 90 feet for the beach toe line, over the 20-year period. From 1970 to the early 1980s, this shoreline reach eroded back to the approximate 1950s position. Most of the seawalls were constructed in response to this erosion cycle. This long-term accretion-erosion cycle was not unique to Lanikai, as similar shoreline movement occurred at Kailua Beach Park. Figure 4a shows the average cumulative movement of the shoreline at the southern end of Lanikai, and Figure 4b shows the historical shoreline movement at Kailua Beach Park at the location of two transects northward of the boat ramp. The long-term accretion-erosion cycle was a natural process, possibly caused by shifts in wind and wave patterns. In general, long-term cycles have been observed in meteorological trends and it has been postulated[3] that there is a cycle with an appropriate period involving the variation in mean direction of the tradewinds near the Hawaiian Islands.

The seawalls and revetments armoring the entire southern end of Lanikai were constructed in response to the erosion cycle to protect existing residential improvements, and were not the cause of the erosion. Their influence now, however, may be to discourage sand buildup because of the increase in reflectivity. Deficit of sand along this southern end of Lanikai is causing a gradual shift of the erosion trend northward into the middle segment of the Lanikai coast which historically has been relatively stable. The project site is in the transition zone between the armored

---

[2]Based on analysis of historical aerial photos as described in the study report "HAWAII SHORELINE EROSION MANAGEMENT STUDY, Overview and Case Study Sites (Makaha, Oahu; Kailua-Lanikai, Oahu; Kukuiula-Poipu, Kauai)", prepared by Edward K. Noda and Associates, Inc. and DHM Inc., for the Hawaii Coastal Zone Management Program, Office of State Planning, June 1989.

[3]Wyrtki, K. and G. Meyers, (1975), "The Trade Wind Field Over the Pacific Ocean - Part 1. The Mean Field and the Mean Annual Variation", Hawaii Institute of Geophysics Report HIG-75-1.

southern end of Lanikai and the middle segment that has undergone relatively small fluctuations in the position of the shoreline and beach. Because there is no evidence that the long-term erosion cycle in the vicinity of the project site is likely to reverse, the subject property owner and others to the north will likely suffer progressive erosion damage, and have little recourse but to build shore protection structures to prevent erosion damage to their homes.

About seven years ago, four property owners with unpermitted seawalls were required to remove the walls and replace them with sloping revetment structures. The prevailing opinion at that time was that sloping revetment structures were less harmful to the beach than vertical seawalls. These four contiguous properties are located about 200 feet south of the project site, on the south side of the public right-of-way (TMK:4-3-4:96). The property on the immediate north side of the public right-of-way (TMK: 4-3-4:77) was the last armored property along this southern reach at that time, also with an unpermitted shore protection structure.

After lengthy litigation with the City and County, a settlement agreement was reached with the property owner of parcel 77. The settlement agreement required that the unpermitted rock slope be removed and a system of sand-filled bags would be used initially to construct a protective revetment structure. Because the Lanikai Community Association was considering pursuing a comprehensive plan for replenishment or restoration of sand along the Lanikai shoreline, the sand bag system would serve as interim protection until such time as the beach was restored. However, because of the uncertainty of the beach restoration program and the questionable long-term durability of the sand bag revetment under storm wave attack and continued beach erosion, the property owner would be permitted to construct a permanent rock revetment if and when the sand bag revetment does not serve to adequately prevent erosion and wave damage to the property. The settlement agreement also included the adjacent parcel 76 (on the north side of parcel 77) and parcel 96 (the public right-of-way on the south side of parcel 77).

The sand bag work was initiated in late 1995. By February 1996, SEAbags had been placed along parcels 77, 76 and 98 (parcel 98 is adjacent to subject parcel 74). SEAbags were not only stacked along the shoreline embankment, but were also placed seaward of the shoreline to form a somewhat protective breakwater berm seaward of the beach toe. The offshore berm was apparently intended to function by tripping the waves and, in the process, trapping suspended sand landward of the berm to rebuild

the beach. The SEAbags on the adjacent properties did not survive the 1995-1996 winter season very well. The SEAbag revetment on adjacent parcel 98 had to be rebuilt in February-March 1996, and by that time, the property owner of the two subject parcels had suffered extensive erosion damage. Photos 1 through 8 show the condition of the subject properties and adjacent properties in February-March 1996.

Whether the SEAbag work undertaken on the adjacent parcels aggravated the erosion on the subject parcels is speculative. However, the erosion that was experienced during that 1995-1996 winter season was particularly severe, prompting the subject property owner to also construct a SEAbag revetment as an emergency shore protection measure. The SEAbag revetment on the subject parcels was initiated in April 1996 and was substantially completed in May 1996. Photos 9 through 11 show the completed SEAbag revetment on the subject parcels and the condition of adjacent properties in June 1996. In November 1996, severe winter waves caused additional damage to the already deteriorated SEAbag system on the adjacent parcels, and also caused some damage to the SEAbag revetment on the subject parcels. Erosion damage to the adjacent unprotected property on the north side of the subject parcels also occurred. In early 1997, the subject property owner replaced the damaged SEAbags to restore the condition of his SEAbag revetment.

Photos 12 through 17, taken in May 1997, show the existing condition of the SEAbag revetment on the subject parcels and the condition of adjacent properties. Note that the shoreline fronting the adjacent properties to the south is continuing to be modified by placement of SEAbags, removal of prior SEAbags that were damaged, placement of additional beach sand obtained from offsite source(s), and possibly mechanical re-distribution of sand in the nearshore area. While the details are unclear, apparently the work is being done as part of a demonstration pilot project for beach replenishment by the Lanikai Beach Management Committee.[4] A Departmental Permit for use within the Conservation District was issued by the Board of Land and Natural Resources on June 3, 1996 for the demonstration beach replenishment project. A condition of the permit was the requirement to perform pre-, during-, and post-construction beach profile monitoring and topographic monitoring for at least a year. The first monitoring report for the "Pilot Research Project" was filed in September 1997 by David Lipp, the coastal engineer who is monitoring the project on a volunteer basis. The report

---

[4]Reference: Conservation District Use Application for a Demonstration Pilot Project for Beach Replenishment on State-owned Submerged Lands Identified as Offshore at Kailua, Oahu, File No. OA-2802, dated May 31, 1996, Department of Land and Natural Resources.

includes time series graphs of beach profiles for five transects along the shoreline. Each graph shows data from four observations made between September 1995 and June 1997. Attached as Appendix A, Lipp's report states that sand movement into the area over time is due to environmental conditions, not the SEAbags themselves. According to Lipp, *"What is important to note is that the sandbags did not prevent the beach from reforming."*

The monitoring report and its conclusions were reviewed in a memorandum dated September 8, 1997, which is attached as Appendix B. In summary, the review:

(1) concurred with Lipp's conclusions and commented on the seasonal movement of sand on Lanikai Beach;

(2) pointed out that there was no evidence of restoration of any dry beach area and that, without the SEAbags protecting the properties, there could have been greater loss of fastlands;

(3) observed that quarterly measurements would account for seasonal changes and provide more meaningful data; and

(4) observed that the monitoring report lacks any description of the work actually performed over the 21-month period, including the amounts of sand added to the littoral system and the various configurations of SEAbags tested.

In any event, the "Demonstration Pilot Project" is limited to a small portion of the Lanikai shoreline and is unlikely to benefit the Dilk's property or the adjacent properties to the north. As stated in the Conservation District Use application, it is experimental in nature. To date, there is no known plan to undertake a comprehensive beach replenishment/restoration program.

In Photo 17, note also that seawalls are now exposed on two parcels to the north of the subject parcels (TMK: 4-3-05:62 and 63). Located on the south side of a public right-of-way (TMK:4-3-05:87), these seawalls were probably built some time ago but were obscured with vegetative growth because this section of beach had accreted and was relatively stable until recent times. With this past winter storm wave damage to the shoreline area, the seawalls are now fully exposed.

In summary, the City and County of Honolulu has made concerted effort over the last ten years to enforce the shoreline setback rules and regulations in a way that would minimize potential impacts to the beach and shoreline at Lanikai. Unpermitted seawalls were required to be replaced with sloping rock revetments, and sand bags were required to be used in lieu of permanent shore protection as an interim measure in hopes that the erosion trend may diminish or reverse. As of this date, the long-term erosion trend is continuing, and there is no evidence of significance difference in beach response related to the types of shore protection structures that have been built. Construction of the proposed seawall would not foreclose the possibility of future restoration of a wide beach strand, whether by natural or artificial means. In the 1960's and 70's, seawalls were built along other portions of Lanikai Beach which were then suffering erosion but have subsequently experienced accretion. Along the middle part of Lanikai Beach, accreted sand has built up the beach in front of the seawalls, in some cases almost to the full height of the walls. The history along Lanikai Beach gives evidence that the presence of a seawall does not preclude natural beach accretion.

4.0 CONSIDERATION OF ALTERNATIVES

Beach restoration and nourishment would be the preferred alternative for the entire southern end of Lanikai. Unfortunately, this alternative is costly and not an economically viable alternative for individual residential property owners. Beach nourishment would be required for a long stretch of shoreline reach extending beyond the subject parcels, since wave energy will quickly redistribute small quantities of beach material unless beach containment structures (such as groins) are built to confine the beach fill fronting individual parcels or short stretches of shoreline. If no structural measures are built to stabilize the beach fill, periodic nourishment would likely be required. Beach restoration and nourishment, in general, is difficult to design and maintain as a "shore protection" alternative. For the beach to provide adequate protection during storm wave events, it must have adequate beach width, elevation, and length along the entire shoreline reach within the defined littoral cell. The large quantities of suitably coarse natural beach sand required for major beach restoration/nourishment projects are not readily available in Hawaii. In fact, sand is periodically barged to Hawaii from overseas locations (such as Australia) for commercial sale to golf courses at premium cost. For beach restoration programs, the actual "cost" of implementation includes the regulatory (EIS/permits), design, initial construction, and periodic nourishment costs. All phases involve substantial commitment of resources, clearly beyond the financial capability of individual residential landowners.

An offshore breakwater structure would be a suitable alternative to mitigate continued erosion damage. A low profile offshore breakwater would not significantly affect scenic views while still serving to dissipate the incoming wave energy, thereby forming a protective area in the lee of the structure. Since littoral sediment transport processes require breaking wave energy to transport the littoral materials at the shoreline, a reduction of the incident wave energy will directly reduce erosion in the lee of the breakwater. Access to the beach and nearshore waters would not be affected by the offshore structure. However, the breakwater must be properly designed to function adequately. For example, it must have adequate dimensions (length, width, height) to dissipate storm wave energy, it must be built with materials that will maintain its structural integrity under storm wave attack (large boulders or concrete armor units), and it must not affect nearshore circulation in a way that may cause water quality problems or dangerous currents. Offshore breakwater construction is costly and carries a higher risk than onshore construction. Repair or maintenance of the

structure, if damaged due to an extreme storm event, is also very costly due to difficulty in accessing the structure with conventional land equipment.

For individual residential property owners, seawalls and revetments are the most viable methods of protecting the shoreline from wave attack. Seawalls are vertical or near-vertical structures, typically concrete or grouted rock masonry walls. Revetments are sloping structures typically constructed using rock of sufficient size to remain stable under design wave attack, although there are a variety of manufactured systems and materials used to build sloping revetment structures. Seawalls are generally less costly to construct than revetments since they can be built using smaller building materials than rock revetments and require much less total quantity of building material. Near-vertical seawalls also occupy less space along the shore than sloping revetments, and their narrow footprint maximizes use of the backshore areas as well as minimizing encroachment into the public shorefront seaward of the structure.

For sandy shorelines, vertical impermeable seawalls are generally not as desirable as permeable rock revetments because of their high reflectivity, which can cause scouring of the sand in front of the structure and can lead to undermining at the base of the wall if the seawall is not founded on hard material. For beach environments, rock revetments are more effective in dissipating wave energy and are not prone to catastrophic damage due to its flexibility. However, revetments must be properly designed such that the armor layer is stable under design wave attack, and with proper provisions for underlayer(s) and filter material to prevent leaching of the foundation or backfill material through the voids in the rock layers. Revetments can also suffer scouring of sand in front of the structure, and the revetment toe must be designed to prevent undermining at the base of the rock slope, which can lead to slumping or unraveling of the rock slope. Because revetments occupy substantial space on the shoreline due to their sloping face and multiple rock layers, in some cases there is insufficient space between the certified shoreline and the dwelling to construct a revetment because of the substantial erosion that has already occurred.

To construct a sloping revetment on the Dilks' property would entail building a portion of the structure seaward of the certified shoreline, within the jurisdiction of the State Conservation District. This would necessitate applying for and obtaining a Conservation District Use Permit from the State Board of Land and Natural Resources. It could also require a permit from the U.S. Army Corps of Engineers.

The placement of SEAbags for interim shore protection, as has been used at the subject property to provide a protective revetment slope, is effective but cannot be considered a permanent measure. The bags are prone to damage from storm wave attack and vandalism, and can require frequent and continual maintenance. The cost of materials and labor to install the bags is less than $300 per linear foot of revetment (assuming that in-situ sand is used to fill the bags). But considering the potential long-term maintenance requirement, the total cost over 25 years can be greater than the cost of initially constructing a permanent shore protection structure. Sand bags are considered "environmentally benign" because the color and texture of the fabric blends in with the beach, and they can be easily removed by simply cutting the bags to release the sand contents. However, they are not "soft" structures in their as-built state. In fact, the large sand bags are solid, hard building materials when fully filled, and a sand bag revetment structure probably is more reflective than a rock revetment, for the same slope. Although the bag material is permeable (meaning that water will pass through the bag material), once the bags are filled and stacked to form a structure, the overall porosity (ratio of void space to hard surface) of the structure is very low on the time scale of wave impact. Therefore, because there are few voids between the stacked bags, wave energy is more readily reflected rather than dissipated within the structure slope as would be for a rock revetment. Another potential concern is that bags that are below the water line or within the tidal/swash zone become very slippery because of algal growth, and pose safety problems where people can slip and injure themselves. Even newly installed bags with no algal growth can be slippery because of the smooth surface of the bag material.

