

DRAFT ENVIRONMENTAL ASSESSMENT

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***TED MAKALENA GOLF COURSE  
CART PATH REALIGNMENT***

Waipi'o, District of 'Ewa, City and County of Honolulu, Hawaii

---



Prepared For

**Department of Design and Construction**  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawai'i 96813

August 2009

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Prepared In Partial Fulfillment of the Requirements of Chapter 343, Hawai'i Revised Statutes; Title 11, Chapter 200, Hawai'i Administrative Rules; and Chapter 25 Special Management Area, Revised Ordinances of Honolulu

Prepared For

**Department of Design and Construction**  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawai'i 96813

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Honolulu, Hawai'i 96814

August 2009

## PROJECT PROFILE

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Proposed Action: Ted Makalena Golf Course  
Cart Path Realignment

Proposing Agency: Department of Design and Construction  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawai'i 96814

Approving Agency: Department of Design and Construction  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawai'i 96813

Tax Map Key: 9-3-002: 034  
Street Address: 93-059 Waipi'o Point Access Road  
Waipahu, HI 96797

Land Area: 150.528 acres  
Owner: City and County of Honolulu

Existing Use: Municipal Golf Course

State Land Use Designation: Agricultural  
*Sustainable* Communities Plan Area: Central Oahu  
SCP Plan Urban Land Use Map: Parks and Golf Course  
Public Infrastructure Map: No Golf Course Modification Symbol  
Special District: None  
Zoning: P-2 Preservation, AG-2 General Agriculture  
Special Management Area: Inside Special Management Area

Need for Assessment: Propose the Use of County Land or Funds  
Section 11-200-5 (b)  
Hawaii Administrative Rules

Anticipated Determination: Finding of No Significant Impact

Contact Person: Mike Sakamoto  
Department of Design and Construction  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawai'i 96814

Telephone: 768-8409

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## SECTION 1

## DESCRIPTION OF THE PROPOSED ACTION

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The Department of Design and Construction, City and County of Honolulu, proposes to construct improvements at Ted Makalena Golf Course located in the town of Waipahu, Waip'io, District of 'Ewa, Honolulu, Hawai'i. Located *makai* of Farrington Highway on Waipi'o Peninsula between Pearl Harbor's West and Middle Lochs, Ted Makalena Golf Course (hereafter "golf course" or "property" is bounded by the Honolulu Police Training Academy on the west, Waipi'o Peninsula Soccer Park on the south, Middle Loch on the east, and a section of the former OR&L railroad right-of-way on the north. Residential housing is located to the north of the historic trail/railroad right-of-way.

The property bears Tax Map Key 9-3-002: 034 encompassing an area of 150.528 acres. A Location Map, Vicinity Map, and Tax Map are shown in Figures 1, 2, and 3.

### **A. Purpose of the Project**

The proposed project is one of past, on-going, and proposed projects for improving playing conditions and facilities at Ted Makalena Golf Course. Most recently, the City and County of Honolulu constructed improvements to sections of the irrigation system. These improvements in conjunction with the availability of water for irrigation have improved the overall golf course grounds and playing conditions of the tee boxes, fairways, and greens. In time, remaining sections of the irrigation system will be upgraded.

The proposed project will realign and replace the cart paths on all holes. The existing cart paths are fraught with shortcomings to include pronounced deterioration to the asphalt concrete surface, inconsistent path widths, grass growing over paths obscuring it from view, patched sections using gravel, concrete, and dirt to provide a riding surface and to prevent unsafe riding conditions. On some holes the cart path is aligned incorrectly creating unsafe conditions for golfers.

### **B. Technical Characteristics**

New 8-foot wide concrete cart paths will be constructed for all 18 holes as shown on Figure 4. The new cart paths generally will be laid out along the right side of the fairways from tee to green for a majority of the holes. On two holes (Nos. 11 and 12) the cart path will remain on the left side of the fairway and on the 7<sup>th</sup> Hole it will be moved to the left side of the fairway. Cart paths will not be realigned for the five par 3 holes. In summary, new cart paths will be constructed following the existing for about nine holes and realigned for the remaining holes. Approximately 3.4 miles of cart paths will be constructed.

In the vicinity of the tees and greens, the cart path will be widened to 12 feet allowing carts to park on the path with room for other carts to pass. At the tees and greens, parking areas will be constructed with 6" high concrete curbing. Curbing will also be built at any other location that would deter golfers from driving off the cart paths.

The existing asphalt concrete paths will be demolished and the former paths graded, leveled, and planted with grass or other suitable vegetation.



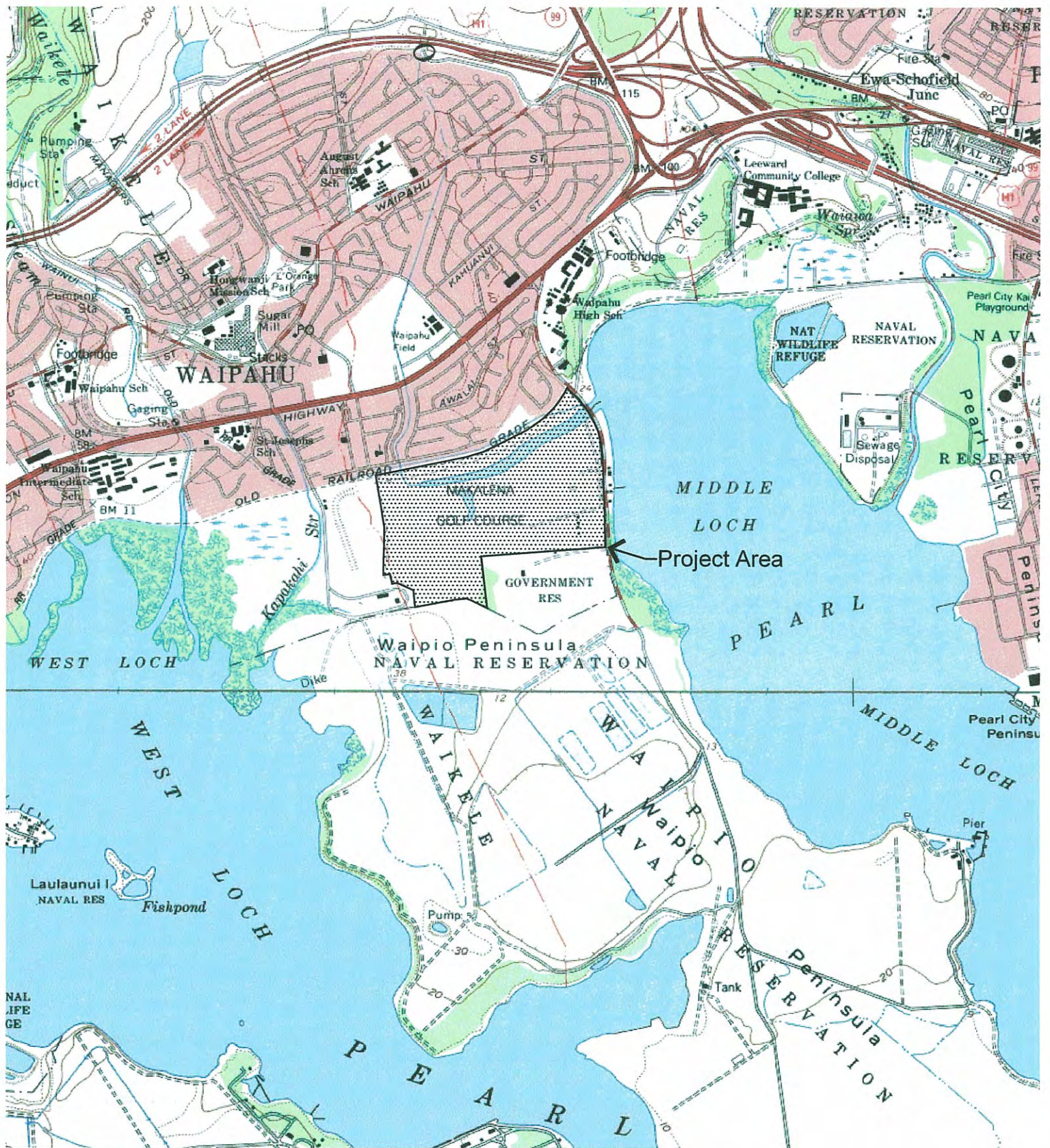
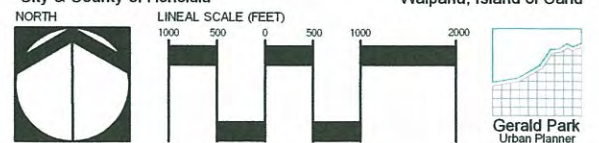


Figure 1  
Location Map  
**Ted Makalena Golf Course**

City & County of Honolulu Waipahu, Island of Oahu



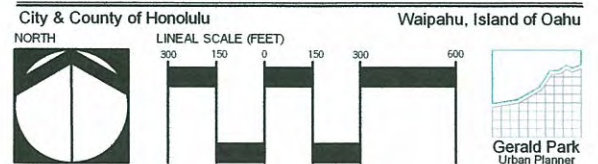
Gerald Park  
Urban Planner  
April 2008

Source: USGS, Waipahu & Pearl Harbor Quadrangles





Figure 2  
Vicinity Map  
**Ted Makalena Golf Course**

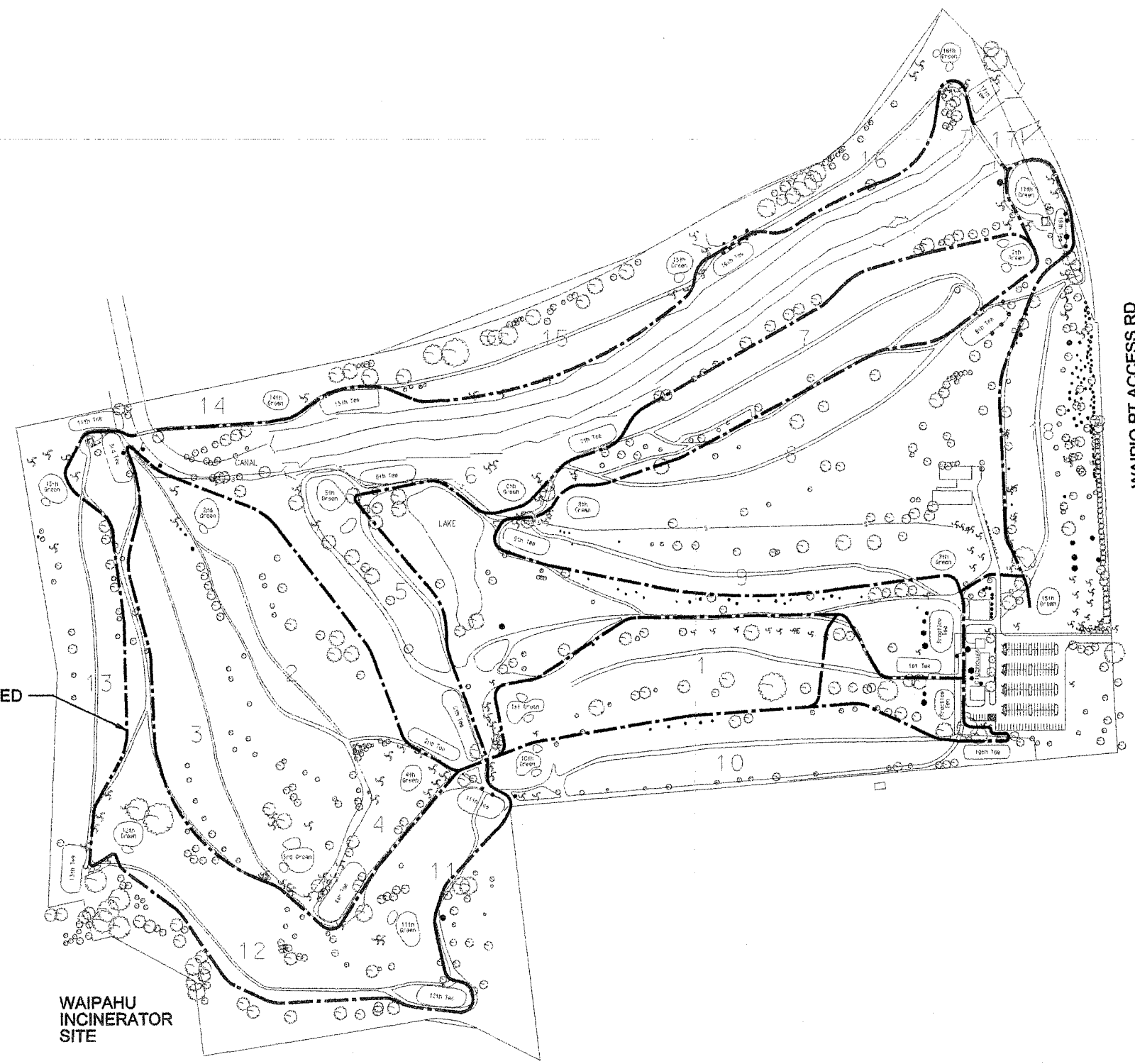






SCALE: 1" = 200'  
TRUE NORTH

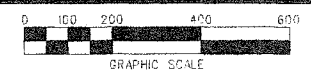
NEW 8'-0" WIDE REINFORCED  
CONCRETE CART PATH  
(TYPICAL)



WAIPIO PT ACCESS RD

WAIPAHU  
INCINERATOR  
SITE

## TED MAKALENA GOLF COURSE CART PATH REALIGNMENT CONCEPTUAL PLAN



REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

**DEPARTMENT OF DESIGN AND CONSTRUCTION**  
CITY & COUNTY OF HONOLULU

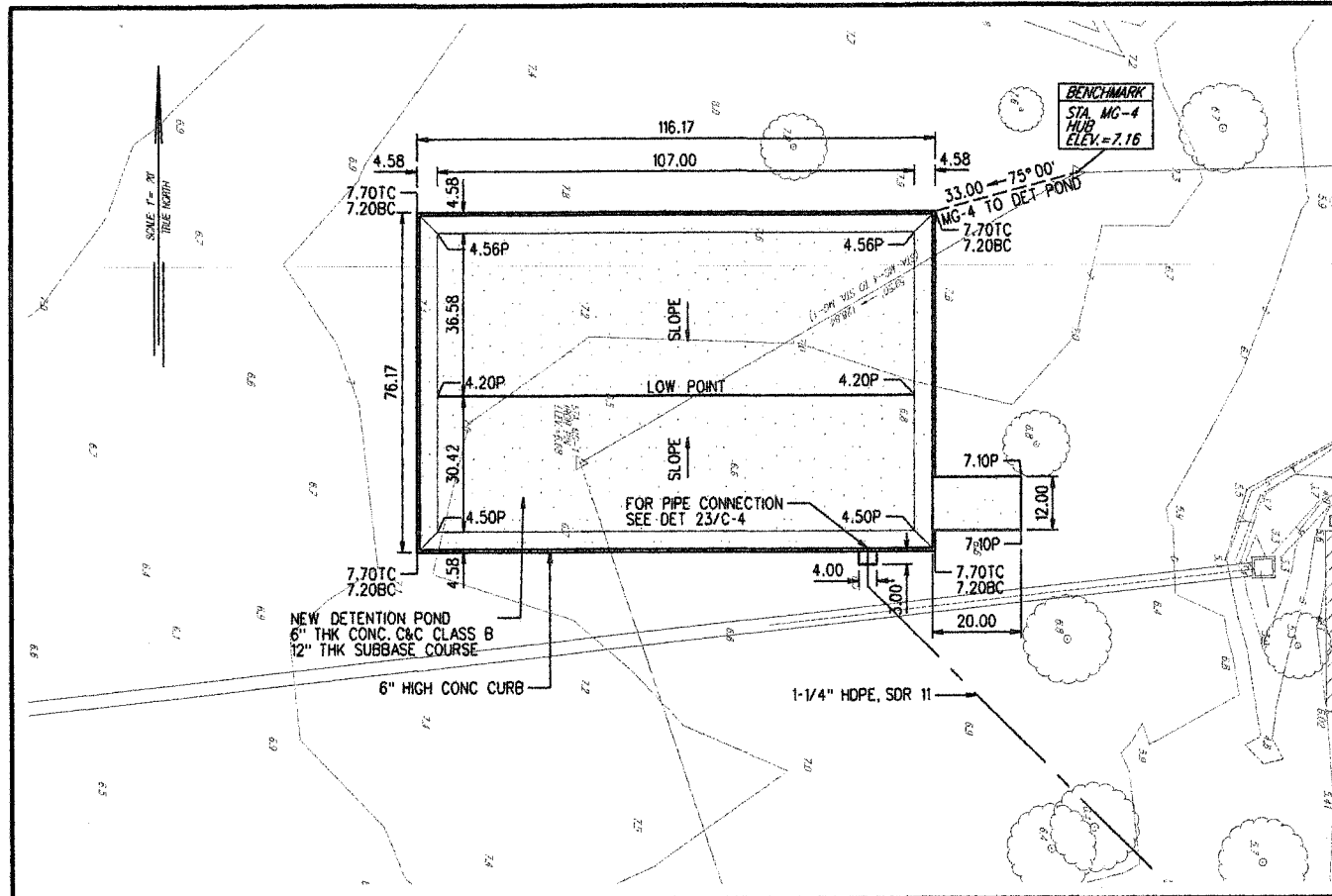
**CONCEPTUAL PLAN  
FOR  
TED MAKALENA GOLF COURSE  
CART PATH REALIGNMENT**

WAIPAHU, OAHU, HAWAII TAX MAP KEY: 93-02-34

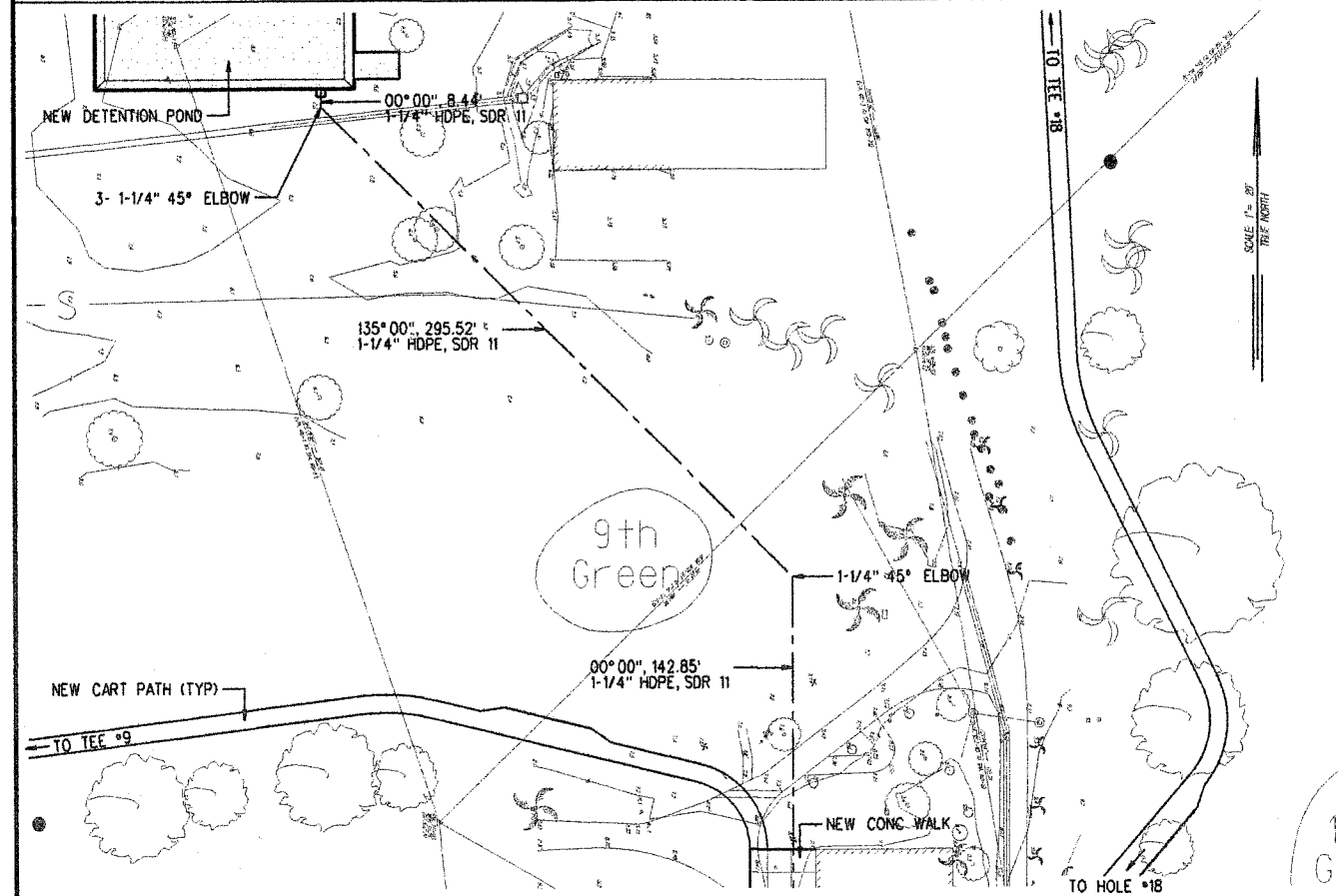
APPROVED: \_\_\_\_\_  
Director, Department of Design and Construction Date: \_\_\_\_\_

CONCUR: \_\_\_\_\_  
Director, Department of Parks and Recreation Date: \_\_\_\_\_

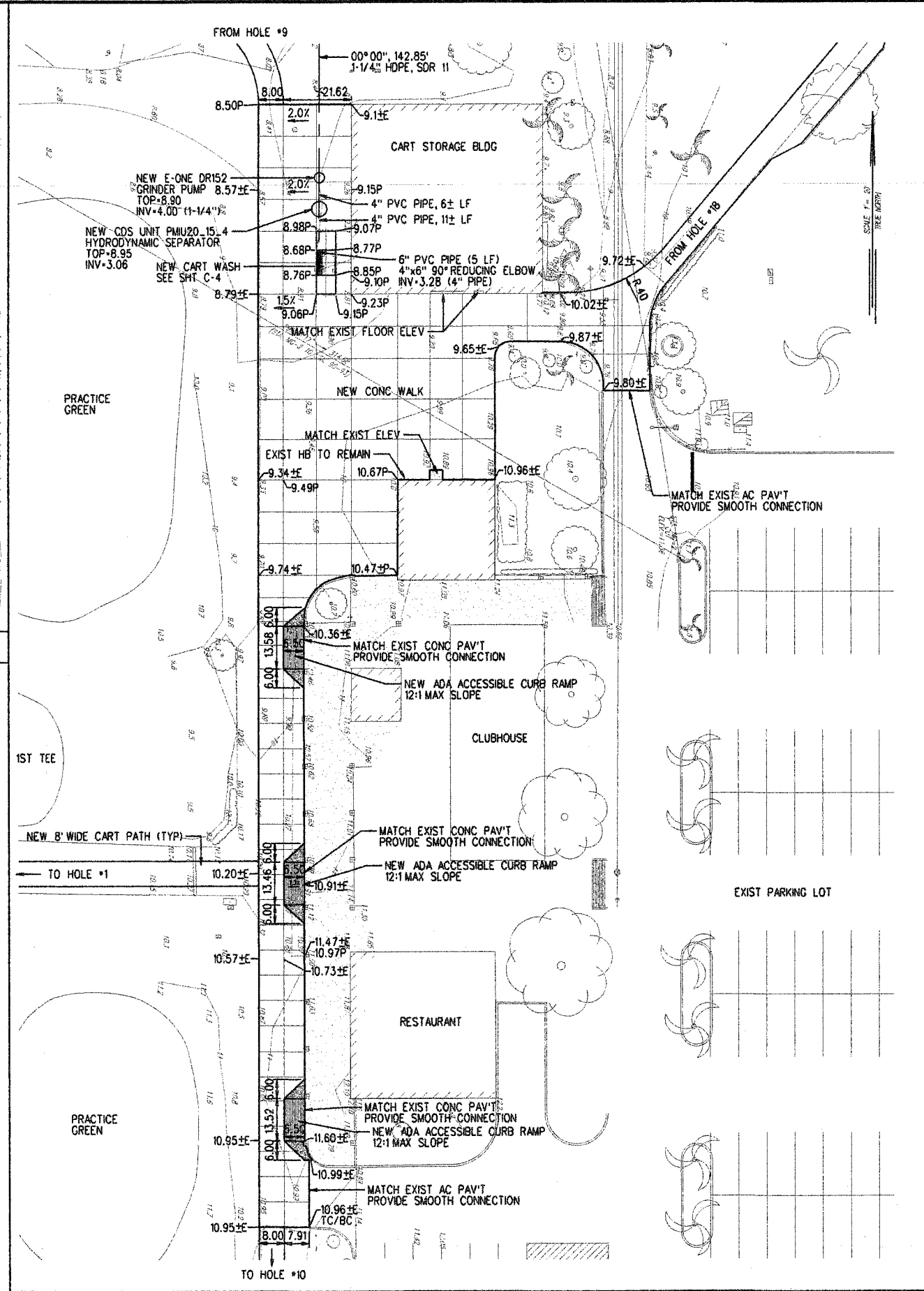




**DETENTION POND** SCALE: 1"=20' **3**



**UTILITY PLAN** SCALE: 1"=20' **2**



**SITE & UTILITY PLAN** SCALE: 1"=20' **1**

DESIGNED BY: [ ]	REVIEWED BY: [ ]	DRAWN BY: [ ]	DATE: [ ]	APPROVED: [ ]	DESCRIPTION: [ ]	REVISION: [ ]	DATE: [ ]	MADE BY: [ ]	APPROVED: [ ]
DEPARTMENT OF DESIGN AND CONSTRUCTION CITY & COUNTY OF HONOLULU <b>TED MAKALENA GOLF COURSE</b> <b>CART PATH REALIGNMENT</b>					<b>SITE &amp; UTILITY PLANS</b>				
JOB NO. [ ] DRAWING NO. <b>C-3</b> SHEET NO. [ ] OF [ ] FILE NO. [ ]									

## SECTION 2 DESCRIPTION OF THE AFFECTED ENVIRONMENT

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### A. Existing Conditions

The history of Waipahu is deeply rooted in the natural resources found in the area. Native Hawaiians settled the area as fish were plentiful in nearby mudflats and shallow waters off Pearl Harbor. Natural springs issued water for agricultural activities and taro and other wetland crops were readily cultivated. The turn of the 20th century saw vast acreages of the Schofield Plateau and 'Ewa Plain with their rich soils committed to a more ambitious endeavor---sugar cane cultivation---which replaced fishing and subsistence farming as the agricultural and economic mainstays of the region. Today, sugar cane is no longer the major economic force in the town and the former Waipahu Sugar Mill with its landmark smokestack stands only as a memory of what was once a vibrant activity.

Ted Makalena Golf Course is one of six municipal golf courses owned and operated by the City and County of Honolulu. The course is named for Ted Makalena the first native born Hawaiian to win a PGA Tour golf tournament---the Hawaiian Open in 1966 (now the Sony Open in Hawaii). The Bob E. Baldock designed par 71 course opened for play in 1971.

The 150-acre golf course is an artificial landscape (created by man) with tee boxes, fairways, greens, sand traps, knolls, depressions, flats, and an extensive network of cart paths and dirt paths. Structural improvements include bridges, a parking lot, and buildings such as comfort stations, cart barn, golf operations/concession, and maintenance. The tee boxes, fairways, and greens are planted in turf grass. An unlined drainage channel (Wailani Stream) runs through the northern portion and empties into Middle Loch of Pearl Harbor outside the golf course limits.

In general the cart paths are in usable condition for most of the holes, that is, golf carts can negotiate the course on the cart paths. There are, however, problems that detract from the recreational experience and raise safety concerns for cart users. These include deteriorating asphalt concrete surfaces, washed out sections filled with gravel or other material, missing sections, grass-covered paths on some holes, low spots that are submerged following heavy rain, inconsistent path widths, lack of parking areas adjoining tee boxes and greens, and some of the paths are located on the wrong side of the fairway.

The existing cart wash area is located between the clubhouse and cart barn (or storage shed). It is an open area covered by asphalt concrete pavement and without any drain inlet or detention basin. Wash water gravity flows in the direction of the cart barn as carts are rinsed off. Accumulated grass clippings and sediment are then shoveled into a small debris pile next to the cart barn for eventual disposal.

The area of the proposed detention basin can be characterized as a "wasteland". The vacant and unimproved area is covered by patches of dirt and grass.

Photographs depicting existing conditions are shown in the Site Photographs.





Photograph 1. Cart Wash and Return Area.



Photograph 2. Cart Path to 2nd Tee Box.



Source: Aerial Photo, USGS Website. 2004

**Photo Key Map**

GRAPHIC SCALE IN FEET



Photograph 3. Cart Path to 2nd Hole.



Photograph 4. Cart Path in 8th Fairway Covered by Turf.



Photograph 5. Cart Path at 11th Tee.

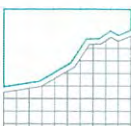


Photograph 6. Cart Path Behind the Comfort Station Near the 14th Tee.

Site Photographs  
**Ted Makalena Golf Course**

City & County of Honolulu

Waipahu, Island of Oahu



Gerald Park  
 Urban Planner  
 April 2008



## B. Environmental Conditions

### 1. Climate

Waipahu can be characterized as having relative equable temperatures ranging from an annual average maximum of about 89° F in August to an annual average low of 65° F in January. The average temperature is 73.8° F. Average annual rainfall is approximately 25 to 30 inches, the majority of which falls in the months of February and December and the monthly average ranges from 1 to 3 inches. The northeasterly trades blow about 75 percent of the time at an average speed of about 10 knots (approximately 15 miles per hour) (Belt Collins Hawaii, 1998).

### 2. Topography

The golf course is relatively flat and without major topographical relief. Ground elevation averages about 10 feet above mean sea level. Man-made tee boxes, greens, mounds, and stockpiled material are the highest non-structural features present.

### 3. Soils

Soil Conservation Service (1972) maps a single soil type on the site as fill land (Fd). In the Waipahu area, this land type consists mostly of areas filled with bagasse and slurry from sugar mills (SCS, 1972; Noda, 1998).

### 4. Water Resources

#### a. Surface Water

Surface water sources consist of a pond near the center of the golf course (near the 6<sup>th</sup> hole, 8<sup>th</sup> green, and 9<sup>th</sup> tee) and a 3,100 foot long section of Wailani Stream (also called 'Eo Stream) in the northern portion (located *makai* of the 14<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, and 17<sup>th</sup> holes). The stream channel "appears to be entirely artificial and was formed by dredging and draining the former Loko 'Eo fishpond in Pearl Harbor's middle loch (Bishop Museum, 2000). In the northwest corner of the golf course, the channel is concrete lined from where it enters the golf course up to a golf cart bridge at the 14<sup>th</sup> hole and unlined to where it discharges into Middle Loch of Pearl Harbor outside the limits of the golf course.

A dense thicket of mangrove and hau grow profusely along an unlined section of the stream separating the 6<sup>th</sup> and 7<sup>th</sup> fairways and the 15<sup>th</sup> and 16<sup>th</sup> fairways.

#### b. Ground Water

Ground water resources are part of the Waipahu aquifer system of the Pearl Harbor aquifer sector (Mink and Lau (1990). Two aquifers underlie this part of Waipahu. The uppermost contains groundwater that is basal and unconfined in sedimentary non-volcanic rocks. The lowermost aquifer is also basal and confined within horizontally extensive flank volcanic lava rocks. The status code assigned by Mink and Lau signifies that the upper aquifer is currently used, ecologically important, of low salinity at 250-1000 mg/l Cl, irreplaceable, and highly vulnerable to contamination. The status code for the lowermost aquifer is the same as that of the uppermost aquifer except that it is moderately vulnerable to contamination.