5.0 DESCRIPTION OF PROPOSED ACTION

Because of the severity of the shoreline erosion fronting the subject parcels, there is little space between the certified shoreline and the house and swimming pool structures. The only type of structure which can physically be constructed landward of the certified shoreline (county jurisdiction only) is a near-vertical seawall. As discussed in Section 4.0 above, constructing a sloping revetment would entail extending the structure seaward into the State Conservation District and would require obtaining a Conservation District Use Permit. Although the Department of Land and Natural Resources has stated that it favors a vertical seawall in this situation, a plan for a sloping revetment has been prepared and is provided as an alternative to the vertical seawall (see Section 5.2 below).

5.1 Proposed CRM Seawall

A concrete reinforced masonry (CRM) seawall is a practical and visually attractive type of shore protection which has been constructed on many lots throughout Lanikai Beach. The seawall would be built landward of the certified shoreline[5] fronting both subject parcels. The seawall would extend along approximately 150 feet of shoreline frontage, with short return sections at each end. Figure 5 shows the proposed layout plan for the seawall and Figure 6 shows a typical section prepared by the property owner's structural engineer.

The top of the seawall would be at elevation 9 feet above MSL, which is at or slightly above the existing grade of the property shoreline. The bottom of the wall would be placed 3 feet below MSL (or on hard material if encountered at shallower depth). Therefore, the total height of the wall is 12 feet. The existing SEAbags that are still intact would be left in place along the seaward base of the seawall, to the extent practicable, to provide additional scour protection and to facilitate construction of the wall. At present, there is little or no dry sand beach fronting the project site (i.e., waves reach the SEAbag revetment during high tide). Therefore, if not for the existing SEAbags, it would be very difficult to build the seawall because wave uprush would inundate the work area.

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[5]The February 12, 1996 shoreline survey was submitted for certification. The shoreline was certified by the State Land Surveyor on June 12, 1997.

The seawall would be constructed of rock set with cement mortar, using very large rocks at the base of the wall and smaller rocks near the top. The bottom width of the wall would be 7.5 feet. Because of the requirement to build the seawall entirely landward of the certified shoreline, the landward base of the wall would be within about 8 feet of the foundation of the house at its closest point, and within about 10 feet of the concrete slab of the pool. Temporary shoring may be required to stabilize the excavation side slope during construction.

Because the top of the wall would not extend much above the existing shoreline elevations, wave overtopping can occur during high tides and storm wave attack. Therefore, weepholes would be provided to relieve hydrostatic pressures that could result in damage to the wall or formation of sinkholes landward of the wall.

To facilitate access to the beach, stairs would be constructed at about midpoint near the boundary between the two subject parcels. No portion of the stairs would extend seaward of the certified shoreline.

At both ends, the seawall would turn mauka and extend approximately 20 feet landward along the side property boundaries. The flank sections of the wall would be virtually identical to the seaward section, except that the footing need not be extended as deep. Because wave crests are nearly parallel with the beach, the flank walls will not be subject to scouring problems. Their function is to prevent erosion on the back-side of the seawall in the event that the adjacent properties are not protected and are allowed to erode. Because the seawall must be built entirely within the Dilks' property, there is very little room to build the flank sections.

The top of the wall will have a green chainlink fence, bronze anodized railing or similar dark-colored fence or railing approximately 42 inches above grade. This is needed for safety.

5.2 Revetment Alternative

As a proposed alternative, a sloping rock revetment would be built along the certified shoreline fronting both parcels. It would extend along the 150 feet of shoreline frontage, with short return sections at each end. Figure 7 shows the proposed layout plan for the revetment, and Figure 8 shows a typical section.

The toe of the revetment would be placed 3 feet below MSL and would rise at a 2:1 slope—2 horizontal to 1 vertical—to an elevation approximately 9 feet above MSL, at or slightly above the existing grade at the property shoreline. The revetment would be approximately 18 feet wide from top to bottom, with a 4-foot crest at the top that would be level with the grade of the property.

As shown in the drawings, the revetment would be aligned in a straight line across the front of the properties and sited as far landward as possible. On the northern parcel, the toe of the revetment would extend to the seaward Land Court property boundary. On the southern parcel, the toe would be landward of the Land Court property boundary. On both parcels, the revetment would extend seaward of the certified shoreline, so that a portion would be in the Shoreline Setback, administered by the City, and a portion would be in the Conservation District, administered by the DLNR. Both a Shoreline Setback Variance and a Conservation District Use Permit would be required.

Based on the plans prepared by the applicant's structural engineer (Figure 8), the following describes the main elements of the revetment:

- Filter fabric and a bedding layer of spalls to 10-inch stones placed on a slope of 2H: 1V. The filter fabric/ bedding layer serves as a foundation for the armor stones to prevent differential settlement into the sand.

- A 2-stone-thick layer of armor stones 900-1,600 pounds in weight (stones of approximately 2-foot diameter), which are large enough to prevent dislocation by storm waves. The larger rocks would be placed on the outer surface. The ends of the filter fabric would be wrapped around large end stones at the crest and toe of the revetment.

The ends of the revetment would be armored to prevent erosion from waves wrapping around the structure, in the event that the adjacent properties are not protected and are allowed to erode.

The SEAbags currently protecting the shoreline of the property would be opened and the sand released. Alternatively, some or all of the SEAbags may be moved away from the Dilks' property and reused in the Lanikai Beach Management Committee's pilot project.

6.0 POTENTIAL LITTORAL IMPACTS

Neither the proposed seawall nor the alternative sloping rock revetment will alter the existing littoral processes affecting the site. The entire southern end of the Lanikai shoreline has been experiencing net long-term erosion since 1970, and erosion has been steadily progressing northward into the middle segment of the Lanikai coast. Unless permanent shore protection is constructed, there is a high risk of damage to the foundation of the house and pool in the near term.

The seawall will not affect longshore sediment transport processes, but there may be some concern that cross-shore transport may be affected because of wave reflection from the near-vertical impermeable face of the seawall. It has been a generally held presumption that the more reflective the structure, the greater the potential for adverse impacts by discouraging sand accumulation in front of the structure. However, given the fact that beach and shoreline erosion is continuing to occur along the Lanikai coastline where there are no shore protection structures, it can be concluded that the long-term erosion trend is a natural process that will certainly not reverse simply by constructing shore protection structures with a sloping porous surface. In fact, long-term field studies by the University of California at Santa Cruz[6], sponsored by the U.S. Army Corps of Engineers, found no significant difference in impact to the beach fronting a sloping rip-rap revetment and an adjacent vertical concrete seawall. Recent field studies conducted by Edward K. Noda and Associates, Inc. at Aliomanu, Kauai, also demonstrated that seasonal cross-shore transport is unaffected by an existing seawall. Monitoring of beach profiles over a four month period (July-October 1996) showed that seasonal beach accretion (increase in beach width) occurred in front of the near-

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[6]Because increased development in coastal areas has led to increased "hardening" of shorelines in response to net long-term shoreline erosion, there is an increased concern of coastal planners to the potential impacts of seawalls and/or revetments on beaches and shorelines. Even within the scientific and engineering community, controversy exists on whether seawalls and/or revetments are adverse and promote erosion. Because of the lack of sufficient field data to objectively resolve the controversy, the U.S. Army Corps of Engineers sponsored studies, beginning in the later 1980s, to monitor beach response to seawalls and revetments at several study sites. The following references describe the results of the monitoring:

U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center, Coastal Engineering Technical Note, CETN III-46 (3/92), CETN III-57 (6/95).

Griggs, G.B., J.F. Tait, K. Scott, N. Plant (1991), "The Interaction of Seawalls and Beaches: Four Years of Field Monitoring, Monterey Bay, California", Proceedings Coastal Sediments '91.

Griggs, G.B., J.F. Tait, W. Corona (1994), "The Interaction of Seawalls and Beaches: Seven Years of Monitoring, Monterey Bay, California", Shore and Beach 62:21-28.

vertical seawall as well as on the adjacent unprotected beach.

The erosion that is occurring along the Lanikai shoreline can be described as "passive" erosion (in contrast to "active" erosion which is induced or accelerated by shore protection structures). When a protective structure is built along an eroding shoreline and erosion continues to occur, the unprotected shoreline adjacent to the structure will continue to erode and eventually migrate landward beyond the structure. The result will be loss of beach in front of the shore protection structure as the water deepens and the shoreface profile migrates landward. This process is designated as passive erosion and is the result of fixing the position of the shoreline on an otherwise eroding stretch of coast, and is independent of the type of shore protection constructed. This is the most common result of shoreline hardening in Hawaii, and is the probable long-term consequence of building the proposed seawall at the Lanikai properties.

In the long-term, passive erosion will likely continue to affect adjacent unprotected properties. However, the consequence of not building the subject shore protection structure is the eventual loss of the house and other residential improvements to erosion damage. Because the existing improvements on the subject parcels (consisting of a 3,000 square feet slab-on-grade custom-designed house and adjacent pool) cannot feasiblely be relocated, the economic and environmental consequences of erosion damage to these improvements are very significant.

If and when a major beach replenishment/restoration program is implemented, the subject seawall and other shore protection structures will not adversely affect the design and performance of the restored beach. In fact, the existing shore protection structures will be beneficial to the long-term beach nourishment program. Periodic nourishment requirements cannot be predetermined with a high degree of assurance (because erosional forces are dependent on the wind/wave climate), and therefore severe erosion of the beach can result in damage to unprotected residential properties and improvements before renourishment can be implemented. However, if properties are already protected with a seawall or other shore protection measure, then this provides flexibility in the timeframe for planning and implementation of subsequent renourishment (for example, time to obtain the necessary funding, and to design and implement the renourishment), without the worry of imminent erosion or wave damage to residential improvements. Thus, a long-term beach replenishment/restoration program can be designed for the sole purpose of maintaining recreational beaches, rather than to serve in the additional capacity of providing shoreline protection.

Potential water quality impacts during construction of a seawall would be temporary and minor, since the seawall would be constructed entirely landward of the certified shoreline. To the extent practicable, the existing SEAbags would be left in place to form a protective berm, to protect the work area from wave uprush. This would minimize wave erosion and turbidity during the excavation to place the base of the seawall. Once the seawall is completed to a height of about 4 feet above MSL (above the height of normal wave uprush), there will be no potential water quality impacts during the remainder of the wall construction.

With respect to construction of a sloping revetment, there would be minor water quality impacts during excavation and placement of the stones. These impacts can be mitigated by performing the excavation during periods of low tide and using the larger stones to form a temporary berm that would protect the work area from wave action. This would minimize wave erosion and turbidity during excavation and would facilitate construction. There would be short-term impacts to beach access and use along this shoreline reach because, for safety reasons, public access within work limits may be restricted during the period of construction.

Photo 1: View southward showing eroded condition of subject property at TMK:4-3-4:74. (Note sand bags on beach south of subject property.)

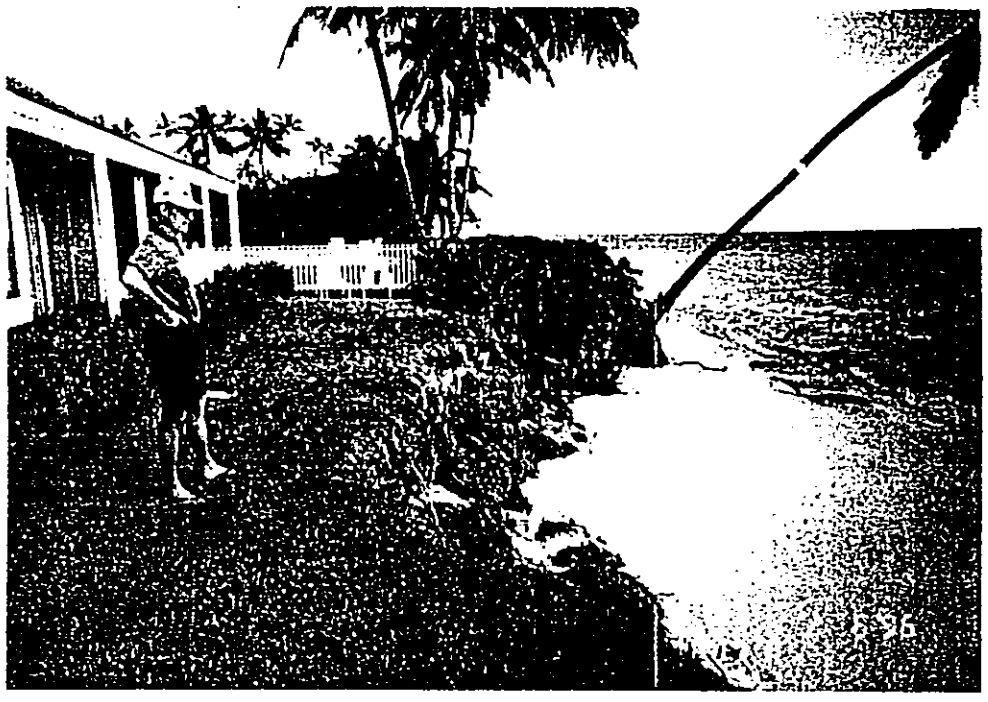


Photo 2: View northward showing eroded condition of subject property.

Photo 3: View southward fronting subject property TMK:4-3-5:61.

DATE OF PHOTOS: FEBRUARY 6, 1996 (Tide approx. +1' MLLW)

Photo 4: View northward showing damaged condition of sandbags fronting adjacent parcel 98 (Carpenter).

Photo 5: View southward showing sandbags fronting parcels 76 (Olds) and 77 (Davis).