## 5. Drainage and Flood Hazards

The flat terrain makes proper drainage difficult as runoff is directed by grade changes to low spots on the course.

According to the Flood Insurance Rate Map panel for the area (Figure 6), most of the course is located within Flood Zone D, which is defined as "areas in which flood hazards are undetermined".

Portions of the golf course on either side of Wailani Stream Channel and including the channel are designed Zone AE. This designation applies to areas inundated by the 100-year flood for which base flood elevations have been determined. The base flood elevation is estimated at 3 to 4 feet above mean sea level along the 6<sup>th</sup>, 7<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup> and 17<sup>th</sup> holes. A 5-foot flood height is projected along the 3<sup>rd</sup> and 14<sup>th</sup> tees.

The FIRM generally depicts a flood area about 50 feet wide on the *mauka* side of Wailani Stream and 100 feet wide on the *makai* side. This would be consistent with the course topography in which higher areas are above the stream channel and lower areas below it.

Waipi'o Peninsula is not subject to inundation from tsunami or storm waves (Civil Defense Tsunami Inundation Map).

## 6. Historical Context

An archaeological investigation and identification of traditional cultural practices associated with the project area was prepared by Cultural Surveys Hawaii (2008) for the proposed project. Excerpts from their investigation are presented below.

The Waipi'o Peninsula and the surrounding loch waters of Pearl Harbor contained abundant marine resources and arable land which would have been extremely favorable to pre-contact Hawaiian populations for the development of large scale taro cultivation and the implantation of aquaculture in the form of large fish ponds or *loko*. A 1928 map of Land Court Application 1000 (LCA) shows a massive fish pond, Loko 'Eo, surrounded by LCA's within the project area. LCA documentation indicates that by the mid-eighteenth century the entire project area consisted of a complex network of irrigation ditches, agricultural fields, fish ponds, and habitations, probably developed over many centuries. Previous archaeological research has identified pre-contact sub-surface cultural layers and human burials just north of the project area (Perzinski et.al. 2004), providing further evidence of the pre-contact Hawaiian occupation of the area.

During the late nineteenth century the O'ahu Sugar Company established sugarcane operations in Waipi'o. A 1925 O'ahu Sugar Company map indicates that the current project area was within the boundaries of Oahu Sugar Company operations. The project area does not appear to have been planted with cane, but may have been utilized for other aspects of sugar cane operations such as a staging area for irrigation and/or railroad maintenance equipment. Subsurface archaeological investigation by the International Archaeological Research Institute, Inc. have suggested that Loko 'Eo, which comprises approximately 75% of the project area, was filled by the O'ahu Sugar Company and used as a settling pond for capturing topsoil from irrigation water (Athens et.al. 2000).







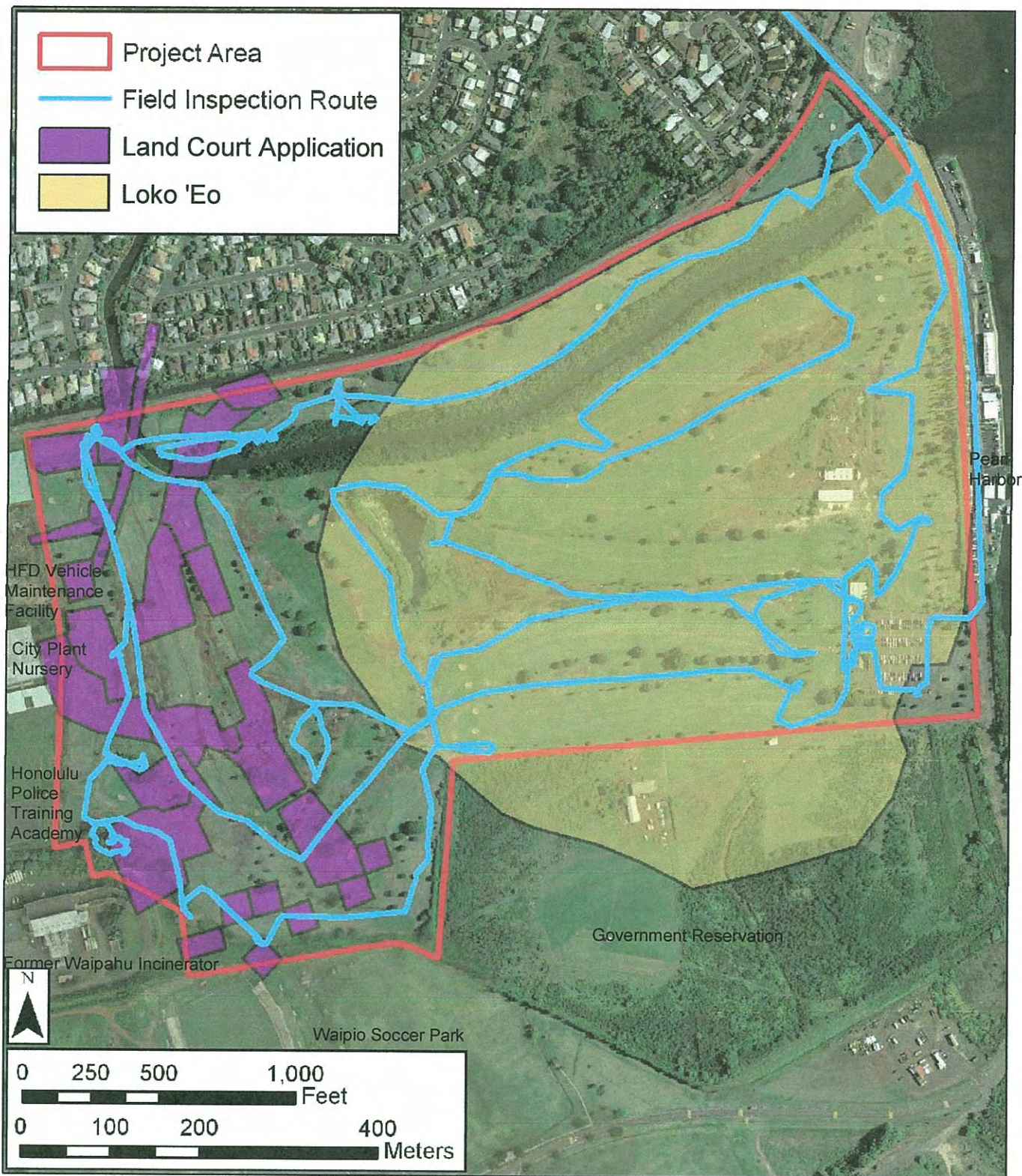
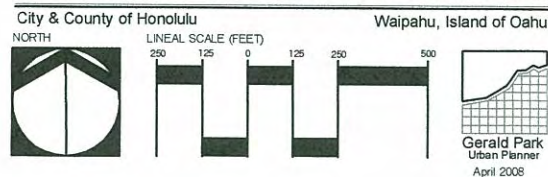


Figure 7  
Loko 'Eo and LCA Overlay  
**Ted Makalena Golf Course**





As the project area currently functions as a municipal golf course there is no evidence pertaining to on-going cultural practices relating to burials on the property or in the immediate vicinity. Due to the presence of extensive fill layers within the project area the proposed golf cart realignment project, involving excavations with a maximum depth of 8 inches, is not expected to effect any burials that may be present within the project area.

A review of historic maps spanning from 1877 through 1956 does not indicate any major trail systems traversing through the project area.

#### 8. Flora

The golf course has been developed and improved with buildings, paved surfaces, ornamental landscaping, Bermuda grass tees and greens, and seashore paspalum fairways. Trees (general rather than site specific) include monkeypod, milo, paper bark, autograph, royal poinciana, banyan, brassaia, kiawe, kukui, pink tecoma, plumeria, silver buttonwood, sea grape, and fiddlewood.

Coconut, Manila palms, and Norfolk Island pine are common. Shrubs include be-still, hibiscus, bougainvillea, and money plant. Thick growths of mangrove and hau line the banks of Wailani Stream. The dense growth makes access to the stream difficult except in the eastern segment where the banks are exposed.

All observed flora is common to the island of O'ahu and the state of Hawai'i.

#### 9. Fauna

Feral cats, feral chicken, and ducks were observed at a variety of locations including the clubhouse. Cattle egret, spotted and barred doves, and ricebird are common birds seen at or flying over the golf course. All observed mammals and birds are common to O'ahu and the state of Hawai'i.

The pond might provide habitat for native and resident water birds. This was not confirmed since only an unidentified species of duck was observed during the field investigation. It cannot be determined if rare, threatened, or endangered birds frequent the pond. Native water birds may be present since Hawaiian stilt, Hawaiian Duck, and Hawaiian Moorhen have been recorded at Pouhala Marsh located about 0.5 miles to the west (Park, 2000). The three species are federally listed as endangered.

The Hawaiian Owl or *pueo* has been observed in the vicinity of Waipi'o Peninsula (Ibid).

#### 10. Views

No significant stationary views from areas above and below the project site are identified in County plans (Central Oahu *Sustainable* Communities Plan, 2002) for the area. The site does not contain any significant visual features, but it offers panoramic views of the Ko'olau Mountains, Pearl City, Honolulu, West Loch of Pearl Harbor, and the Waianae Mountains.

In the absence of any structures on the premises, the view from adjoining residential lots on the north is that of fenced golf course

The Coastal View Study (Chu, 1987) places Ted Makalena Golf Course in Section A Pearl Harbor, South Shore Viewshed. No significant stationary views are identified from the golf course or towards the golf course from public viewing areas. Farrington Highway is identified as a coastal roadway but it offers no continuous or intermittent coastal viewing across the golf course.

From various locations on the golf course, the top most sections of the Waipahu Sugar Mill smokestack (174 feet in height) can be viewed rising above the tree tops and residential dwellings along the northern boundary of the golf course.

### **C. Land Use Controls**

The State Land Use Commission classifies the project site Agricultural (See Figure 8). The State land use law (Chapter 205, Hawaii Revised Statutes) does not allow golf courses in the State Agricultural district unless "...golf course and golf driving ranges approved by a county before July 1, 2005 for development within the agricultural district shall be permitted uses within the agricultural district (§205-4.5 (d))." Ted Makalena Golf Course was developed before July 1, 2005 and is thus a permitted use in the State Agricultural district.

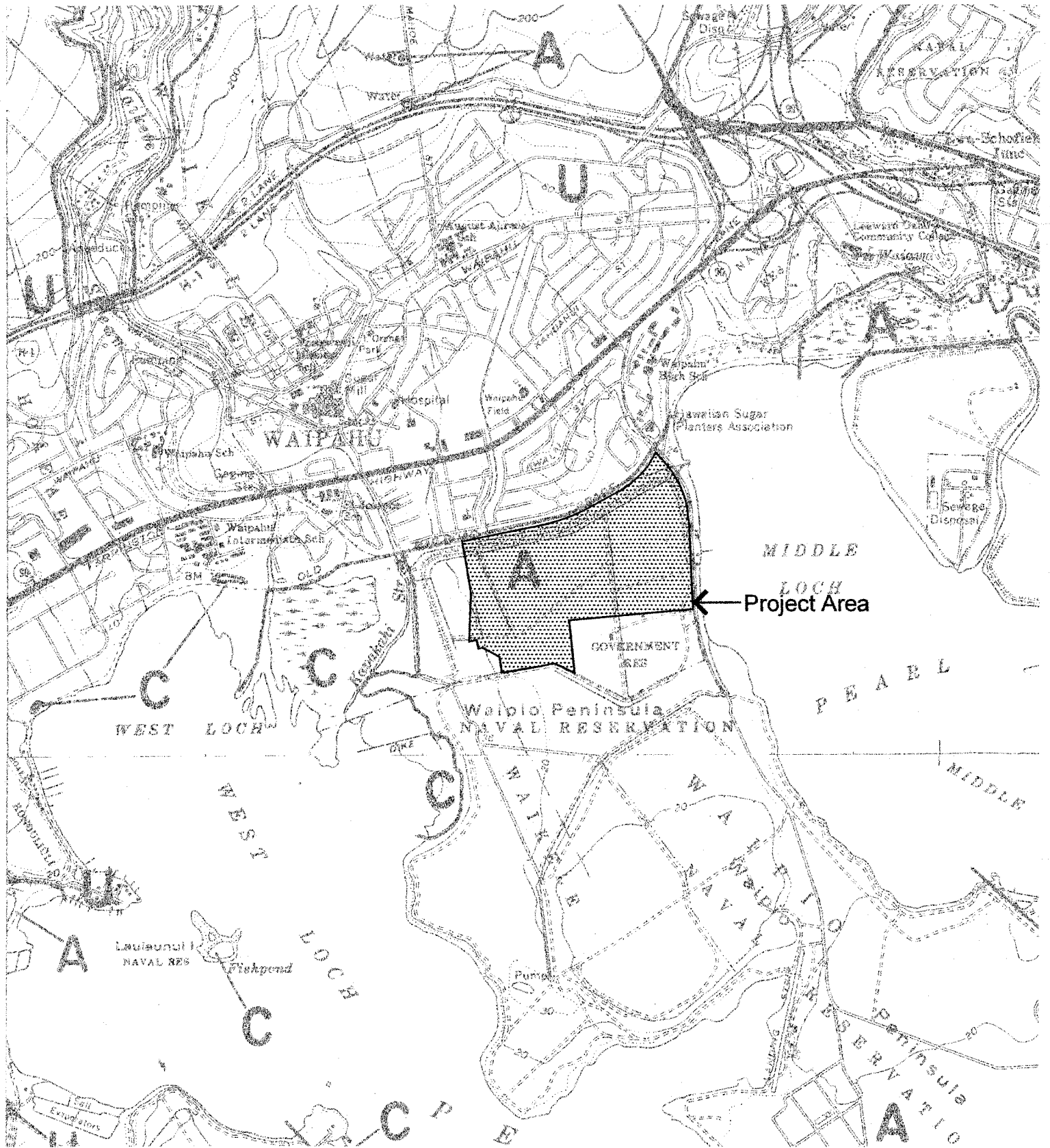
The O'ahu General Plan (2002) places Waipahu in the Urban Fringe and the community is part of the Central O'ahu *Sustainable Communities Plan* ("COSCP") area. According to the COSCP, Central Oahu has eight public and private golf courses. The City operates the Ted Makalena Golf Course on the Waipi'o Peninsula. Because of the need to use high-quality water for irrigation above the Pearl Harbor aquifer, municipal golf course improvements in Central Oahu should be limited to enhancement of Ted Makalena Golf Course. Any new stand-alone municipal course to serve the region should be planned for 'Ewa where non-potable water for irrigation uses will be available from the Honouliuli Wastewater Treatment Plant.

The COSCP does not offer planning principles and guidelines directly applicable to Ted Makalena Golf Course. Recommended principles and guidelines are directed to new island wide and regional parks and sports and recreation complexes.

The COSCP also includes a section of planning principles and guidelines for revitalizing and developing Waipahu Town. The future of Waipahu is envisioned as a vibrant community where the country atmosphere is preserved, where business prospers, and where diverse people can come together to live, work, shop, and play. This Waipahu of the future is prescribed in a town plan with four major activity centers or "anchors".

Ted Makalena Golf Course along with other municipal facilities located on Waipi'o Peninsula such as the Police Training Academy, Waipi'o Peninsula Soccer Park, the Waipahu Refuse Convenience Center, the Waipahu wastewater pump station, and a section of the Pearl Harbor historic trail comprise the Recreation Anchor. In addition to these facilities, the town plan recommends: developing a major shoreline park and preservation area along the entire shoreline of Pearl Harbor's West and Middle Lochs; restoring the OR&L right-of-way for train operations; and develop a shoreline pedestrian and bicycle path within the OR&L right-of-way (a section of the Pearl Harbor Historic Trail).

The COSCP Urban Land Use Map (DPP, 2002 under revision) designates the property Golf Course and it is located inside the Urban community boundary. The "makai portion of the



**Legend**

- U Urban
- A Agriculture
- C Conservation

**Figure 8**  
**State Land Use Districts**  
**Ted Makalena Golf Course**

City & County of Honolulu Waipahu, Island of Oahu

NORTH

LINEAL SCALE (FEET)

1600 500 0 500 1000 2000

Gerald Park  
 Urban Planner  
 April 2008

boundary encloses that portion of the Waipi'o Peninsula that is in the blast zone for the West Loch Naval magazine (Ibid)."

Ted Makalena Golf Course is not "symbolized" on the Public Infrastructure Map (PIM) for Central O'ahu. A Golf Course modification symbol will have to be added to the PIM for future construction of \$3 million or more. Therefore, an application will be submitted to the Department of Planning and Permitting to amend the PIM to place a "Golf Course/Modification" symbol on the existing golf course prior to requesting construction funds for future improvements.

The zoning map for Waipahu (Zoning Map No. 8) zones the golf course P-2 General Preservation. Public uses and structures such as a municipal golf course are a permitted use in the P-2 zoning district.

Ted Makalena Golf Course is located within the City and County of Honolulu's Special Management Area (See Figure 9). A Special Management Area Permit will be required prior to constructing the proposed improvements.

## **E. Public Facilities and Services**

### **1. Circulation and Traffic**

Waipi'o Point Access Road is a paved two-way, two-lane collector road aligned along the western edge of Middle Loch, Pearl Harbor. The roadway extends from Farrington Highway on the north to the naval magazine on Waipi'o Peninsula on the south. That portion of the road extending from Farrington Highway to just below Poailani Circle is owned by the City and County of Honolulu. The remaining portion is located on federal land (Belt Collins Hawaii, 1998).

Access to facilities *makai* of Poailani Circle including Ted Makalena Golf Course and Waipi'o Peninsula Soccer Park is therefore through federal property.

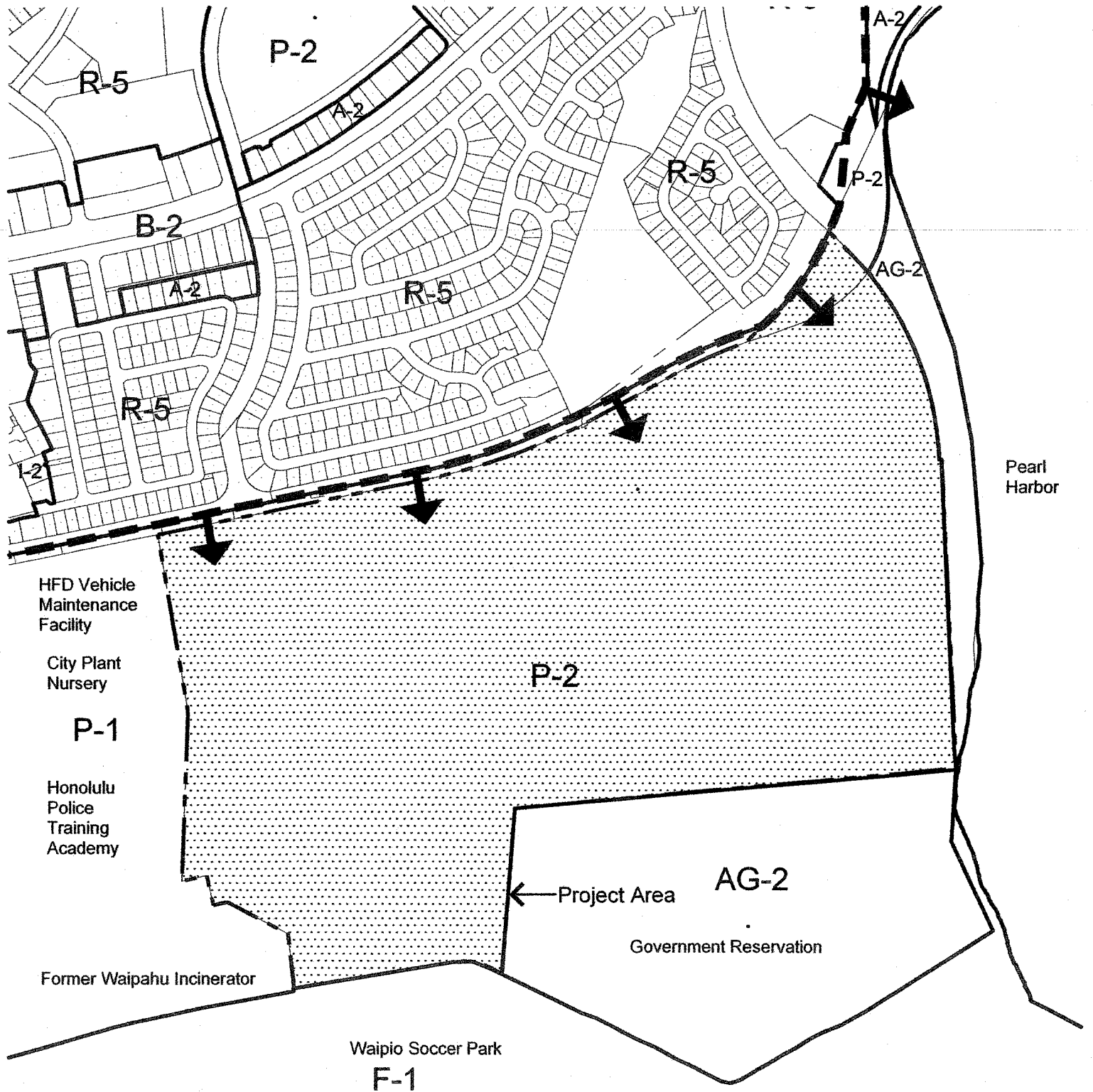
### **2. Water**

Potable water is drawn from a 12" PVC main in Waipahu Depot Road. The main also provides water to several municipal facilities located on lower Waipahu Depot Road.

Irrigation water use is estimated at 400,000 gallons per day and is drawn from a 12' water main providing irrigation water to the Waipi'o Peninsula Soccer Park. The water main is located in Waipahu Depot Road.

### **3. Wastewater**

Wastewater from the two comfort stations and clubhouse is discharged into a sewer lateral crossing the golf course in an east to west direction. Connection is made near the 14<sup>th</sup> tee from where wastewater gravity flows to the Waipahu Wastewater Pump Station on Waipahu Depot Road about 0.5 miles to the west.



**Legend**

- R-5 RESIDENTIAL (5,000 SF. LOT MINIMUM)
- A-2 APARTMENTS (MEDIUM DENSITY)
- B-1 BUSINESS (COMMUNITY)
- I-2 INDUSTRIAL (INTENSIVE)
- AG-2 AGRICULTURE (GENERAL)
- F-1 FEDERAL & MILITARY PRESERVATION
- P-1 PRESERVATION (RESTRICTED)
- P-2 PRESERVATION (GENERAL)

SPECIAL MANAGEMENT AREA BOUNDARY

Source: Zoning-City & County of Honolulu, Department of Planning & Permitting  
 Zoning Map 20, Ord. 86-121, Oct. 22, 1986  
 Special Management Area-City & County of Honolulu Online GIS Database

**Figure 9**  
 Zoning and Special Management Area  
 Ted Makalena Golf Course

City & County of Honolulu Waipahu, Island of Oahu

NORTH LINEAL SCALE (FEET)

0 150 300 450 600

Gerald Park  
 Urban Planner  
 April 2008



#### 4. Protective Services

Police service originates from the Pearl City Police Station on Waimano Home Road about 2.5 miles away in Pearl City.

First response to any on-site emergency would originate from the Waikele Fire Station (Engine 42) located about 2.8 miles to the north of the golf course. An engine company is posted at the station. Second response would originate from the Waipahu Fire Station about 2.8 miles to the west in the Waipahu Industrial Area where engine (Engine 12) and ladder companies (Ladder 12) are posted.

A City and County of Honolulu emergency ambulance is posted at the Waipahu Fire Station.

#### 5. Utility Services

Overhead electrical and communication are available along Waipi'o Point Access Road.

#### 7. Recreation

Waipahu District Park, located *mauka* of Farrington Highway on Paiwa Street, is one of the major recreation facilities in Waipahu. A gymnasium, two recreation buildings, playground, two softball fields, swimming pool, training pool, outdoor tennis courts, outdoor basketball courts, outdoor volleyball courts, a baseball/football field, and off-street parking comprise this 13.8 acre public recreation facility.

Hans L'Orange Neighborhood Park, located about four blocks *mauka* of Farrington Highway at the intersection of Paiwa and Waipahu Streets, is widely known for its baseball field.

A section of the Pearl Harbor Historic Trail passes to the north of the golf course. The paved multi-use trail is within the old OR&L railroad right-of-way. The trail can be gained from Waipi'o Point Access Road on the east or Waipahu Depot Road on the west. The 18.6 mile long trail is planned to link Halawa Landing (within the Pearl Harbor Naval Complex) on the east with the community of Nanakuli on the west. The trail would link communities with natural and historic resources, recreational resources, shoreline resources, and athletic venues along its length.

Waipi'o Peninsula Soccer Park, the premier soccer complex on the island of O'ahu, is located to the south of Ted Makalena Golf Course. The complex currently features 20 soccer fields and a stadium field lighted for night use.

## SECTION 3

# SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS AND MEASURES TO MITIGATE ADVERSE EFFECTS

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### A. Assessment Process

The scope of the project was discussed with staff of the Department of Design and Construction and the consulting engineer. State and County agencies were contacted for information relative to their areas of expertise. Time was spent in the field noting conditions on the golf course and in the adjoining areas. The discussions and field investigations allowed us to identify existing conditions and features that could affect or be affected by the project. These conditions are:

- The proposed improvements are confined to the Ted Makalena Golf Course;
- The property has been extensively altered by the construction of the golf course to include tee boxes, fairways, greens, bunkers and sand traps, cart paths, golf operations and maintenance structures, and parking lot;
- There are no rare or endangered flora on the premises;
- There are no archaeological features on the premises;
- There are no known cultural resources on the premises;
- Wailani Stream flows in an earthen channel through the golf course;
- Most of the golf course is not located in a flood hazard area except for land adjoining Wailani Stream;
- Public utilities will not be adversely affected by the proposed improvements.

### B. Short-term Impacts

Construction will temporarily affect air quality and the acoustical environment. Grubbing, grading, trenching, stockpiling, backfilling and other soil moving activities will raise fugitive dust at construction sites which can settle in adjoining areas. Windy conditions coupled with exposed soil can create dust problems. The general contractor will employ on-site dust control measures to prevent the work site and construction equipment and activities from becoming significant dust generators. Control measures shall comply with Chapter 60.1, Air Pollution Control, Title 11, Department of Health, State of Hawai'i (and revisions thereto).

Most construction equipment and vehicles are diesel powered and emit exhaust emissions typically high in nitrogen dioxide and low in carbon monoxide. The Federal and State nitrogen dioxide standard ---100mg/m<sup>3</sup> per annum---which is an annual standard, is not likely to be exceeded during construction. Carbon dioxide emissions should be less than that generated by automobile traffic on adjoining streets. Aldehyde odors from diesel equipment may be detected but should be dispersed by the prevailing winds.

Like fugitive dust, construction noise cannot be avoided. The golf course is bounded by residential uses along the 14<sup>th</sup>, 15<sup>th</sup>, and 16<sup>th</sup> holes. Residential properties are considered noise sensitive areas and construction noise may be audible as work takes place nearby. Exposure to noise will vary by construction phase, the duration of each phase, and the type of equipment used during the different phases. Maximum sound levels in the range of 82-96 db(A) measured at 50 feet from the source would be generated by heavy machinery during

site work. After site work is completed, reductions in sound levels, frequency, and duration can be expected during actual construction of the various park facilities.

The golf cart paths on the above mentioned holes will be constructed on the opposite side of the fairways from residential dwellings. A minimum of 200 feet to a maximum of 300 feet separates the dwellings from the construction sites along the fairways. This separation will help to attenuate noise. If required, the general contractor will obtain a noise permit from the State Department of Health. Although the permit does not attenuate noise per se it regulates the hours during which excessive noise is allowed. The general contractor will be responsible for obtaining and complying with conditions attached to the permit. Work will be scheduled between the hours of 8:00 AM to 3:30 PM Mondays through Fridays. The contractor will also ensure that construction equipment with motors are properly equipped with mufflers in good operating condition.

Construction noise may disturb golfers playing the hole where construction is taking place. Players will have to coordinate their shot making to coincide with short stoppages in construction noise. This impact cannot be avoided and would generally be limited to a hole at a time with occasional spillage onto adjoining holes.

Site work will expose soil thus creating opportunities for erosion (fugitive dust and suspended sediment in runoff). Grubbing, grading, and stockpiling of excavated or imported material will be performed in accordance with the erosion control ordinance of the City and County of Honolulu and grading plans approved by the Department of Planning and Permitting, City and County of Honolulu.

Estimated earthwork/grading quantities are 12,000 cubic yards excavation for the cart paths and walkways 1,345 cubic yards for the detention pond and drain line trench. There will be minimal fill. Excess material will be used to fill low areas elsewhere or stockpiled at one of two existing on-site stockpile sites. Best Management Practices (BMPS) for erosion and drainage control during construction will be incorporated into grading plans. Site work will exceed one (1) acre thus an NPDES General Permit Authorizing Discharges of Storm Water Associated with Construction Activity will be required from the State Department of Health. Any discharges related to project construction or operation activities will comply with applicable State Water Quality Standards as specified in Hawai'i Administrative Rules, Chapter 11-54.

To comply with City storm water quality policies, storm water will be directed to and collected in low areas and allowed to evaporate or percolate into the ground as occurs under existing conditions. Other methods may be implemented pursuant to approved, site-specific Best Management Practices and criteria in Part II Water Quality Criteria, City Rules Relating to Storm Drainage Standards (Department of Planning and Permitting, 2000). Estimates of storm water discharge for the area affected by the improvements have not yet been calculated. Estimates will be provided with the application for an NPDES Permit.

The pond and potential water bird habitat will not be adversely affected. Construction noise may cause birds to seek temporary habitat in other areas of the golf course. Silt fences will be erected around work sites and edges of the pond and stream bank to contain storm water discharge and prevent sediment deposition into the surface waters.

The proposed improvements involves minimal ground disturbance involving 8-inch deep and 10-foot wide excavations for the installation of 8 feet wide golf cart paths. The shallow

excavations would be confined within fill layers and would not impact naturally deposited sediments, thus avoiding any subsurface archaeological deposits that may be present. Should excavation unearth subsurface archaeological sites, artifacts, cultural deposits, or burials work in the immediate area will cease and the State Historic Preservation Division notified for proper disposition of the finds.

Areas adjoining tee boxes, greens, and the realigned fairway routes will be grubbed of grass. The cart paths will be routed to avoid trees. No threatened or endangered plants are found at the course. Where the new cart paths deviate from the original cart paths, the original cart paths will be demolished and planted with turf or other suitable vegetation.

The movement of men and material to and from the site will contribute some vehicles to traffic on Waipi'o Point Access Road. Work can be scheduled for non-peak traffic hours to minimize traffic congestion both before and after school (Waipahu High School) hours.

### **C. Long-term Impacts**

Background research had indicated that during pre-and early post-contact times the project area was burgeoning with traditional Hawaiian activity in the form of habitation, agriculture, and aquaculture. LCA documentation indicates that by the mid-eighteenth century the entire project area consisted of a complex network of irrigation ditches, agricultural fields, fish ponds, and habitations. However, successive land modifications associated with historic sugar cultivation and military operations as well as modern golf course development have caused extensive land disturbances throughout the project area which have destroyed and/or buried any evidence of both pre- and post-contact land use. As expected, no historic properties were observed during the field inspection of the project area. Additionally, based on all available information, it is extremely unlikely that the proposed project will affect on-going cultural practices.

The project is anticipated to benefit golf course operations, improve the recreational experience for golfers, and increase play. In terms of operational impacts, concrete cart paths are less prone to deterioration than other surfacing materials, has a longer life span than other materials, and thus requires less maintenance. The new paths will also provide access for maintenance vehicles and divert cart traffic away from certain areas of the course.