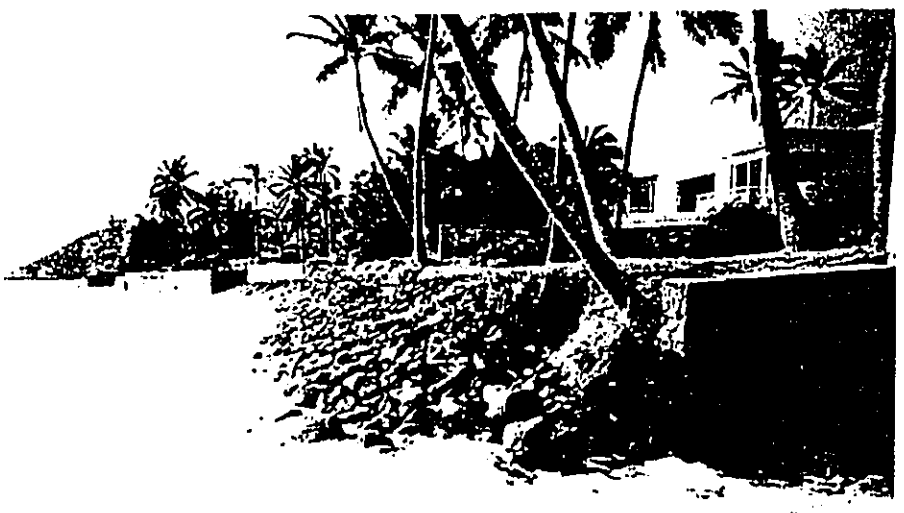


Photo 6: View southward showing condition of shoreline south of parcel 96 (public right-of-way).

DATE PHOTOS: FEBRUARY 6, 1996
(Tide approx. +1' MLLW)

Photo 7: Eroded condition of subject property at TMK:4-3-5:61. (Note erosion of shoreline vegetation and undermining/collapse of fence.)

Photo 8: View southward showing rebuilt sand bag revetment on adjacent parcel 98 (Carpenter).

DATE OF PHOTOS: MARCH 14, 1996 (Tide approx. +0.3' MLLW)

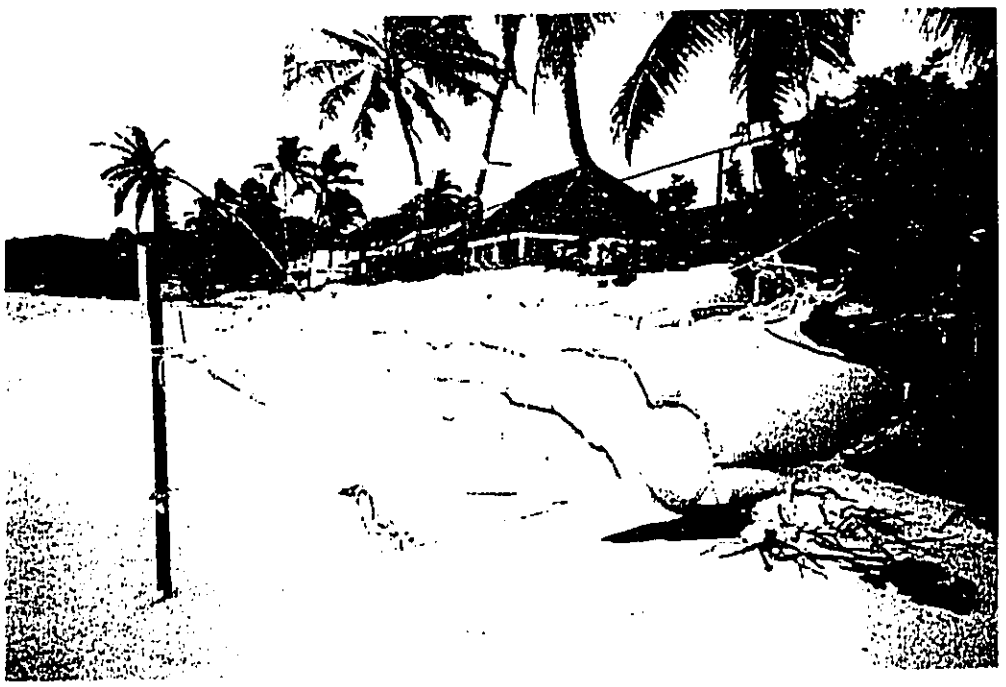


Photo 9: View southward showing completed sand bag revetment on subject property TMK:4-3-5:61.

Photo 10: View northward from parcel 76 (subject property TMK:4-3-4:74 is in background).

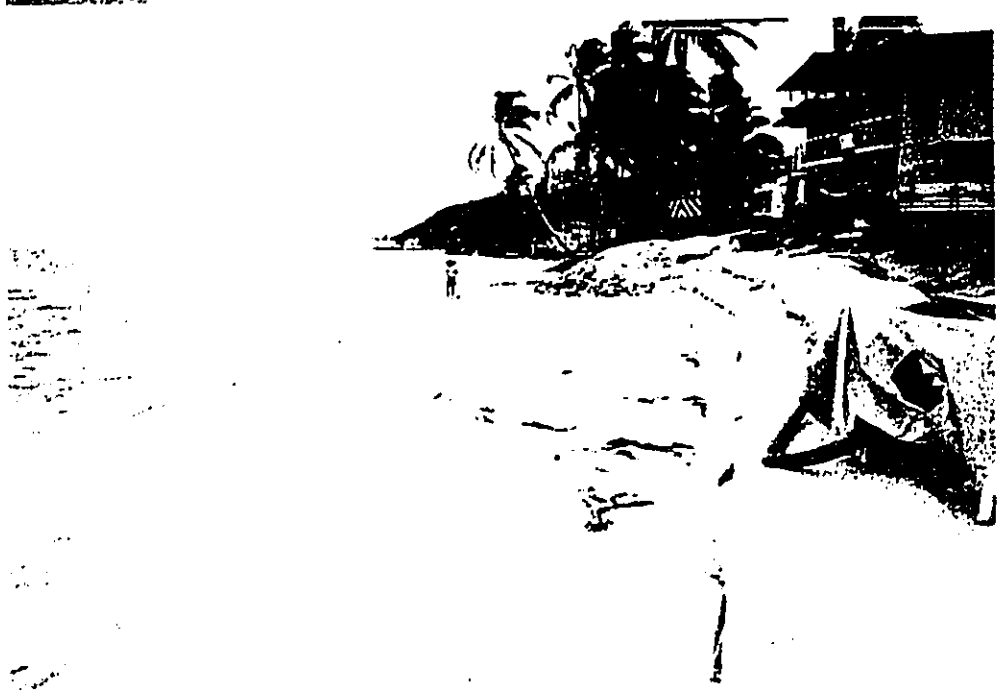


Photo 11: View southward from parcel 76.

DATE PHOTOS: JUNE 30, 1996
(Tide approx. +2' MLLW)

Photo 12: View southward fronting subject property TMK:4-3-5:61 showing condition of sand bag revetment after repairs completed.

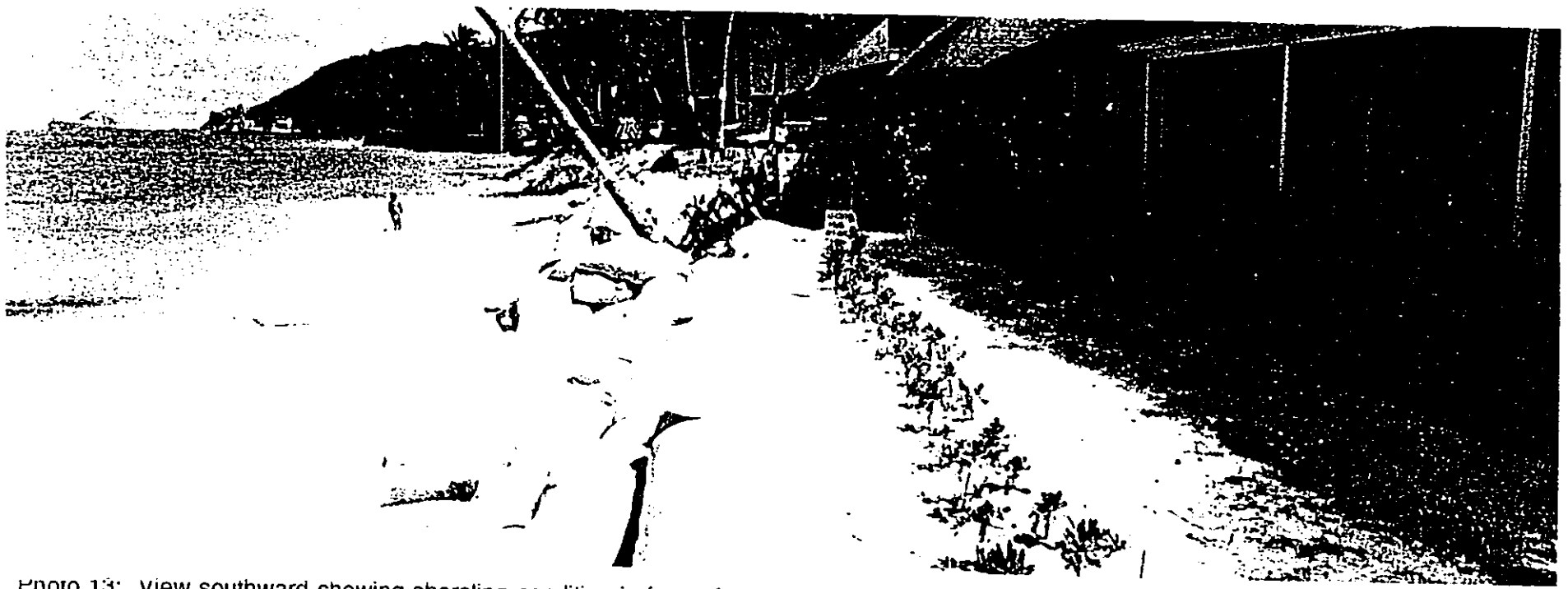


Photo 13: View southward showing shoreline condition in front of the house on subject parcel TMK:4-3-4:74.

DATE OF PHOTOS: MAY 9, 1997 (Tide approx. +1' MLLW)

Photo 14: View northward showing condition of shoreline fronting adjacent parcels 76 (Olds) & 98 (Carpenter). Subject parcel is in background.

Photo 15: View southward fronting parcel 77 (Davis). Note stockpiled sand and new sand bags on this property.

DATE OF PHOTOS: MAY 9, 1997 (Tide approx. +1' MLLW)

Photo 16: View northward from north end of subject parcel TMK:4-3-5:61 showing eroded condition of adjacent shoreline.

Photo 17: View southward from public right-of-way showing exposed seawalls on parcels 62 and 63 located north of subject parcel.

DATE OF PHOTOS: MAY 9, 1997 (Tide approx. +1' MLLW)

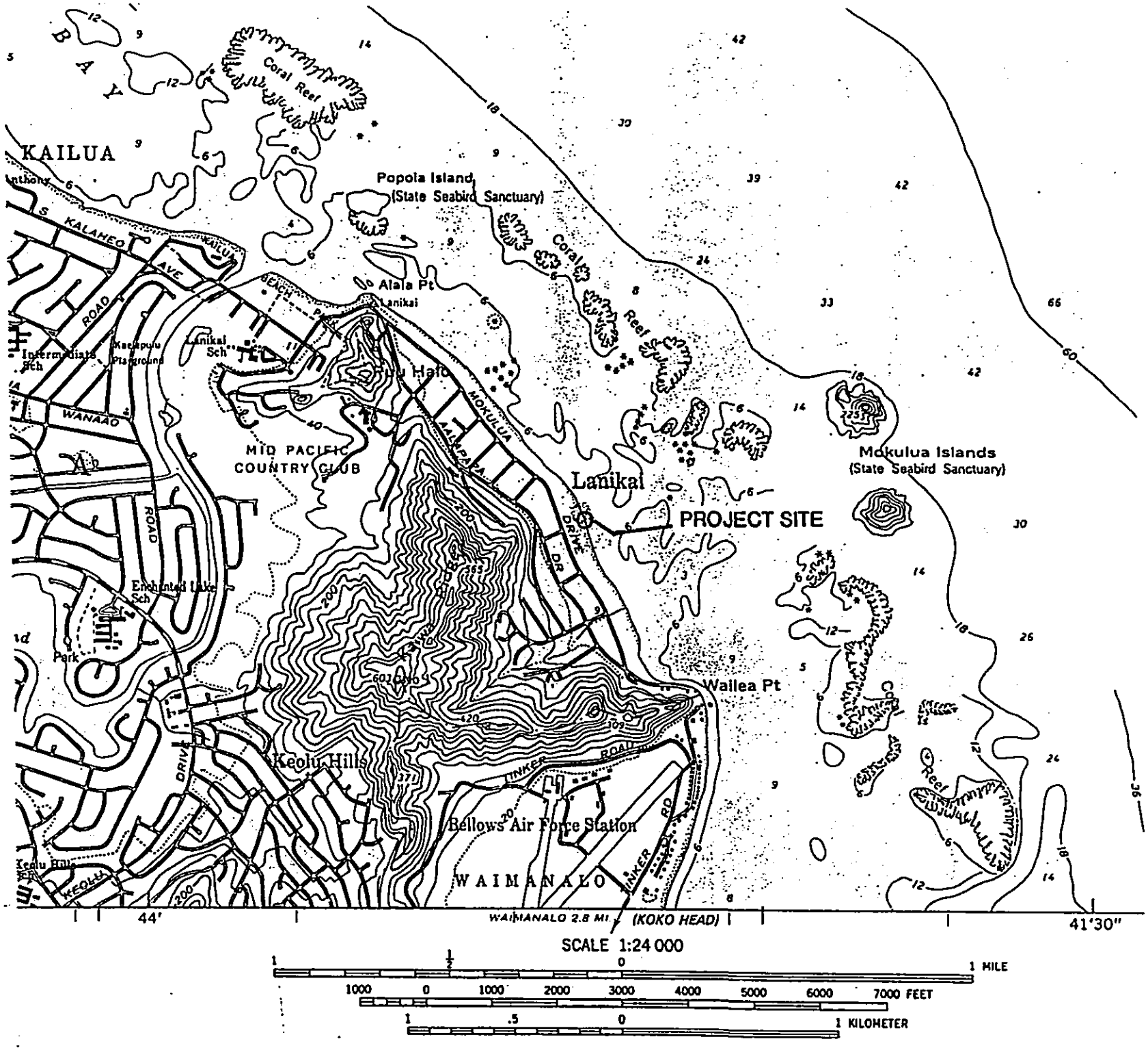

KAILUA
BAY
Coral Reef
Popoia Island
(State Seabird Sanctuary)
Alala Pt
Lanikai
S KALAHEO AVE
KAILUA ROAD
BEACH PARK
Intermediate Sch
Kaelepulu Playground
Lanikai Sch
Puu Halo
MOKULUA
KALAPAKA
MID PACIFIC COUNTRY CLUB
WANAAO ROAD
Lanikai
PROJECT SITE
Mokulua Islands
(State Seabird Sanctuary)
Enchanted Lake Sch
Park
Wailea Pt
Keolu Hills
KEOLU DRIVE
TINKER ROAD
Bellows Air Force Station
WAIMANALO
WAIMANALO 2.8 MI. (KOKO HEAD)
44'
41'30"
SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETER

FIGURE 1

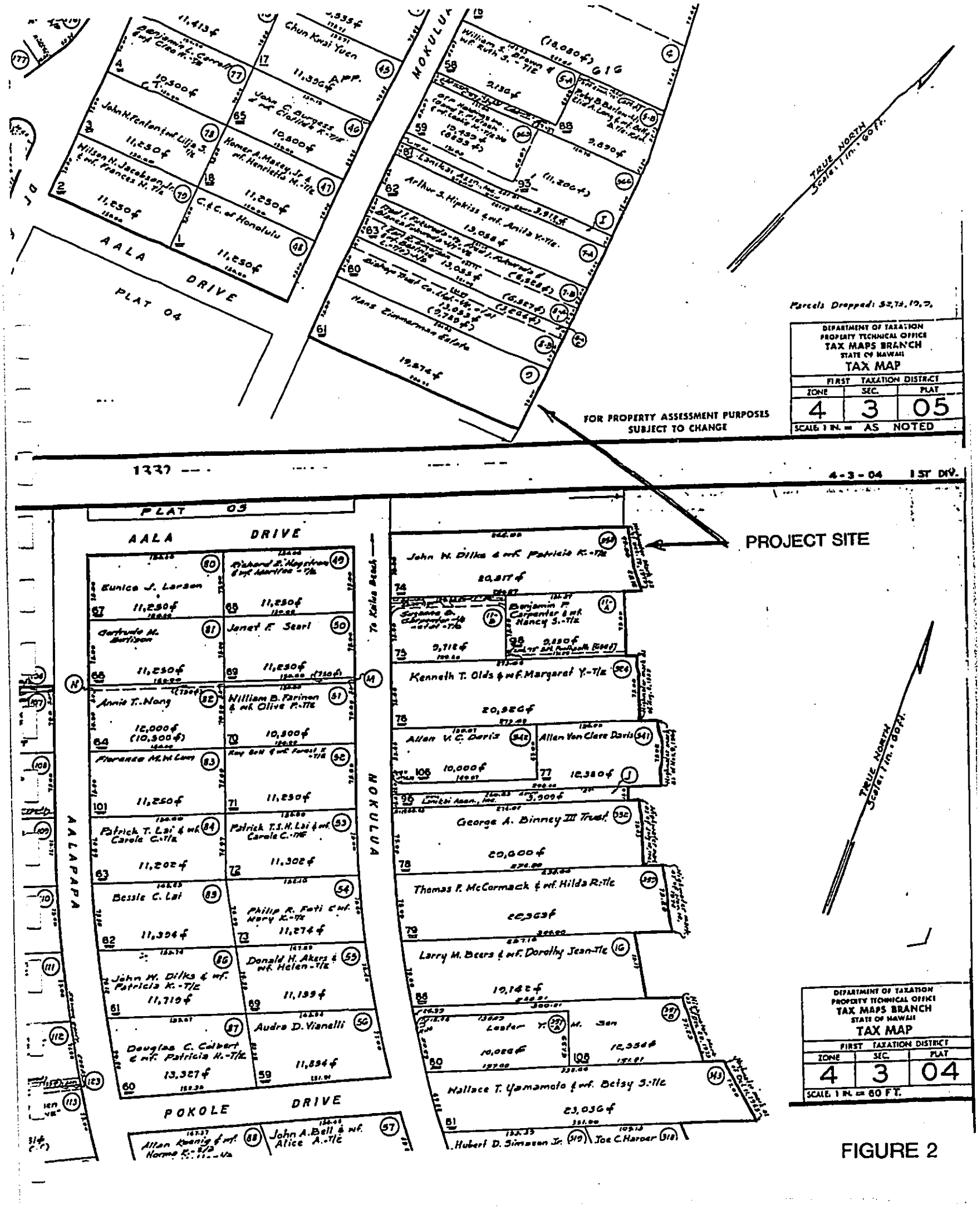
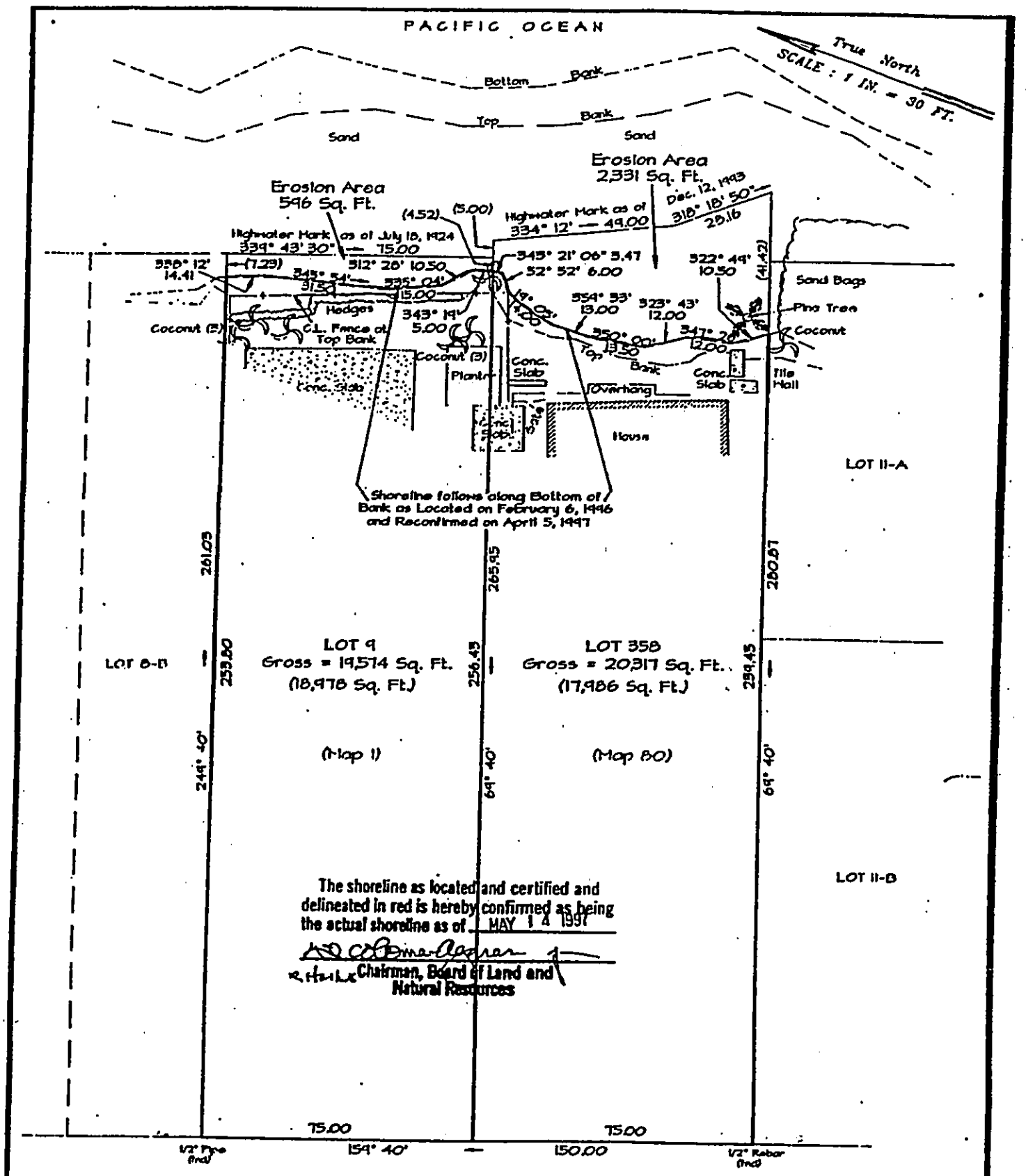

AALA DRIVE
PLAT 04
MOKULUA
AALAPAPA
POKOLE DRIVE
PLAT 05
PROJECT SITE
FOR PROPERTY ASSESSMENT PURPOSES SUBJECT TO CHANGE
Parcels Dropped: 32,73,10,9.
DEPARTMENT OF TAXATION
PROPERTY TECHNICAL OFFICE
TAX MAPS BRANCH
STATE OF HAWAII
TAX MAP
FIRST TAXATION DISTRICT
ZONE 4 SEC. 3 PLAT 05
SCALE 1 IN. = AS NOTED
4-3-04 1ST DIV.
TRUE NORTH
Scale: 1 in. = 60 Ft.
DEPARTMENT OF TAXATION
PROPERTY TECHNICAL OFFICE
TAX MAPS BRANCH
STATE OF HAWAII
TAX MAP
FIRST TAXATION DISTRICT
ZONE 4 SEC. 3 PLAT 04
SCALE 1 IN. = 60 FT.

FIGURE 2



KENDALL N. H. HEE
LICENSED PROFESSIONAL LAND SURVEYOR
No. 5649
HAWAII, U.S.A.

This work was prepared by me or under my direct supervision.

Shoreline Certification

Lot 358 as shown on Map 80
and Lot 6 as shown on Map 1
of Land Court Application 616
at Lanikai Beach Tract, Kailua, Oahu, Hawaii
T.M.K. : 4-3-04 : 74 And 4-3-05 : 61

FIGURE 3

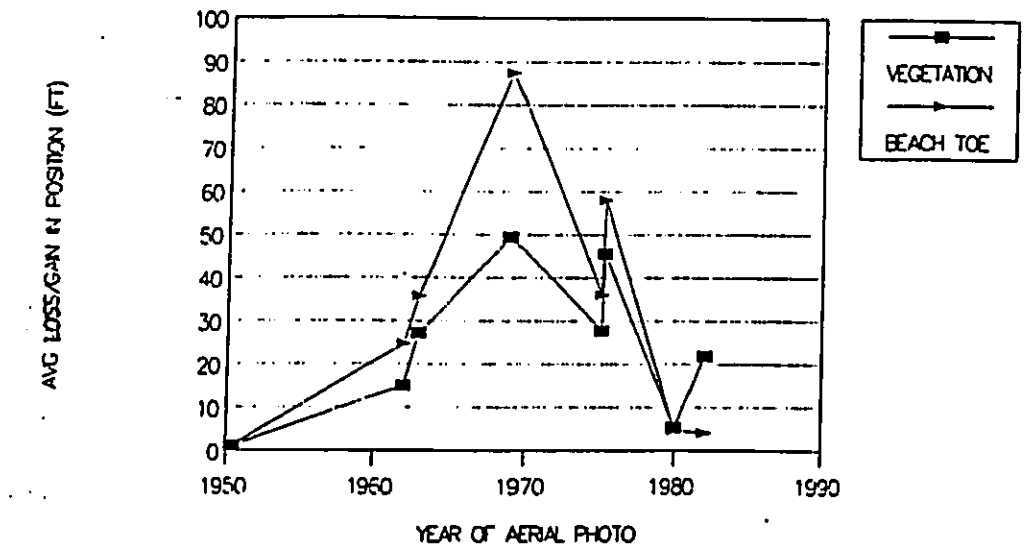


Figure 4a: Average cumulative movement for a 2,500-foot stretch of shoreline from Wailea Point northward to the project site.