For players, the new paths will help to define the golf holes from tee to green, safely transport players from tee to green (cart paths generally do not cross from one side of the fairway to the other), prevent damage to tee boxes, fairways, and greens by having a clearly defined travel way and providing curbed parking areas adjoining tee boxes and greens, improve the overall utility and appearance of the recreation facility and the recreational experience, and offer an alternative to walking.

In conjunction with other improvements such as installing a new irrigation system, turf conditions and playing conditions are expected to improve. This would result in increased play with concomitant competition amongst golfers for tee times. Increased play will foster increase revenue from green fees and cart rentals.

Potential increases in green fees and cart rentals will be evaluated by the Department of Enterprise Services and subject to action by the Honolulu City Council.

Improvements to, and the installation of, a pollutant removal system for the cart wash area will preclude discharge of sediment, oil, grease, and other pollutants into the environment. Wash water discharged into the detention basin will be allowed to evaporate

## SECTION 4

## SPECIAL MANAGEMENT AREA OBJECTIVES AND POLICIES

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The relationship of the proposed project to Special Management Area objectives and policies is discussed in this section. The Special Management Area objectives and policies are the same objectives and policies for Coastal Zone Management (Chapter 205A, Hawai'i Revised Statutes).

### **A. Coastal Zone Management Objectives**

1. Recreational Resources
  - (A) Provide coastal recreational opportunities accessible to the public.
2. Historic Resources
  - (A) Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
3. Scenic and Open Space Resources
  - (A) Protect, preserve, and, where desirable restore or improve the quality of coastal scenic and open space resources.
4. Coastal Ecosystems
  - (A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal resources.
5. Economic Uses
  - (A) Provide public or private facilities and improvements important to the State's economy in suitable locations.
6. Coastal Hazards
  - (A) Reduce hazard to life and property from tsunamis, storm waves, stream flooding, erosion, subsidence, and pollution.
7. Managing Development
  - (A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
8. Public Participation
  - (A) Stimulate public awareness, education, and participation in coastal management.
9. Beach Protection
  - (A) Protect beaches for public use and recreation.
10. Marine Resources
  - (A) Implement the State's ocean resources management plan.



## **B. Coastal Zone Management Policies**

### **(1) Recreational Resources**

- (A) Improve coordination and funding of coastal recreational planning and management; and
- (B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
  - (i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
  - (ii) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidable damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
  - (iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
  - (iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
  - (v) Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
  - (vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
  - (vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
  - viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the

Statement: Ted Makalena Golf Course is not located on a beach or shoreline lot. Thus, there are no opportunities for shoreline recreation associated with the golf course and there is no lateral access or public access to or along the shoreline. Public use of West and Middle Loch of Pearl Harbor is not currently permitted.

The golf course is located makai of the OR&L railroad right-of-way which is proposed for development of a pedestrian walkway and bike path called the Pearl Harbor Historic Trail. The 18.6 mile long rail/trail would extend from Halawa Landing near Aloha Stadium eventually to the Leeward Oahu community of Nanakuli. Parts of the trail already exist. An approximately 5 mile long section of the City's Pearl Harbor Bike Path follows the shoreline from Halawa Landing at Pearl Harbor on the east to Waipahu Depot Road in the town of Waipahu on the west. From Waipahu the multiple-use trail would follow a historic train line and new bicycle paths to Nanakuli. The train line is currently used by the Hawaiian Railway Society which runs historic trains in the Ewa area.

There is no access to the OR&L railroad right-of-way and Pearl Harbor Historic Trail through Ted Makalena Golf Course.

## 2) Historic Resources

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

Statement: An archaeological field inspection did reveal the presence of historic properties. Additionally, based on all available information, it is extremely unlikely that the proposed project will affect on-going cultural practices.

## 3) Scenic and Open Space Resources

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

Statement: The Coastal View Study (Chu, 1987) placed Ted Makalena Golf Course in Section A Pearl Harbor, South Shore Viewshed. No significant stationary views are identified from the golf course or towards the golf course from public viewing areas. Farrington Highway is identified as a coastal roadway but it offers no continuous or intermittent coastal views between the road and the shoreline. Coastal views are blocked by residential subdivisions along Farrington Highway.

The upper sections of the Waipahu Sugar Mill smokestack (174 feet in height) can be seen from various places on the golf course. This view will not be affected by the proposed improvements.

## 4) Coastal Ecosystems

- (A) Improve the technical basis for natural resource management;
- (B) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
- (C) Minimize disruption or degradation of coastal water ecosystems by efficient regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
- (D) Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.

Statement: The project is not proposed in an area of open waters, potential fisheries and fishing grounds, and wildlife habitats. A pond may provide habitat to native water birds

although none were observed during a field investigation. Improvements are not proposed to the pond thus there should be no impact on this water feature. Construction activities nearby could affect the presence of water birds but this impact should be temporary as construction will be short-term at any of the holes fringing on the pond.

#### 5) Economic Uses

- (A) Concentrate coastal dependent development in appropriate areas;
- (B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
- (C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
  - (i) Use of presently designated locations is not feasible;
  - (ii) Adverse environmental effects are minimized; and
  - (iii) The development is important to the State's economy.

Statement: Although Ted Makalena Golf Course is located in the Special Management Area, it is not a coastal dependent development.

#### 6) Coastal Hazards

- (A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
- (B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;
- (C) Ensure that developments comply with requirements of the Federal Flood Insurance Program;
- (D) Prevent coastal flooding from inland projects; and
- (E) Develop a coastal point and nonpoint source pollution control program.

Statement: The golf course is located outside of the 100-year flood hazard area and coastal high hazard area delineated for this section of Waipahu and Waipi'o Peninsula.

#### 7) Managing Development

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

## 8) Public Participation

- (A) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;
- (B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and
- (C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Statement: A Major Special Management Area ("SMA") Permit is required for the proposed improvements. The Department of Planning and Permitting ("DPP"), City and County of Honolulu, will schedule a public hearing as part of the SMA review process. Notice of the public hearing will be published in a local daily newspaper. Adjoining property will be notified by mail as to the time and place of the hearing.

The Honolulu City Council approves SMA permits by Resolution. The application for SMA Permit and DPP recommendation will be presented to the Honolulu City Council and the City Council Zoning Committee. The Zoning Committee can also schedule a public hearing if warranted. Honolulu City Council hearing procedures provide ample opportunity for the public to comment on the SMA Permit application.

## 9) Beach Protection

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

Statement: The proposed improvements are not located on a beach or shoreline thus there should be no effect on beach processes.

## 10) Marine Resources

- (A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
- (B) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- (C) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;
- (D) in the sound management of ocean resources within the United States exclusive economic zone;
- (E) Promote research, study, and understanding of ocean processes, marine life, necessary to understand how ocean development activities relate and impact upon ocean and coastal resources; and

(F) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Statement: The improvements are not proposed on the shoreline thus no impact on marine resources is anticipated.

**A. No Action**

A No Action alternative would maintain the status quo and preclude the occurrence of short and long-term environmental impacts both beneficial and adverse disclosed in this assessment.

**B. Pavement Material**

Asphalt concrete was used for cart paths at Makalena Golf Course when it was constructed. The material did not hold up well to years of use and is not the desirable material for the new cart paths. Although less expensive to install than concrete, the material requires significant more maintenance over time to protect it.

**C. Cart Path Alignment**

The cart path routing shown in Figure 4 is the alternative preferred by the City's golf course administrators and the golf course manager and superintendent. Alternative routing schemes would not result in impacts to the physical environment different from that disclosed in this assessment. The preferred alternative fosters golfer safety by relocating cart paths from the middle of the fairway to the "safe" side of the fairway (generally the left side depending on the hole layout) and in some instances on the right side of the fairway to separate the paths from adjoining parallel fairways.

**D. Detention Pond Location**

The site of the proposed detention pond is the most suitable location for the facility. It is located in an unused portion of the golf course that is free of trees and other vegetation thereby maximizing exposure to the sun. The site also is in proximity to the new cart wash area thus minimizing piping "runs". Other potential sites are too far from the wash area.

## SECTION 6

## AGENCIES AND ORGANIZATIONS TO BE CONSULTED DURING THE ASSESSMENT PROCESS

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### **State**

Department of Health  
Environmental Planning Office  
Department of Land and Natural Resources  
Historic Preservation Division

### **County**

Board of Water Supply  
Department of Enterprise Services  
Department of Environmental Services  
Department of Parks and Recreation  
Department of Planning and Permitting  
Department of Transportation Services  
Honolulu Police Department  
Honolulu Fire Department

### **Other**

Hawaiian Electric Company  
Hawaiian Telcom  
Waipahu Neighborhood Board No. 23  
Waipahu Public Library (Placement)  
The Honorable Nestor Garcia, Honolulu City Council

Permits and approvals required for the project and approving authorities are listed below. Additional permits and approvals may be required pending final construction plans.

**City and County of Honolulu**

Honolulu City Council

Special Management Area Permit-Major

Department of Planning and Permitting

Grubbing, Grading, and Stockpiling Permit  
Building Permit for Building, Electrical, Plumbing, Sidewalk/Driveway and Demolition Work

**State of Hawaii**

Department of Health

Variance from Pollution Controls (Noise Permit)  
NPDES General Permits (Discharges Associated with Construction Activities)

Department of Land and Natural Resources

Historic Site Review



Chapter 200 (Environmental Impact Statement Rules) of Title 11, Administrative Rules of the State Department of Health, establishes criteria for determining whether an action may have significant effects on the environment (11-200-12). The relationship of the proposed project to these criteria is discussed below.

**1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;**

An archaeological field investigation did not reveal the presence of historic properties in the project area. In addition, there are no known traditional cultural practices conducted within or in the immediate vicinity of the project area.

**2) Curtails the range of beneficial uses of the environment;**

The proposed improvements will not curtail the range of beneficial uses of the environment. The improvements will correct deficiencies to improve the playing conditions and recreational enjoyment of a public recreation facility.

**3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, Hawaii Revised Statutes, and any revisions thereof and amendments thereto, court decisions or executive orders;**

The project will not conflict with long-term environmental policies, goals, and guidelines of the State of Hawaii.

**4) Substantially affects the economic welfare, social welfare, and cultural practices of the community or State;**

The project will not substantially affect the economic or social welfare of the State.

No historic properties were observed during the field inspection of the project area. Based on all available information, it is extremely unlikely that the proposed project will affect on-going cultural practices.

**5) Substantially affects public health;**

Public health will not be adversely affected by the proposed project.

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

Substantial secondary impacts such as population changes or effects on public facilities are not anticipated.

**7) Involves a substantial degradation of environmental quality;**

Environmental quality of the golf course and surrounding neighborhoods will not be degraded.

**8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;**

The project is not the precursor for a larger action. It is, however, part of an on-going capital improvement program to upgrade and improve municipal recreation facilities throughout the City and County of Honolulu.

**9) Substantially affects a rare, threatened or endangered species, or its habitat;**

There is no rare, threatened or endangered flora or fauna on the premises. It is not known if native water birds frequent a freshwater pond located near the center of the golf course. Native water birds were not observed at the pond during the field investigation for this project.

**10) Detrimentially affects air or water quality or ambient noise levels; or**

Ambient air quality will be affected by fugitive dust and combustion emissions but can be controlled by measures stipulated in this Assessment. Construction noise will be audible during the entire construction process. Construction work will proceed one hole at a time thus noise will be temporary in any one location. All construction activities will comply with air quality and noise pollution regulations of the State Department of Health.

**11) Affects an environmentally sensitive area such as a flood plain, tsunami zone, erosion prone area, geologically hazardous land, estuary, fresh water, or coastal waters.**

The proposed improvements are not located in an environmentally sensitive area.

**12) Substantially affects scenic vistas and view planes identified in county or state plans or studies; or**

The proposed improvements will not affect scenic vistas identified in county plans for the area. Public views of the shoreline from the roadway nearest the coastline will not be affected because the improvements are located less than 6" above grade and will not be visible.

**13) Requires substantial energy consumption.**

Substantial energy consumption is not anticipated.

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## **APPENDIX A**

### **ARCHAEOLOGICAL LITERATURE REVIEW AND FIELD INSPECTION**

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**An Archaeological Literature Review and Field Inspection  
for the Ted Makalena Golf Course Improvements Project**

**Waipi'o Ahupua'a, 'Ewa District, O'ahu**

**TMK: [1] 9-3-002: 034**

**Prepared for  
Gerald Park Urban Planner**

**Prepared by  
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Kailua, Hawai'i  
(Job Code: WAPIO 4)**

**July 2008**

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## Management Summary

Reference	Archaeological Literature Review and Field Inspection for the Ted Makalena Golf Course Improvements Project Waipi'o Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-3-002: 034 (Tulchin & McDermott 2008)
Date	July 2008
Project Number	Cultural Surveys Hawai'i Inc. (CSH) Job Code: WAIPIO 4
Investigation Permit Number	The fieldwork component of the archaeological literature review and field inspection study was carried out under CSH's annual archaeological permit # 08-14 issued by the Hawai'i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR), per Hawai'i Administrative Rules (HAR) Chapter 13-282.
Project Location	The project area is located within the northern portion of the Waipi'o Peninsula, and is bordered by the Middle Loch of Pearl Harbor to the east, Kapakahi Stream to the west, the remnants of the Oahu Railway and Land Company (OR&L) railroad grade to the north, and a government reservation to the south. This area is depicted on the 1999 Pearl Harbor USGS 7.5-minute topographic quadrangle.
Project Funding and Land Jurisdiction	City and County of Honolulu (City)
Project Area Acreage	Approximately 150 acres
Project Description	The Ted Makalena Golf Course Improvements Project consists of the realignment of golf cart paths throughout the project area. Ground disturbance will involve 8-inch deep and 10-foot wide excavations for the installation of 8 feet wide reinforced concrete golf cart paths.
Agencies	SHPD, City
Historic Preservation Regulatory Context and Document Purpose	The proposed project is subject to Hawai'i State environmental and historic preservation review legislation [Hawai'i Revised Statutes (HRS) Chapter 343 and HRS Chapter 6E-8 and HAR Chapter 13-275]. This investigation does not fulfill the requirements of an archaeological inventory survey investigation per the rules and regulations of the SHPD/DLNR (per HAR Chapter 13-276). However, the level of work is sufficient to determine if there are any major archaeological concerns within the project area and to develop data on the general nature, density and distribution of archaeological resources, as well as to provide recommendations of any additional cultural resource management work that might be needed prior to land alteration within the project area. This document was prepared to support the project's historic preservation and environmental review.