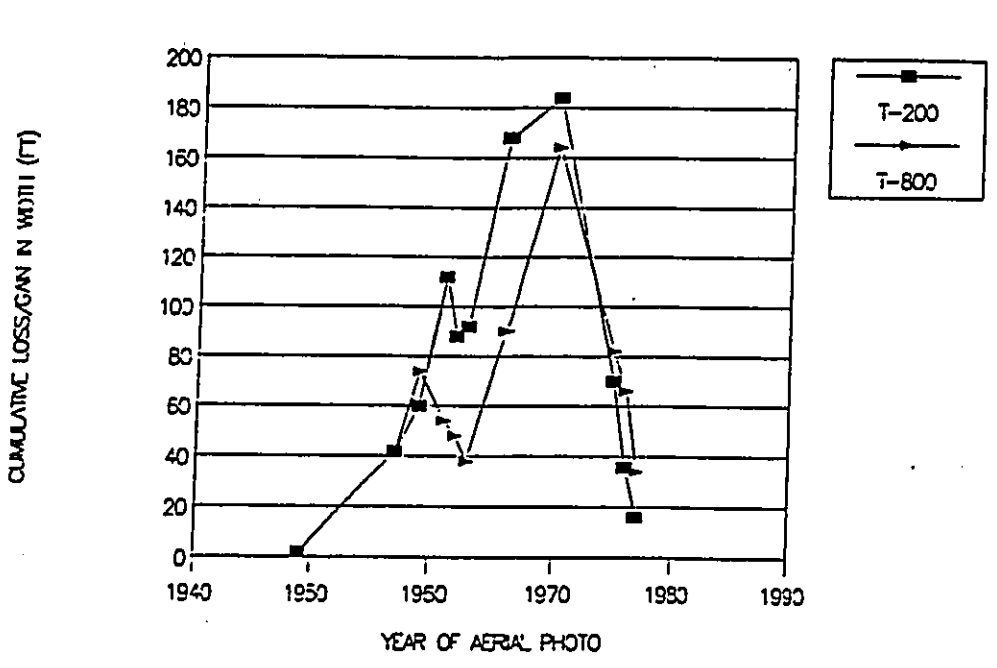
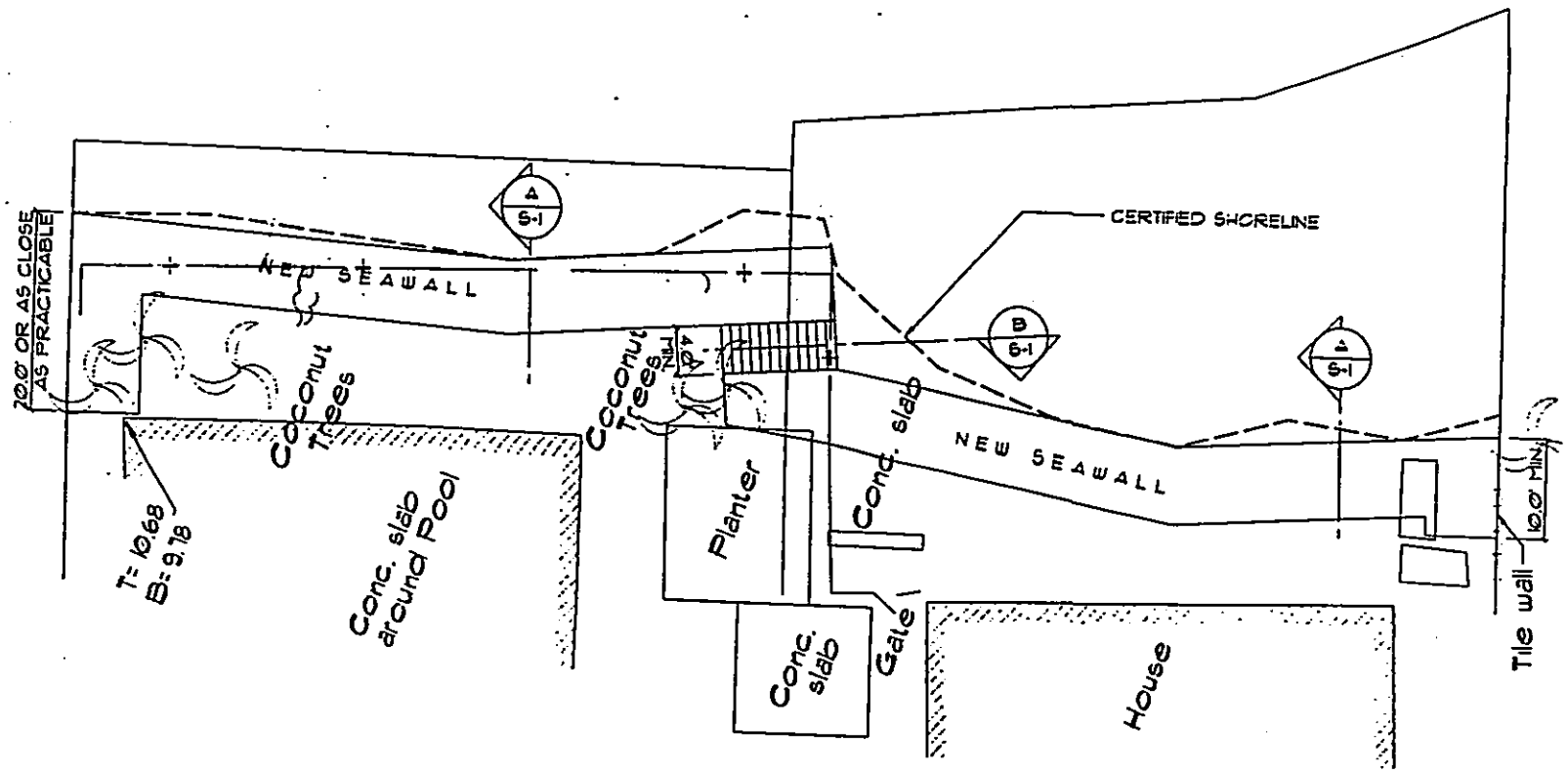


Figure 4b: Cumulative movement of the shoreline at Kailua Beach Park at locations 200' and 800' from the boat ramp.

(From "HAWAII SHORELINE EROSION MANAGEMENT STUDY, Overview and Case Study Sites - Makaha, Oahu; Kailua-Lanikai, Oahu; Kukuiula-Poipu, Kauai", by Edward K. Noda and Associates, Inc. and DHM, Inc., for the Hawaii Coastal Zone Management Program, June 1989.)

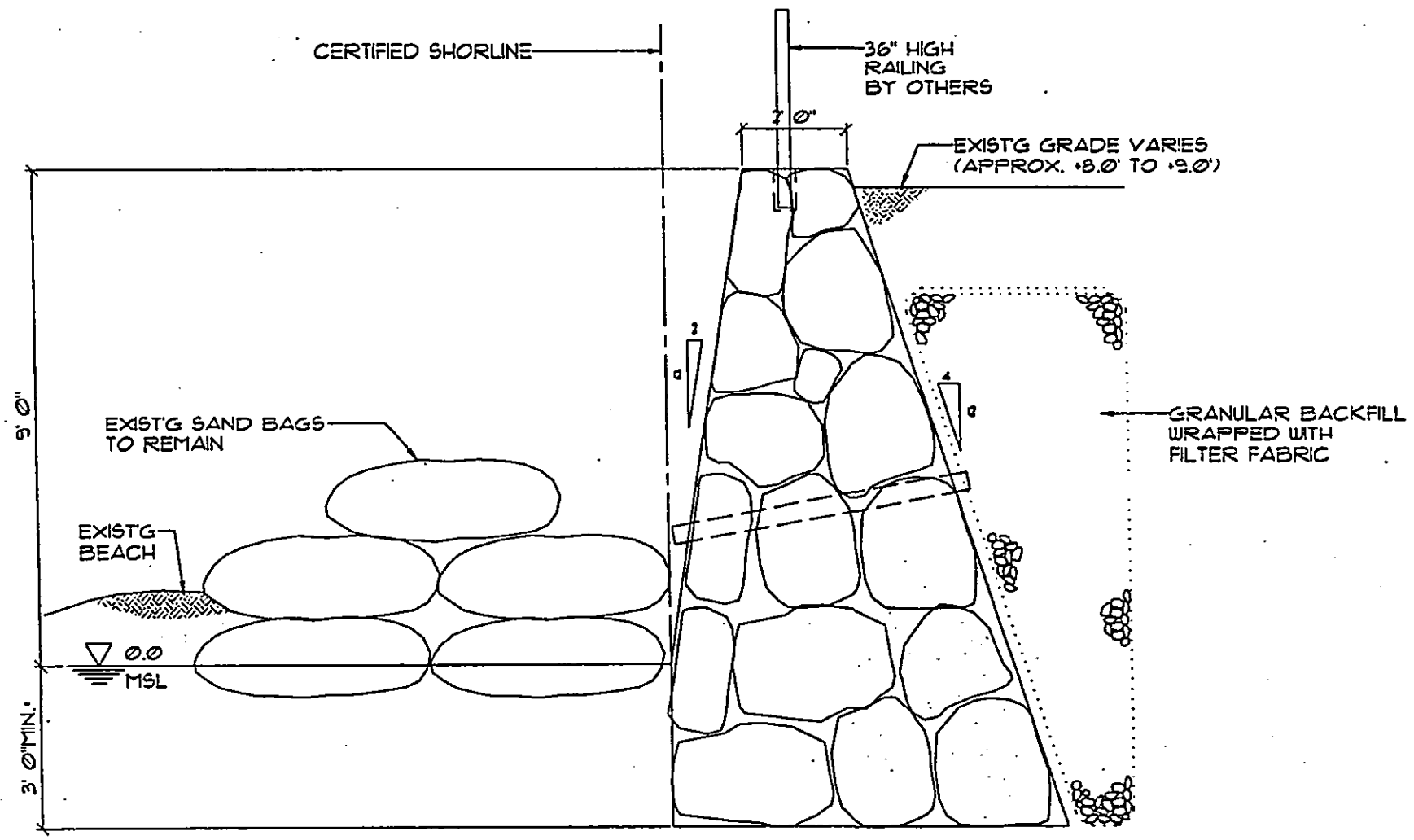
FIGURE 4



WALL LAYOUT PLAN

SCALE: 1" = 20'

FIGURE 5



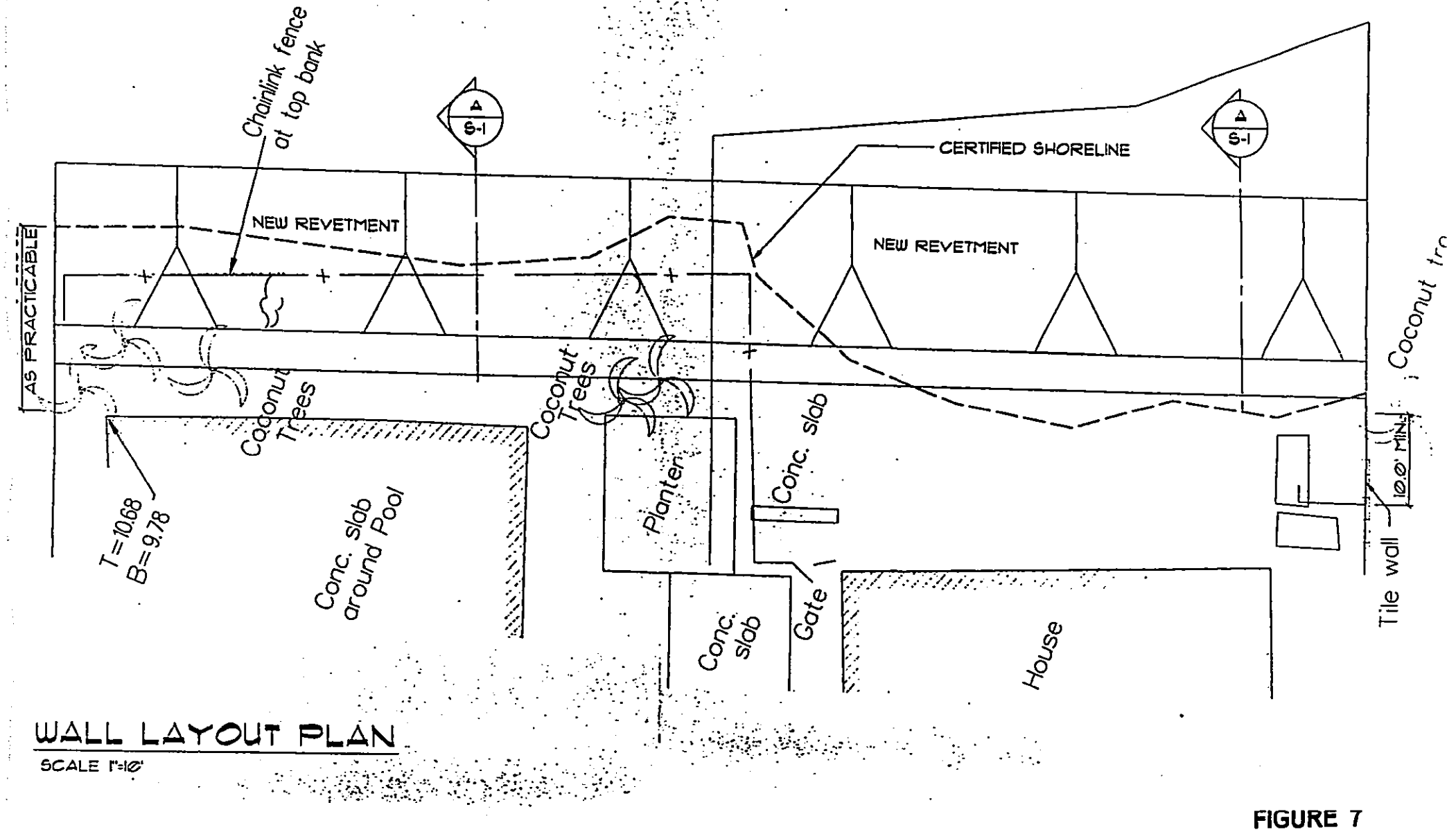
*EMBED 3'-0" MIN. BELOW MEAN SEA LEVEL UNLESS FOUNDED ON SOLID NON-ERODIBLE SUBSTRATA

SECTION THRU NEW CRM SEAWALL

SCALE: 1" = 3'