Fieldwork Effort	The fieldwork component of the archaeological literature review and field inspection study was accomplished on May 27, 2008, by two CSH archaeologists, Jon Tulchin, B.A., and Douglas Thurman, B.A., under the general supervision of Matt McDermott, M.A. (principal investigator). The fieldwork required approximately 2 person-days to complete.
Results Summary	No historic properties were observed during the field inspection of the project area. The absence of historic properties can be attributed to extensive land modifications associated with historic sugar cultivation and military operations, as well as the modern golf course development observed throughout the project area. Observed land modifications consisted of a dredged drainage canal, leveled and graded areas utilized as fairways, artificial knolls and sand traps, asphalt paved golf cart paths, wooden and concrete structures for golf patrons and maintenance staff, and a green waste dumping area.
Recommendations	<p>CSH recommends consultation with SHPD/DLNR prior to land alteration within the project area. This document should be used to support this consultation with SHPD to establish the appropriate cultural resource management requirements for the project.</p> <p>Based on the results of this investigation, no additional cultural resource management work is recommended for the project. This is based on the results of the field inspection, in which no historic properties were observed, as well as a review of previous archaeological work within the project area and in the immediate vicinity, which suggest that the entire project area contains fill layers that are approximately 3 to 7 meters thick (Goodman &amp; Cleghorn 1998; Athens et al. 2000). The proposed Ted Makalena Golf Course Improvements Project involves minimal ground disturbance involving 8-inch deep and 10-foot wide excavations for the installation of 8 feet wide reinforced concrete golf cart paths. The shallow excavations proposed for this project would be confined within fill layers and would not impact naturally deposited sediments, thus avoiding any subsurface archaeological deposits that may be present.</p>

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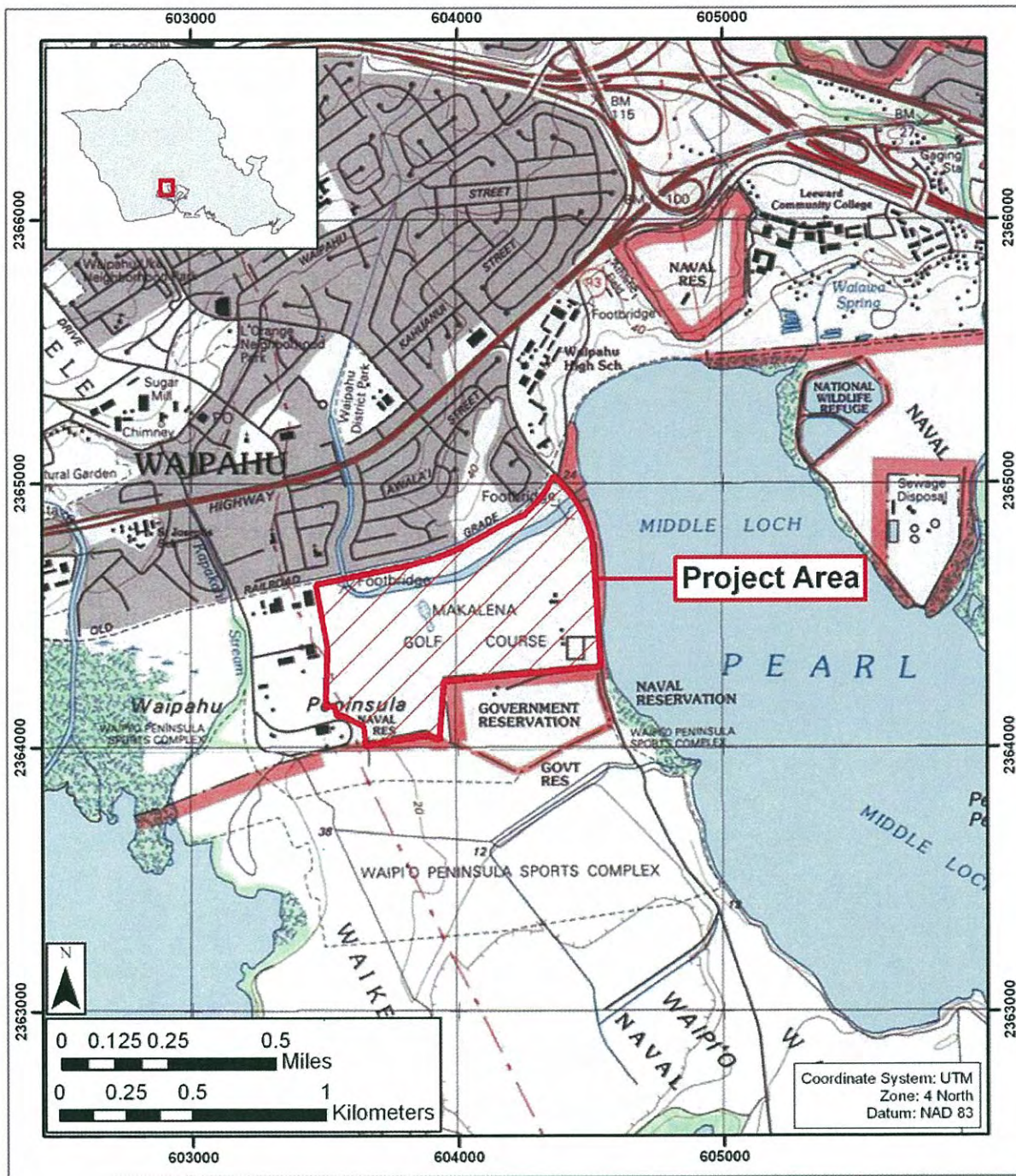


Figure 1. Portion of 1998 Pearl Harbor USGS 7.5-minute topographic quadrangle, showing the location of the project area









Figure 3. Aerial photograph showing the location of the project area (source: U.S.G.S Orthoimagery 2005)





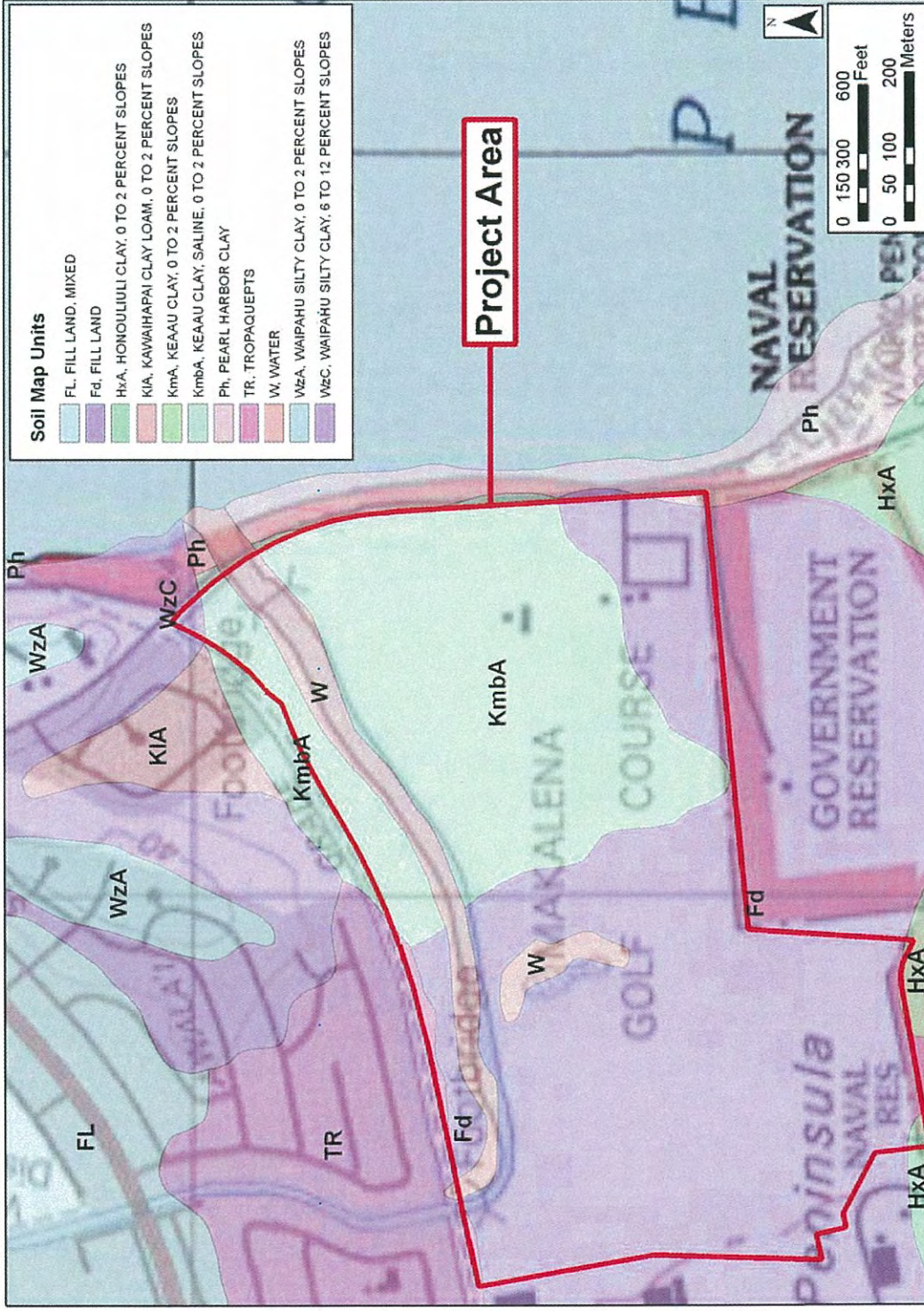


Figure 5. Overlay of Soil Survey of the State of Hawai'i (Foote et al. 1972), indicating sediment types within the project area



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## Section 2 Methods

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### 2.1 Document Review

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

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

### 2.2 Field Methods

The fieldwork component of the archaeological literature review and field inspection was conducted on May 27, 2008 by two CSH archaeologists, Jon Tulchin, B.A., and Douglas Thurman, B.A., under the general supervision of Matt McDermott, M.A. (principal investigator). The fieldwork required 2 person-days to complete.

In general, the purpose of the field inspection was to develop data on the nature, density, and distribution of archaeological sites within the study area, and also to develop information on the degree of difficulty that vegetation and terrain create for future archaeological studies. The field inspection consisted of a walk-through reconnaissance along the proposed route of the golf cart realignment corridor (see Figure 4). The spacing between the archaeologists was generally 10-20 m. Potential archaeological sites or site areas were documented with brief written descriptions, and photographs, and were located with Garmin GPS survey technology (accuracy 3-5 m). A track log of the area covered by the pedestrian survey was also generated (see section 4).

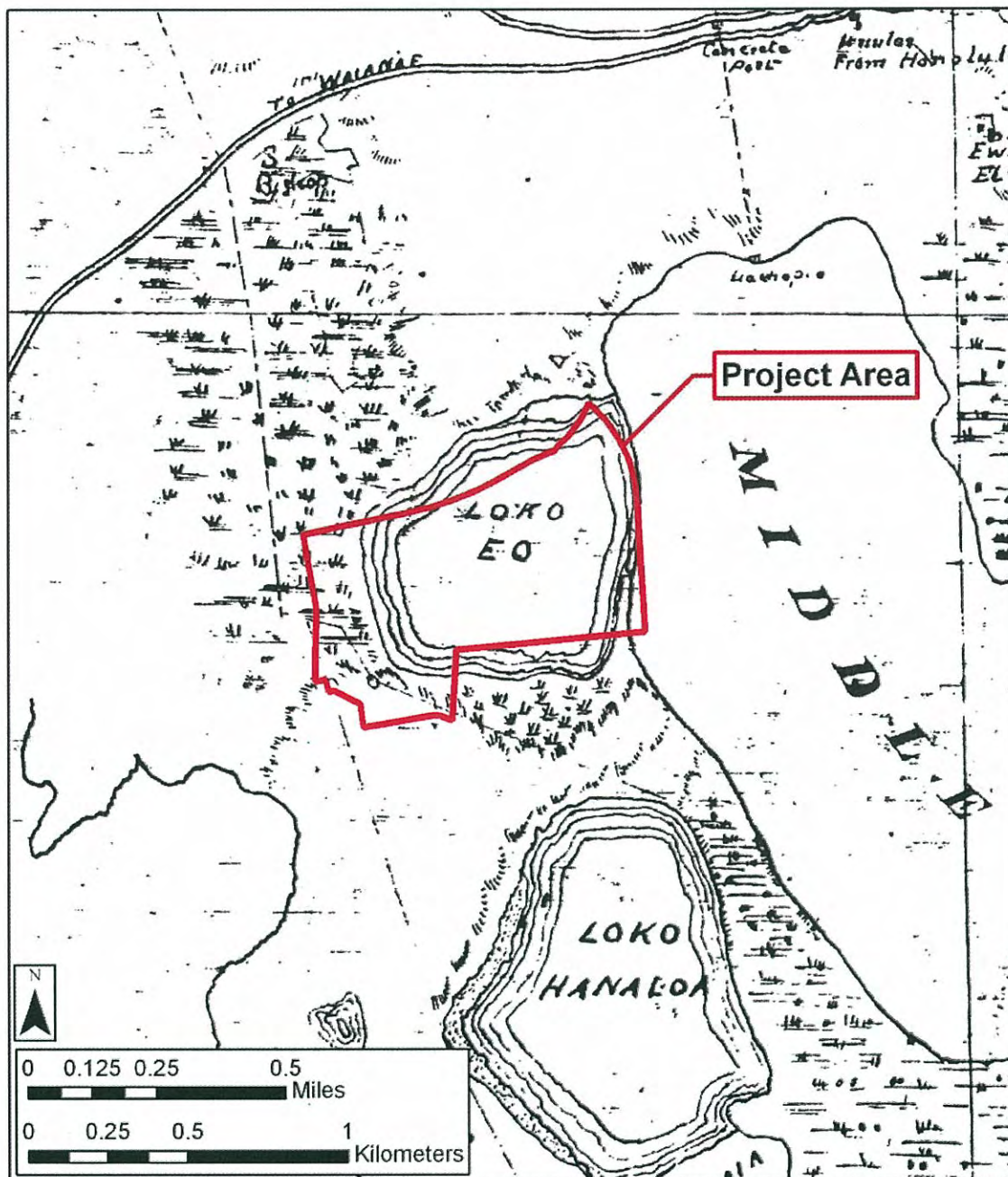


Figure 6. Portion of 1877 J. F. Brown's map of Waipi'o Ahupua'a, showing the project area

The lowland areas of Waipi'o were used for agriculture, as described by E. Craighill Handy in the 1940s:

Between the West Loch of Pearl Harbor and Loko Eo the lowlands were filled with terraces that extended for over a mile up into the flats of Waikele Stream. The lower terraces were formerly irrigated partly from Waipahu Stream, which Hawaiians believe came all the way through the mountains from Kahuku. It is said that terraces formerly existed on the flats in Kipapa Gulch for at least two miles upstream above its junction with Waikele. Wild taros grow in abundance in upper Kipapa Gulch (Handy 1940:82).

### 3.1.2 Pre-contact to 1800

In the legend of Nāmakaokapao'o, the *kula o Keahumoa* (plain of Keahumoa), located northwest of the project area and just *makai* of Kīpapa gulch, is mentioned. Nāmakaokapao'o's mother was Pokai and his father was Kaulukahai, a great chief of Kahiki (the ancestral home of the Hawaiians). The father returned to his home before the birth of his son, Nāmakaokapao'o, leaving his O'ahu family destitute. A man named Puali'i saw Pokai and desired to marry her. They then resided on the plains of Keahumoa, planting sweet potatoes. Nāmakaokapao'o was a small, brave child who took a dislike to his stepfather, and pulled up the sweet potatoes Puali'i had planted at their home in Keahumoa. When Puali'i came after Nāmakaokapao'o with an axe, Nāmakaokapao'o delivered a death prayer against him, and slew Puali'i, hurling his head into a cave in Waipouli, near the beach at Honouliuli (Fornander 1919, Vol. 5:274-276).

The plains of Keahumoa are of interest as it was the location where sometime during the first half of the eighteenth century, a chief named Kualii'i; consolidated his supreme power over the entire island of O'ahu by defeating the chiefs of 'Ewa (Cordy 2002:32). Kualii'i met the competing army on the plains of Keahumoa, but the 'Ewa chiefs surrendered when they saw Kualii'i's overwhelming forces, and they ceded the lands of Ko'olauloa, Ko'olaupoko, Waialua, and Wai'anae to him (Fornander 1917, Volume IV (2):366, 400).

During the second half of the eighteenth century, Waipi'o again became a focus of political intrigue and warfare. In 1783, the forces of the Maui chief Kahekili gained control of the island of O'ahu by defeating the mō'i, Kahahana, "from the powerful 'Ewa chiefs' line" (Cordy 1981:207). According to the nineteenth-century Hawaiian historian Samuel Kamakau, the defeated O'ahu chiefs plotted to kill the Maui chiefs. Waipi'o was given the name Waipi'o kīmopō, "Waipi'o of secret rebellion," due to all the covert planning (Kamakau 1992:138). Following the plan's failure, Kahekili took revenge on the 'Ewa and Kona districts:

...and when Ka-hekili learned that Elani of 'Ewa was one of the plotters, the districts of Kona and 'Ewa were attacked and men, women, and children were massacred, until the streams of Makaho and Niuhelewai in Kona and of Kahoa'ai'ai in 'Ewa were choked with the bodies of the dead, and their waters became bitter to the taste, as eyewitnesses say, from the brains that turned the water bitter. All the O'ahu chiefs were killed and the chiefesses tortured (Kamakau 1992:138).

If Kamakau is correct, the population of Waipi'o would have been decimated during the 1780s. "The O'ahu society never rose again" (Cordy 1981:208).

Kahekili and the Maui chiefs retained control of O'ahu until the 1790s. Kahekili died at Waikiki in 1794. His son, Kalanikāpule, was defeated the following year at the battle of Nu'uau by Kamehameha, who distributed the O'ahu lands - including Waipi'o Ahupua'a - among his favorite followers where "...land belonging to the old chiefs was given to strange chiefs and that of old residents on the land to their companies of soldiers, leaving the old settled families destitute" (Kamakau 1992:376-377).

### 3.1.3 1800s to 1850

Native Hawaiian activity and habitation at the middle of the nineteenth century continued to be clustered in the *makai* (seaward) lowlands and the fishponds near the coast. The *makai* landscape of the *ahupua'a* was dominated by an extensive network of taro *lo'i* (irrigated fields), as indicated by Land Commission Award (LCA) documents from the mid-nineteenth century Māhele.

The end of the eighteenth century and beginning of the nineteenth century marked Hawai'i's entry into world trade networks. One of the chief exports at this time was sandalwood (*Santalum* sp.) or *'iliahi*, which was prized in China for its unique fragrance and used in the manufacture of household items, as incense, as perfume, and as medicine (St. John 1947). The central plains of 'Ewa (*mauka* of present project area) supplied the Hawaiian Kingdom with *'iliahi*. One of the first generation missionaries, Sereno Bishop (1901), described his memories of the central O'ahu region in the 1830s:

Our family made repeated trips to the home of Rev. John S. Emerson at Waialua during those years. There was then no road save a foot path across the generally smooth upland. We forded the streams. Beyond Kipapa gulch the upland was dotted with occasional groves of Koa trees. On the high plains the ti plant abounded, often so high as to intercept the view. No cattle then existed to destroy its succulent foliage. According to the statements of the natives, a forest formerly covered the whole of the then nearly naked plains. It was burned off by the natives in search of sandalwood, which they detected by its odor burning [cited in Sterling and Summers 1978: 89].

The dry forests formerly covering this region probably never came back, particularly considering the harm done to the *'iliahi* seedlings with the introduction of cattle soon thereafter (Judd 1933).

Around the 1830s, cattle grazing began in the *mauka* regions of Waipi'o (Bishop 1901:87). In 1847, residents of more *makai* land petitioned the Minister of the Interior, John Young, to resolve the problem of stray animals (cited in Hammatt et al. 1996). These stray animals may have been from herds of cattle and goats grazing on the *kula* lands of Waipi'o. In addition to damage from stray animals on the lands of Waipi'o, the impact of grazing animals was noted several kilometers away at Pearl Harbor and in the vicinity of the present project area. Stray cattle probably continued to be a problem until large-scale agriculture was introduced in the early part of the twentieth century. The occupation of the uplands by cattle denuded the countryside of

ground cover, and caused vast quantities of earth to be washed down by storms into the lagoons, shoaling the water for a long distance seaward (Bishop 1901:87).

During much of the nineteenth century, Waipi'o Ahupua'a was associated with John Papa 'I'i, a significant figure and chronicler of the Hawaiian Kingdom. In an account of his birth, 'I'i records the establishment of his family at Waipi'o after the ascendancy of Kamehameha on O'ahu:

John Papa Ii was born in Kumelewai, Waipio, in Ewa, Oahu, on the third day of August (Hilinehu in the Hawaiian calendar) in 1800, on the land of Papa Ii, whose namesake he was. Papa ['I'i's uncle] was the owner of the pond of Hanaloa and two other pieces of property, all of which he had received from Kamehameha, as did others who lived on that *ahupua'a*, or land division, after the battle of Nuuanu. He gave the property to his *kaikua hine*, or cousin, who was the mother of the aforementioned boy. Her names were Wanaoa, Pahulemu, and Kalaikane ['I'i 1959:20].

'I'i's writings, collected in *Fragments of Hawaiian History*, provide glimpses of life within Waipi'o Ahupua'a during 'I'i's lifetime. 'I'i mentions the "family [going] to Kipapa from Kumelewai by way of upper Waipi'o to make ditches for the farms" ('I'i 1959:28) and recalls that, during the visit to O'ahu by the Kaua'i chief Kaumuali'i and his entourage, the chief's attendants were provided with gifts: "From Waipi'o in Ewa and from some lands of Hawaii came tapa made of *mamaki* bark" ('I'i 1959:83). 'I'i notes how a period of famine was managed in Waipi'o and what resources were available during the famine:

Here is a wonderful thing about the land of Waipio. After a famine had raged in that land, the removal of new crops from the taro patches and gardens was prohibited until all of the people had gathered and the farmers had joined in thanks to the gods. This prohibition was called *kapu 'ohi'a* because, while the famine was upon the land, the people had lived on mountain apples (*'ohi'a 'ai*), ti, yams, and other upland foods. On the morning of Kane an offering of taro greens and other things was made to remove the *'ohi'a* prohibition, after which each farmer took of his own crops for the needs of his family ['I'i 1959:77].

### 3.1.4 The Māhele

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown and the *ali'i* received their land titles. The common people (*maka'āinana*) received their *kuleana* awards (individual land parcels) in 1850. It is through records for Land Commission Awards (LCAs) generated during the Māhele that the first specific documentation of life in Waipi'o Ahupua'a, as it had evolved up to the mid-nineteenth century come to light.

The great majority of the awarded land parcels were located in the *makai* portions of Waipi'o, at or just above the peninsula. John Papa 'I'i was awarded most of the *ahupua'a* of Waipi'o in LCA 8241, comprising approximately 20,540 acres. Included in the documentation for 'I'i's award is a list of "the people living on the land of Waipi'o 'Ewa in 1848" (Native Register vol.5: 512-517).



A substantial award within the *ahupua'a* went to Abenera Pākī, the father of Bernice Pauahi Bishop. Part of LCA 10613 given to Pākī comprised the 350 acres of the *'ili* of Hanaloa. Also receiving a land award (LCA 2937) in Waipi'o was William Harbottle, who claimed two acres at Hanapouli'i.

The remaining land claims documented in the records, totaling 99 (not all of which were awarded), are for *kuleana* worked and lived upon by the Hawaiians of Waipi'o. Predominant among the claimed land usages in Waipi'o are 312 *lo'i*, irrigated taro patches, of various sizes; and 43 *mo'o*, or fields, comprising indeterminate numbers of *lo'i*. Clearly, wetland taro cultivation was the primary agricultural pursuit within the *ahupua'a* at the mid-nineteenth century, likely reflecting a long history of taro farming. At the coast, four fishponds are claimed. In the *mauka* reaches of Waipi'o, 53 claims were made for portions of *kula* (pasture land) and 25 for "okipu" or *'okipu'u* (forest clearings). The fact that several claims were made in the *mauka* regions suggests that Waipi'o residents had particular locales that they traveled to repeatedly. *Kula* land is a general term for open fields, pastures, uncultivated fields, or fields for cultivation, and upland (drier), which is distinct from meadow or wetland (Lucas 1995:60). *Kula* lands were often used for opportunistic plantings such as bananas, sugar cane, sweet potatoes, dry land taro, and others that did not depend heavily on a consistent source of water. *Okipu'u* is defined as a forest clearing (Lucas 1995:82), a place that was presumably used to gather forest products and medicinal herbs and or for pasturage.

In contrast to the well-populated *makai* lands of Waipi'o, the *mauka* regions were often described in nineteenth century accounts as virtually uninhabited. The missionary William Ellis described the interior regions of 'Ewa in 1823-24:

The plain of Eva is nearly twenty miles in length, from the Pearl River to Waialua, and in some parts nine or ten miles across. The soil is fertile, and watered by a number of rivulets, which wind their way along the deep water-courses that intersect its surface, and empty themselves into the sea. Though capable of a high state of improvement, a very small portion of it is enclosed or under any kind of culture, and in traveling across it, scarce a habitation is to be seen [Ellis 1963:7].

Despite Ellis' impression of desuetude and absence of people in the more *mauka* reaches of 'Ewa, there is evidence that the population of Waipi'o during the early nineteenth century was not focused solely on the fertile coast. Kamakau notes, in an inventory of advances in education during the reign of Kamehameha III (from 1825 to 1854) that "schools were built in the mountains and in the crowded settlements. Waipi'o had school houses near the coast and in the uplands" (Kamakau 1992:424). The placement of a school "in the uplands" of Waipi'o suggests that some portion of the *ahupua'a* population was settled there.

A 1928 map of Land Court Application 1000 shows nineteen LCAs within the project area, all of which are concentrated within the western portion of the project area, surrounding Loko 'Eo (Figure 7). Documentation from eight LCAs was reviewed in an attempt to reconstruct traditional Hawaiian land use patterns within the project area during the mid nineteenth century (Table 1; see Appendix A). LCA documentation indicates that the project area was utilized for

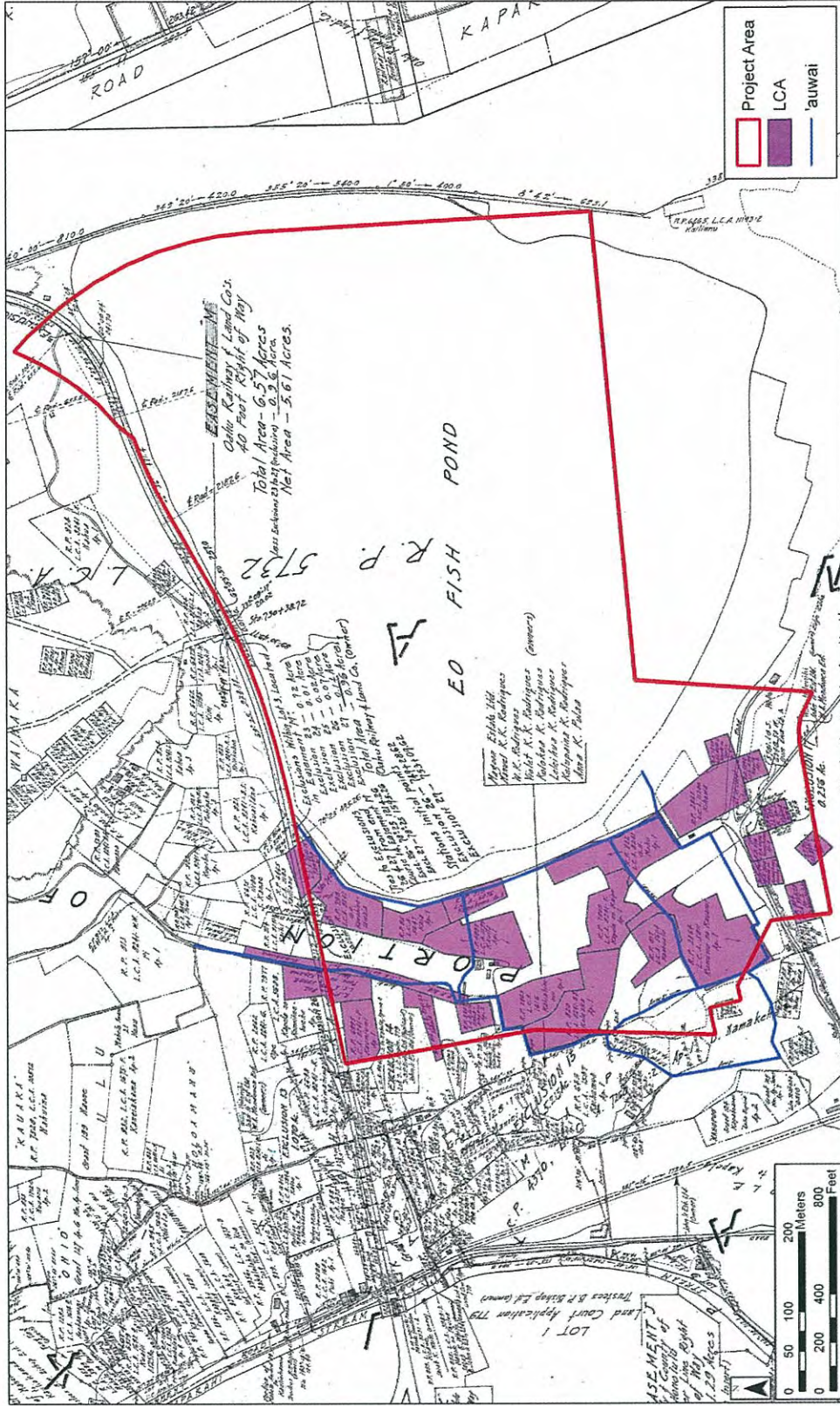


Figure 7. 1928 map of Land Court Application 1000 showing LCAs and 'auwai within the project area

Table 1. Land Commission Awards Located within the Project Area

Land Claim #	Claimant	'Ii	Land Use	Landscape Feature	Awarded
5811	Kumumu	Hanaloa	<i>Kō 'ele</i> (small land unit farmed for the chief), <i>9 lo 'i</i> (wet land taro patch), <i>loko i'a kalo</i> (combination fish pond and taro patch), <i>kula</i> (dry land agricultural plot)	Boundary walls, Henuhenu fish pond, sand dunes	2 ap.; 4.65 Acs
6076	Humehume	Puopae	<i>Kō 'ele</i> , <i>loko i'a kalo</i>	' <i>auwai</i> , <i>loko</i> (fish pond), boundary walls, sand dunes	2 ap.; 1.198 Acs.
8241BB	Koleaka	Homaikaia	<i>loko i'a kalo</i>	' <i>auwai</i> (irrigation ditch)	1 ap. 1.81 Acs.
8241CB	Keawekolohe	Homaikaia, Hanaloa	<i>Kō 'ele</i> , <i>lo'i</i> , <i>loko</i>	-	1 ap. .412 Acs.
8241GH	Moku	Kalualaea	House lot, <i>lo 'i</i> , <i>loko</i>	' <i>auwai</i>	1 ap.255 Acs.
8241GO	Kawahinelawaia	Keio	2 <i>lo'i</i>	Bounded on all sides by <i>kula</i> and sea of Konohiki	
11199	Kauaila, wahine	Kalualaa, Puuopae	House lot, 2 fish ponds ( <i>puuone</i> )	<i>Loko</i> , ' <i>auwai</i> , <i>mo'o</i> (raised strip of land between ' <i>auwai</i> )	2 ap.; 1.63 Acres
1200	Kihewa	Eoiki, Puuopae	<i>Kula</i> , <i>loko kalo</i> (combination fish pond and taro patch)	Boundary walls, <i>Loko</i> (fish pond)	1 ap.; 1.4 Acs.