A
S-1

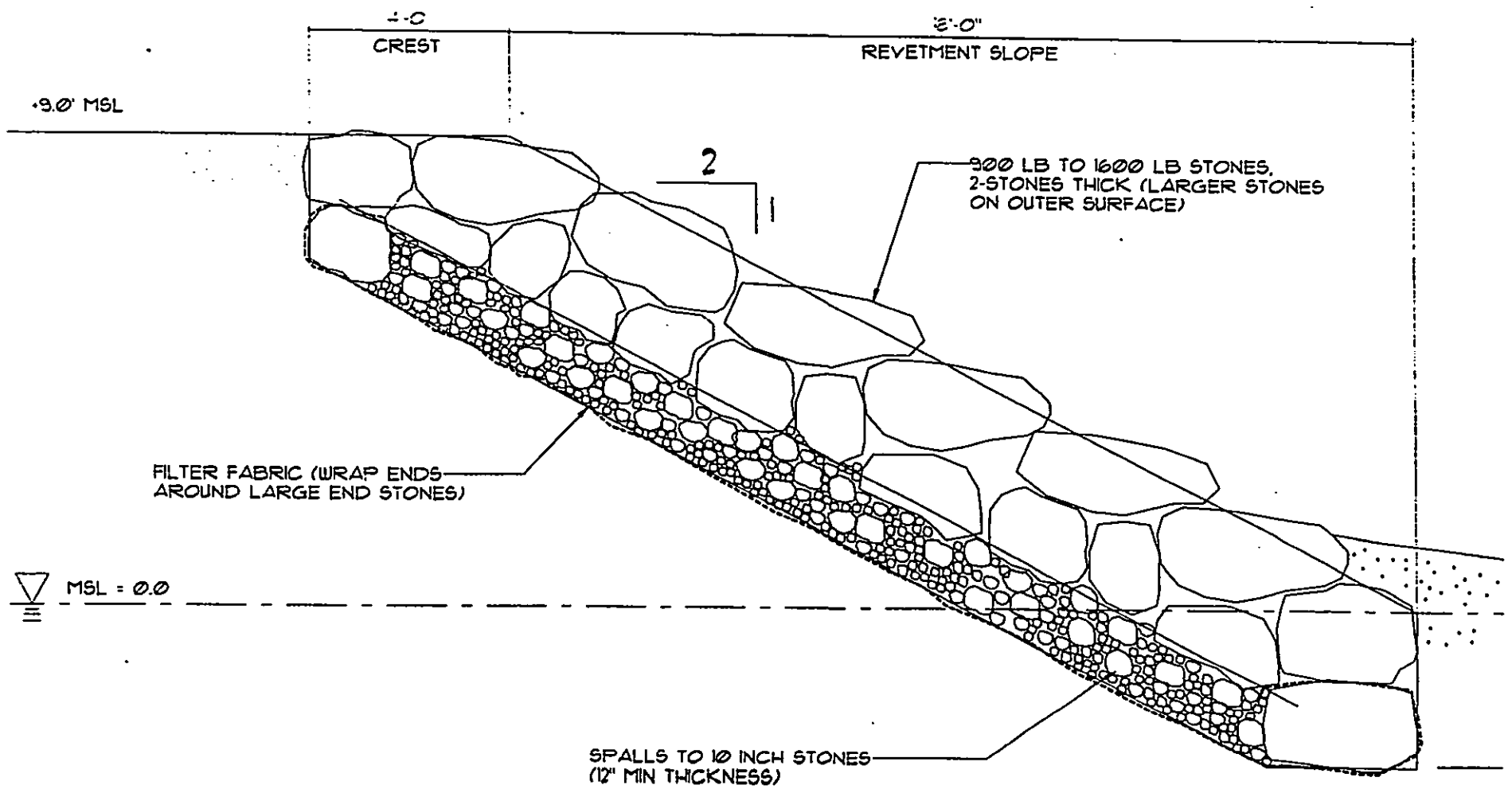
FIGURE 6



WALL LAYOUT PLAN

SCALE 1"=10'

FIGURE 7



TYPICAL SECTION THRU REVETMENT

SC 1/2" = 1-0"

FIGURE 8

Appendixes A and B

A. Lanikai Beach Pilot Research Project
Monitoring Report - September 1997

B. Review of Monitoring Report

LM

Lanikai Beach Management Committee

1343 Mokulua Drive
Kailua, Hawaii, 96734

RECEIVED
97 JUL 28 A9:28
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII

July 24, 1997

Michael Wilson, Chairman
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI, 967809

The Lanikai Beach Management Committee has prepared this report as an informational update for the various City, State and Federal agencies that were involved in the planning and permitting of our pilot project.

David Lipp, our coastal engineering consultant, has provided a series of beach profiles covering the period from September, 1995 to June, 1997. He includes a brief written assessment.

A photographic record of the area has been kept since December, 1995. Views up and down the beach are taken once a month at low tide. Prior to December, 1996, the tide height for photographs was random. We are now trying to standardize the time for shooting a photo so that changes in beach profile are more apparent. We have included a few of these pictures as a visual record of the project. More are available upon request.

We have several observations on the use of the bags as experienced over the last months:

1. The sandbags placed along the escarpments fronting the subject properties have provided protection from further erosion of the fastland. They have been shored up in several spots, but no moreso than boulder revetments that line the area to the south of the experiment. They would appear to be working well as a means of protecting the private property they front.

2. The "perched beach" has provided continuous lateral access to the open beach from the public right of way. After the erosion became acute in 1994, such access was unavailable to the public until the sandbags were positioned in this format.

3. The sandbags are "user friendly". Children play on and around them, fishermen fish from them and sunbathers sit on them. Walking on them is not difficult, as opposed to walking on boulders at the water's edge.

4. Repositioning the bags can be done relatively quickly with the right equipment. Mr. Correa has developed a method of moving the bags from spot to spot and has reconfigured the layout several times in the course of the experiment. (See photo)

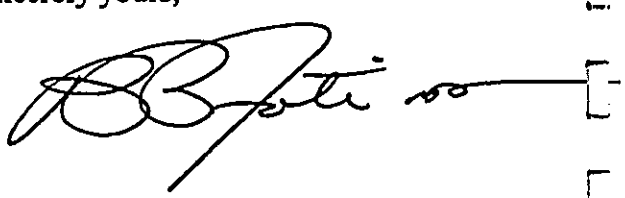
APPENDIX A

5. Since the bags have been in the water schools of halalu (young akule) have formed in the nearshore water where none were observed before. Sea turtles have also been seen grazing on the limu that grows over the submerged bags.

6. The smooth fabric bags become slippery when submerged, but the heavily textured bags, even though covered with limu, are not hazardous underfoot.

The project has another year to go under the terms of the permit. We would like to continue.

Sincerely yours,



Philip R. Foti

Summary of observations on the Lanikai Beach Revetment Alternative Pilot Research Project (9/95 to 7/96):

The sand movement in Lanikai is primarily longshore and its direction is dependant on the wind and wave directions. In the test area there is little sand transport during a mild wind and wave climate from any direction. Strong trade winds and associated wind waves produce a slight northwesterly transport (toward Kailua). Strong easterly winds and waves produced from a long duration easterly wind produce a strong northwesterly transport. North winds and north swells produce a southeasterly transport (toward Waimanalo). The trend is thus slow sand movement toward Kailua during the summer, increased sand movement toward Kailua during the fall (when the trades tend to turn easterly and increase in velocity), and variable movement during the winter dependant on wind and swell. The trend during the winter and spring is for sand movement towards Waimanalo.

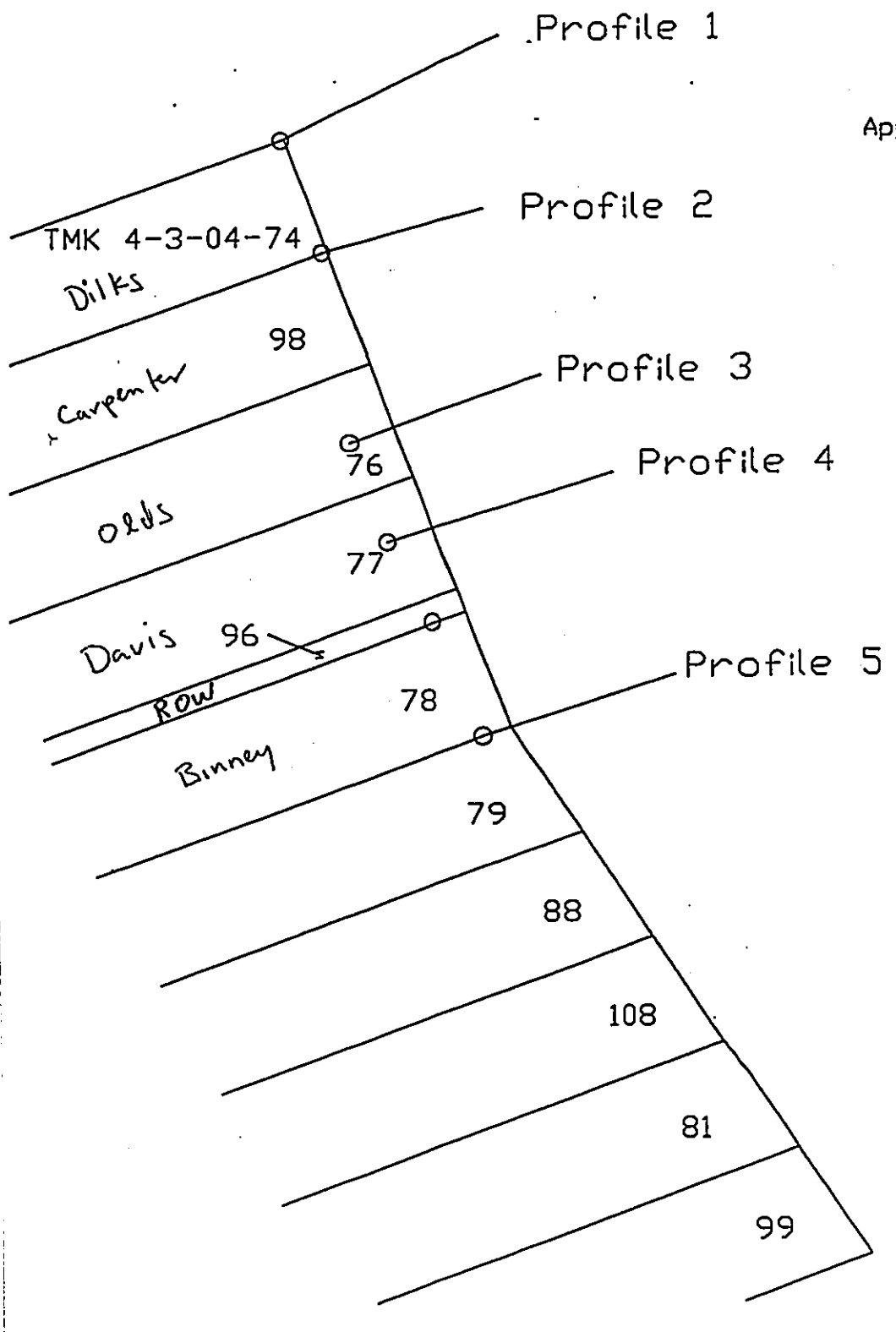
Between the period of 9/2/95 when the first profile was taken, and 10/5/96, there was considerable loss of sand from the area fronting Dilks and Carpenter (profiles 1 and 2). During the period of 10/5/96 and 6/8/97, all the sand returned to this area, the 6/8/97 profile is very similar to the 9/2/95 profile. This sand movement into the project area during late '96 and early '97 is due to environmental factors and not the sandbags themselves. ***What is important to note is that the sandbags did not prevent the beach from reforming.***

The profiles fronting the Olds property shows no real loss between 9/95 and 10/96, but does show an increase by 6/97. Again, mother nature moved the sand, but the bags did not prevent the beach from forming.

The Davis property bags jut out slightly from the neighboring bags, this has turned out to be beneficial to the beach fronting the neighboring properties. During the winter the sand accumulated fronting the Olds property, during the summer and spring the sand accumulates fronting the public right of way to the beach. The sand accumulates because a small longshore transport gradient is created due to the sandbags fronting the Davis property. This effect is shown in the Binney profile of 10/5/96. Binney is to the southeast of Davis, during tradewind weather the sand accumulates fronting the right of way between Binney and Davis. This has enhanced public access.

I recommend continuing the pilot program.

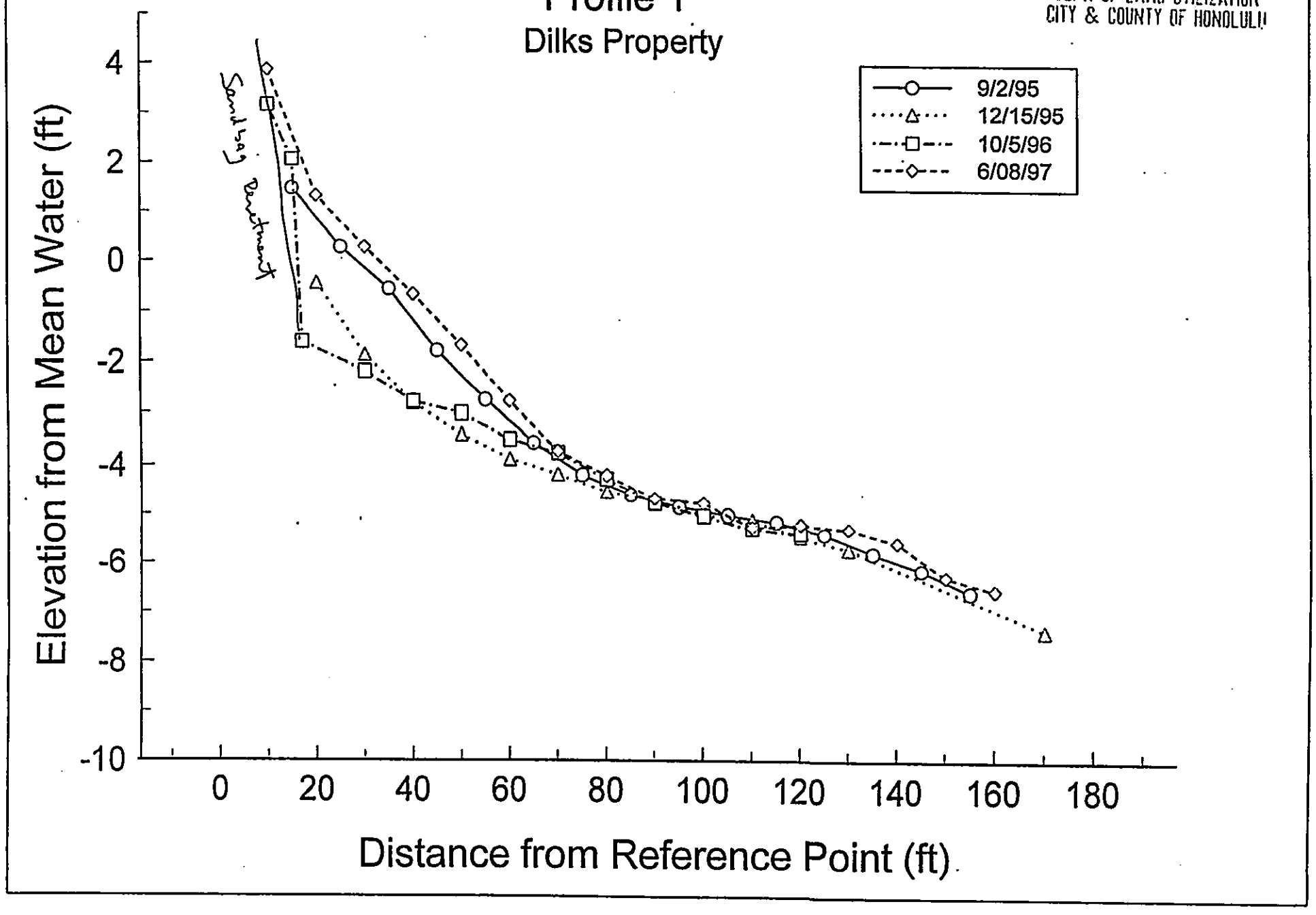
David Lipp
Coastal Engineer



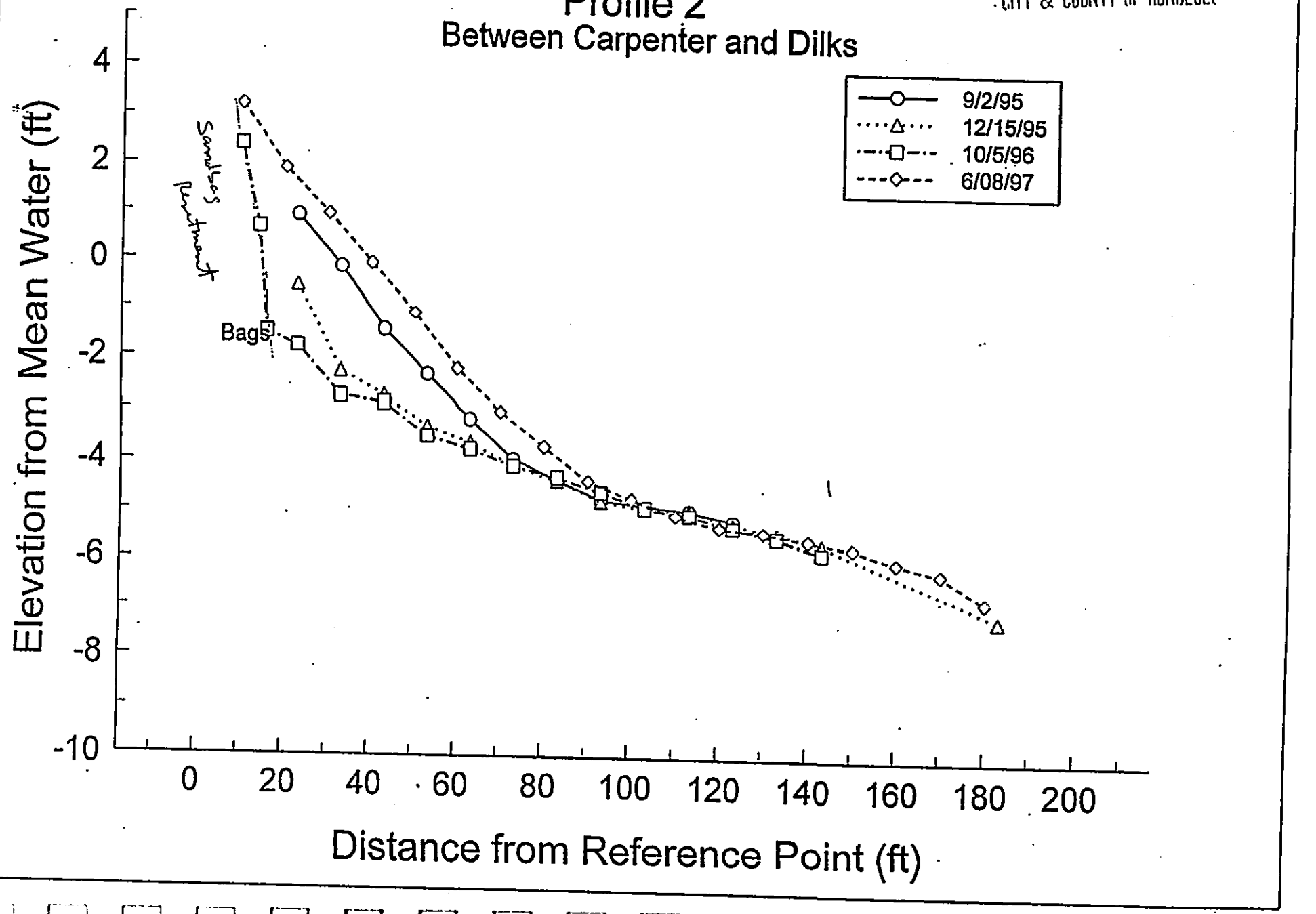
1997 SEP -8 AM 10: 11

DEPT. OF LAND UTILIZATION
CITY & COUNTY OF HONOLULU

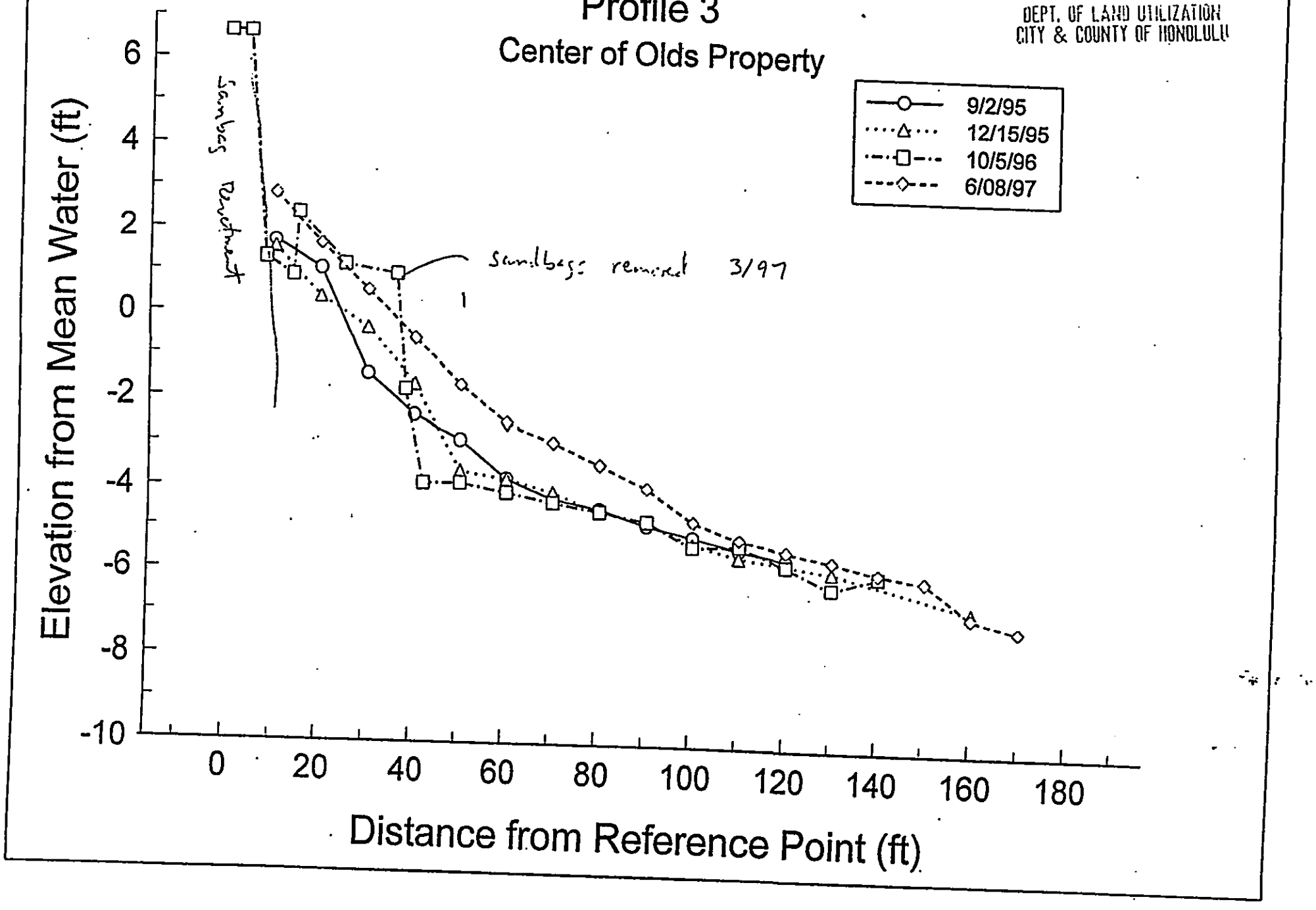
Profile 1
Dilks Property



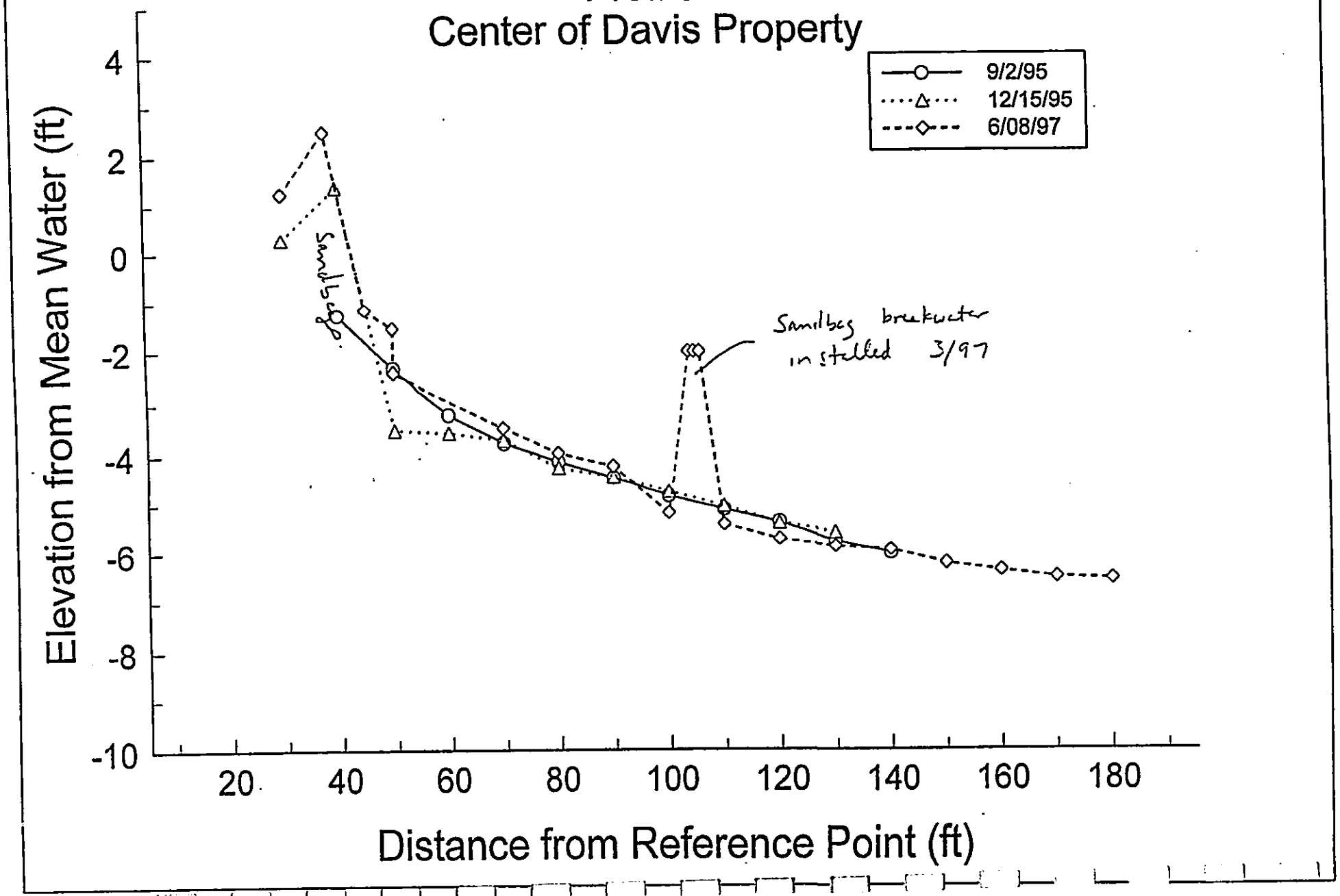
Profile 2
Between Carpenter and Dilks



Profile 3
Center of Olds Property



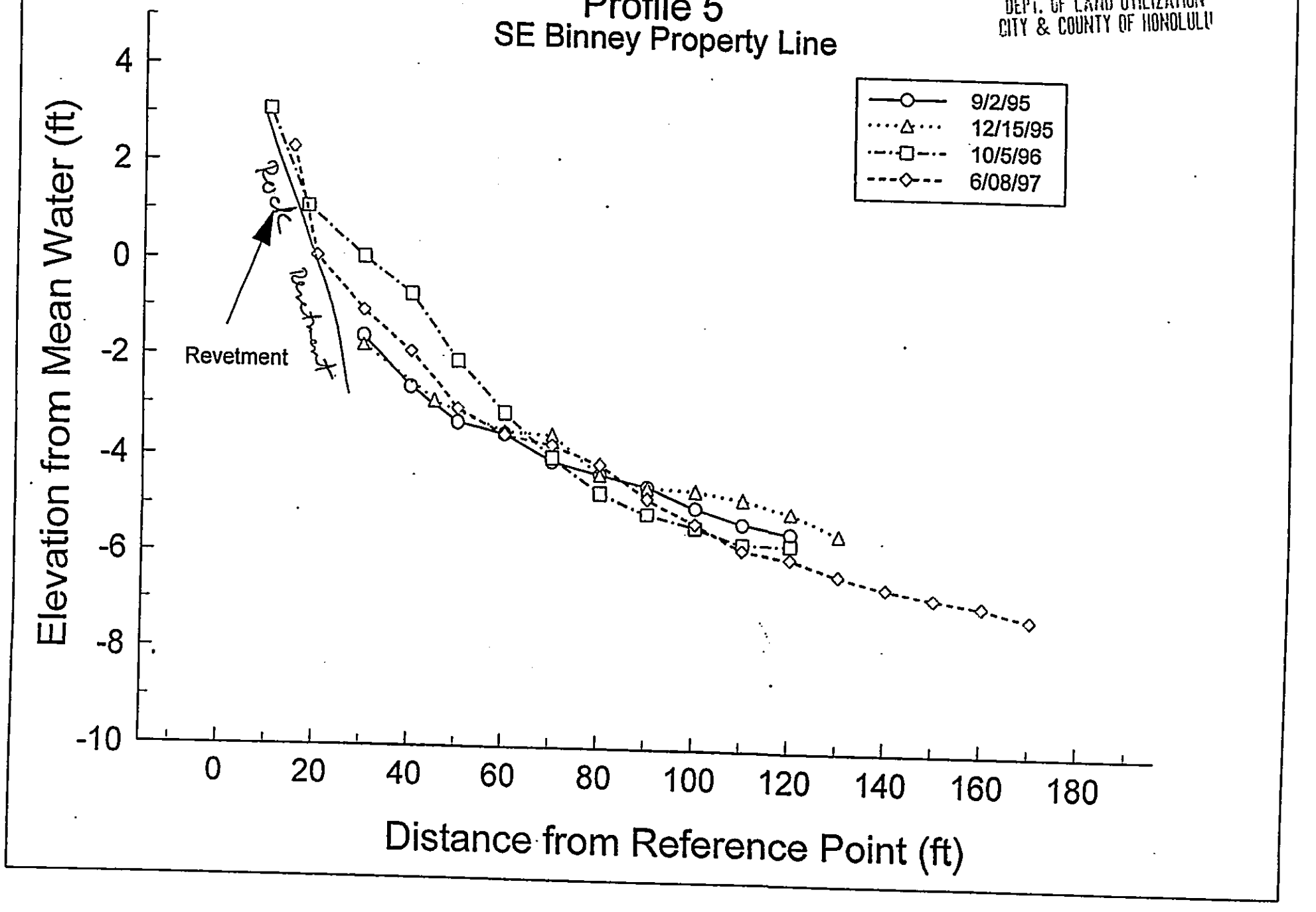
Profile 4
Center of Davis Property



1997 SEP -8 AM 10: 11

DEPT. OF LAND UTILIZATION
CITY & COUNTY OF HONOLULU

Profile 5
SE Binney Property Line



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CN 1781

September 8, 1997

MEMORANDUM

TO: Robin Foster

FROM: Elaine Tamaye

SUBJECT: Summary Report by David Lipp

I have reviewed the data and summary report by David Lipp and have the following comments:

(1) There is a significant seasonal movement of sand along this section of coastline. The beach profile data are not sufficient to define the extent of the seasonal variability versus long-term trend. Profiling was done only twice in 1995 (Sept and Dec), once in 1996 (Oct), and once in 1997 (Jun). Therefore, it is not possible to draw any conclusions from this data about the "effectiveness" of the pilot program. It is important to note that David Lipp's conclusion was that the sand movement is due to environmental factors and not the sandbags themselves. His only "conclusion" about the sandbags is that "the sandbags did not prevent the beach from reforming".

(2) Although the profiles indicate that the sand elevations on the beach have increased from Dec 1995 to June 1997, that is not to say that the beach has been "restored". The profiles extend seaward of the sandbag revetments, and there is no evidence of restoration of any dry beach area. The top of beach elevations (less than 4 feet above mean water level) are clearly below the wave runup level. Therefore, if not for the existing shore protection structures, there could very likely have been additional loss of fastlands (erosion of the shoreline as defined by the vegetation line), even though there may have been a slight gain in elevation of the beach foreshore.

(3) In order to provide meaningful data, the beach profiles need to be measured at least quarterly, and additional profiles should be established on the Kailua-side (across "dry" beach areas) to determine the pilot program's effect on adjacent shoreline areas and to obtain a better understanding of the

seasonal sand movement affecting this coastal reach.

(4) There is no mention about how much sand was "added" to the littoral system. How much of this sand fill contributed to the increase in beach elevations? There is also no description of what was done with the sandbags, such as what configurations were tested and for how long. There is simply insufficient information from the monitoring program to draw any valid conclusions about the pilot program.

Appendix B

Justification for a Shoreline Setback Variance under ROH Sec. 23-1.8 (b)(3) "Hardship Standard"

The owner will suffer hardship if he is not allowed to to reinforce the existing, nonconforming seawall. The application for a shoreline setback variance fulfills the three criteria for hardship set forth in ROH Sec. 23-1.8 (b)(3), as discussed below.

The applicant will be deprived of reasonable use of the land. The property has a nonconforming seawall. If the Department denies after-the-fact approval of the support wall and instead requires that the improvements be removed, then future storm waves could undermine the seawall and cause it to break. This could in turn lead to severe erosion of the property due to storm waves and ongoing coastal erosion. Erosion of the property would eventually threaten the foundations of the residences on the two adjoining lots – parcels 4-3-004: 108 and 99.

The applicants' proposal is due to unique circumstances. Lanikai Beach has been undergoing long-term coastal erosion, proceeding from the southern end of the beach toward the middle. In fact, the subject lot has had a seawall for 46 years. Extraordinarily severe storm surf that occurred November 20-21, 2004, damaged but did not destroy the nonconforming seawall.

The sole reason for the variance request is the damage caused by the extraordinary storm surf. erosion occurring at this particular section of beach.

The proposal is the practicable alternative which conforms best to the purpose of the shoreline setback regulations. The Coastal Engineering Evaluation analyzes a number of alternative measures. In general, the preferred alternative would be beach restoration by replenishment of sand, possibly augmented by construction of a low-profile offshore breakwater structure. To be effective, however, a beach restoration program must be designed, financed, permitted, and developed across an entire littoral cell. The littoral cell in this case would encompass the beach frontage of numerous residential properties. Typically, beach restoration projects are

carried out by the U.S. Army Corps of Engineers or by an agency of state government. The scope of such a project places it beyond the capability of a single property owner.

Reinforcing the nonconforming seawall by building a new support wall will not alter littoral processes, since the seawall itself has been in place for 46 years. Building the support wall also prevented catastrophic failure of the seawall. If the seawall had failed, it would have caused severe soil erosion and water pollution. It would also have led to undermining of the adjoining properties, together with the shore protection structures and residences on those properties.

A sloping rock revetment, though theoretically possible, would provide little or no benefit to the shoreline environment. Moreover, removing the *nonconforming* seawall and support wall and replacing them with a sloping revetment is not a practicable alternative because of the difficulty of construction and the risk to neighboring residences. The amount of earth-moving, the proximity of the adjoining residences, and the need to provide flank retaining walls combine to make this alternative impracticable.

Appendix C

COMMENTS on DRAFT ENVIRONMENTAL ASSESSMENT
Support Wall for Nonconforming Seawall, Lanikai

Consulted Party	Comment Date	Response
City & County of Honolulu		
Department of Planning and Permitting	3/08/05	3/06/06
State of Hawaii		
Department of Land and Natural Resources	---	---
Historic Preservation Division, DLNR	---	---
Office of Environmental Quality Control	12/23/04	3/06/06
Office of Hawaiian Affairs	---	---
University of Hawaii at Manoa Environmental Center	---	---
Federal Government		
U.S. Army Engineer District, Honolulu	---	---
U.S. Fish & Wildlife Service, Pacific	---	---
Community		
Kailua Neighborhood Board #31	---	---
Lanikai Association	---	---

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

MUFI HANNEMANN
MAYOR

HENRY ENG, FAICP
ACTING DIRECTOR

DAVID K. TANOUE
DEPUTY DIRECTOR

2004/ED-30(DT)

March 8, 2005

Mr. Robin Foster
PlanPacific
345 Queen Street, Suite 802
Honolulu, Hawaii 96813

MAR - 9 2005

Dear Mr. Foster:

Project Name	:	Wang Support Wall for Nonconforming Seawall
File No.	:	2004/ED-30
Location	:	1368 Mokulua Drive - Lanikai
Tax Map Keys	:	4-3-4: 81

We are forwarding copies of all comments we have received relating to the Draft Environmental Assessment (EA) for the above-referenced project as well as our comments.

In accordance with the provisions of Chapter 343, Hawaii Revised Statutes, you must respond in writing to these and any other comments, which were received during the 30-day public comment period which began with the publication of a notice of availability of the Draft EA (EIS) on January 23, 2005. The Final EA must include these comments and responses, as well as revised text, if appropriate.

Height

The height of the wall appears to exceed the height allowed in Section 21-4.40 of the Land Use Ordinance (LUO) and if so, it will require a (zoning) variance from that Section. The Final EA should include an alternative that would comply with the LUO and add the LUO variance in the EA under "List of Approvals and Permits Required," if a zoning variance will be needed.

Plans

The Final EA should include a plan showing the location of the dwelling. Also, an elevation drawing (along the exposed face of the wall) should be included. All elevation and section drawings should show finished and existing grades. All plans must include a graphic (bar) scale.

Flood Regulations

The EA should include a section on the LUO flood hazard district requirements and how the seawall has complied with the flood requirements.

Alternatives

The EA should include a section on alternatives considered, if any.

Consulted Parties

The Final EA should include a list of consulted parties. Please see attached list.

Should you have any questions, please contact Dana Teramoto of our staff at 523-4648.

Sincerely yours,

HENRY ENG, FAICP
Acting Director of Planning
and Permitting

HE:cs

Attachments

Posse Doc. No. 355138

PLANPACIFIC

March 6, 2006

Mr. Henry Eng, FAICP, Director
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Mr. Eng:

Subject: Draft Environmental Assessment (Draft EA) for Support Wall for a Nonconforming Seawall, Lanikai; TMK 4-3-004: 081

Thank you for your comment letter dated March 8, 2005. Following is an itemized response to your comments.

Height. In the Final EA, Section 6, List of Approvals and Permits Required, has been amended to reflect the requirement for a variance from the maximum height standard of the Land Use Ordinance (LUO Sec. 21-4.40). The Project Summary (Section 1) has been similarly amended.

Plans. The Final EA includes a revised Figure 4, Wall Plans. It includes the following changes: (1) a revised Site Plan showing the location of dwellings relative to the shoreline setback; (2) a revised Section drawing showing original and finished grades; and (3) a new Elevation drawing showing the wall heights.

Flood Regulations. A new Section 3.9 describing Flood Hazards has been inserted into the Final EA.

Alternatives. Section 4 of the Draft and Final EA, Consideration of Alternatives, discusses two alternatives – a sloping revetment and "no action." In addition, the Coastal Engineering Evaluation (Appendix A) addresses offshore breakwater and beach nourishment alternatives.

Consulted Parties. The Final EA contains a new Appendix C, Comments and Responses on the Draft Environmental Assessment. It includes a list of consulted parties.

Sincerely,

Robin Foster

Robin Foster, AICP

345 Queen Street
Suite 802
Honolulu
Hawaii 96813

Tel (808) 521-9418
Fax (808) 521-9468

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
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E-mail: oeqc@health.state.hi.us

December 23, 2004

Mr. Eric Crispin, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawai'i 96813

Dear Mr. Crispin:

Subject: Draft Environmental Assessment for 1368 Mokulua Drive, Lanikai, O'ahu

Thank you for the opportunity to review and comment on the subject project. We have the following comments.

1. For assistance in completing the assessment, please review the "Shoreline Hardening Policy and Environmental Assessment Guidelines" available at http://www.state.hi.us/health/oeqc/guidance/shoreline.htm

2. Please consult with adjacent neighbors.

If you have any questions, please contact Jeyan Thirugnanam at 586-4185.

Sincerely,

Genevieve Salmonson

Genevieve Salmonson
Director

c: PlanPAcific

PLANPACIFIC

March 6, 2006

Ms. Genevieve Salmonson, Director
State of Hawaii
Office of Environmental Quality Control
236 South Beretania Street, Suite 702
Honolulu, HI 96813

Dear Ms. Salmonson:

Subject: Draft Environmental Assessment (Draft EA) for Support Wall for a Nonconforming Seawall, Lanikai; TMK 4-3-004: 081

Thank you for your comment letter dated December 23, 2004. In response, we offer the following:

1. We are familiar with the Shoreline Hardening Policy and Environmental Assessment Guidelines.

2. We have consulted with the adjacent neighbors and the Lanikai Association.

Sincerely,

Robin Foster

Robin Foster, AICP

345 Queen Street
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Honolulu
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Fax (808) 521-9468