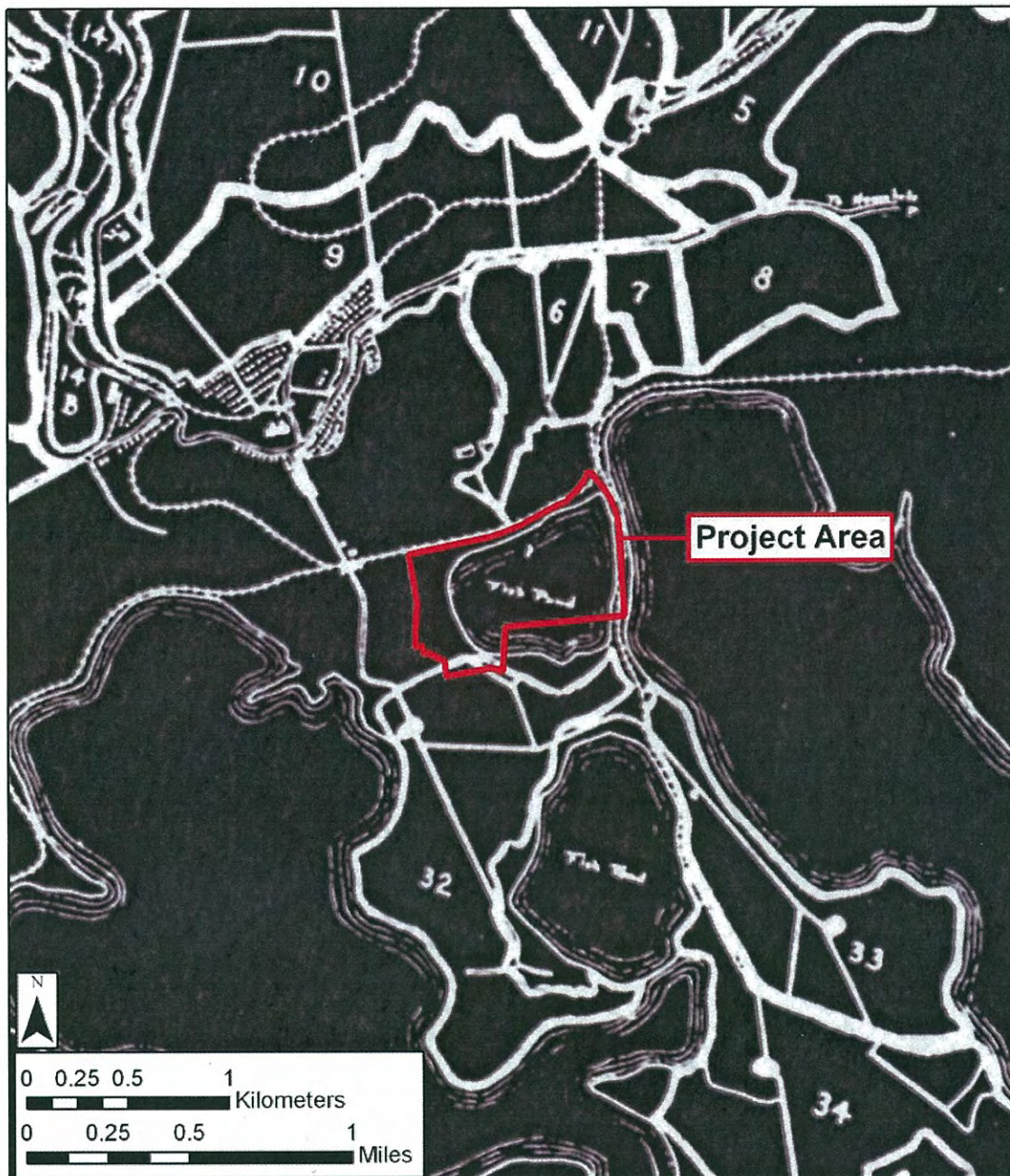


Figure 8. 1925 Oahu Sugar Company map showing project area location



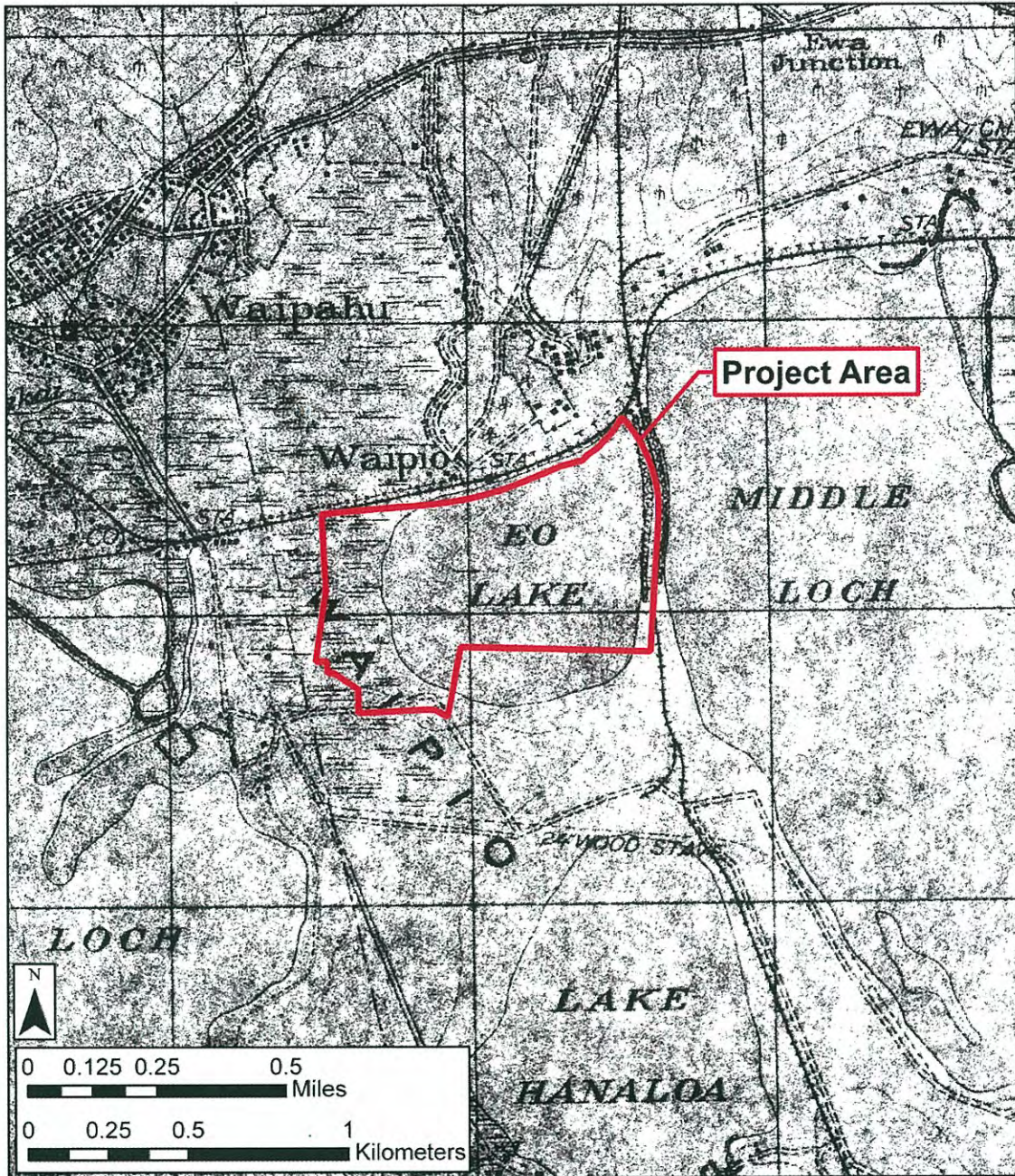


Figure 9. 1919 War Department map showing the location of the project area



O'ahu through the Ko'olau Range to irrigate the fields and provide water to the mill of the Oahu Sugar Company in 'Ewa. The Waiāhole Water Company, a subsidiary of Oahu Sugar, created the Waiāhole Ditch System, which was "an engineering feat of epic proportion for those times" (Condé and Best 1973:37). The ditch system was completed in 1916 and, with some modifications, is still in use. A 1927 USGS map and a 1943 War Department map indicate flumes and pipe lines running through the western portion of the project area, and may represent the expansion of sugar cane activities into this area (Figure 10 & Figure 11).

Early in the twentieth century, the U.S. Government began acquiring the coastal lands of 'Ewa for the development of a naval base at Pearl Harbor. The U.S. Navy began a preliminary dredging program, which created a 30-foot deep entrance channel measuring 200 feet wide and 3,085 feet long. In 1908, money was appropriated for five miles of entrance channel dredged to an additional 35 feet down (Downes 1953). In 1909, the government appropriated the entire Waipi'o peninsula from the 'Ī'Ī estate.

By 1941, Pacific Naval Air Bases expenditures for new construction at Pearl Harbor were in the hundreds of millions of dollars. The Japanese attack on Pearl Harbor, December 7, 1941, damaged or destroyed much of the new construction. Reconstruction was instituted to double the Pearl Harbor's war capacity. Military planners approved a new ammunition depot in the mountainside of Waipahu, a large new hospital in 'Aiea, and thousands of additional changes to the Navy Yard to accommodate the new aircraft carrier task forces (Woodbury 1946). During World War II, the military used the sugar cane rail system to "haul large quantities of ammunition" (Condé and Best 1973:315). A 1956 U.S. Army Map Service map shows the entire project area as part of a "naval reservation" with Loko 'Eo completely drained and filled in (Figure 12).

1968 Dept of Defense Map indicates that the project area is no longer designated as a naval reservation (Figure 13). Also of note is the extensive residential development along the northern border of the project area. It is during this time period that the land jurisdiction of the project area was probably transferred to the City and County of Honolulu, the current land owner of the project area. Following the demilitarization of the project area, the City and County developed it into a municipal golf course. The Ted Makalena Golf Course was opened in 1971 and continues to be in operation. A 1977 aerial photograph shows the completely developed golf course (Figure 14). Of note is the presence of a newly dredged canal through the northern portion of the project area.

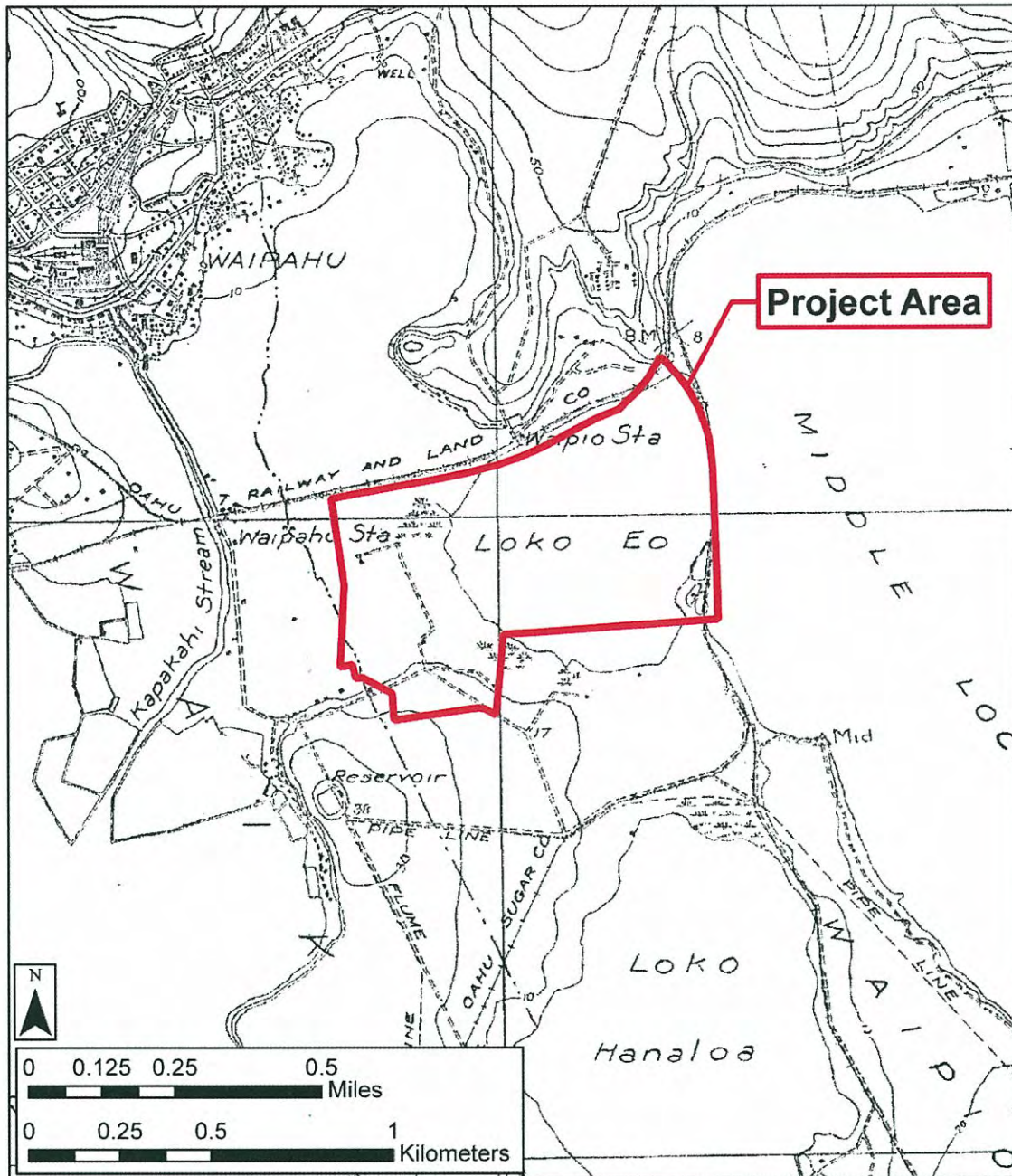


Figure 10. 1927 USGS map showing project area location



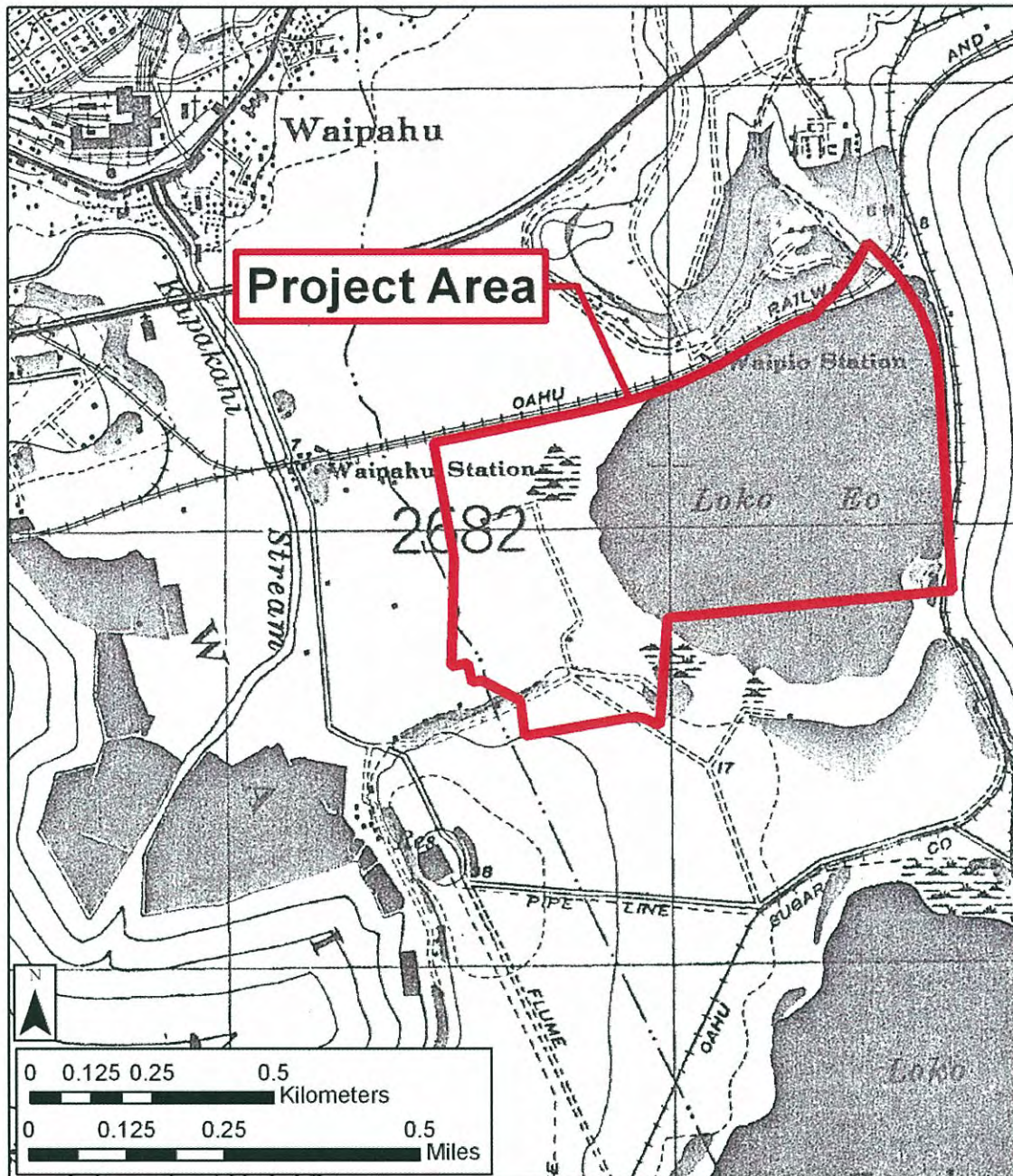


Figure 11. 1943 War Department map showing project area location



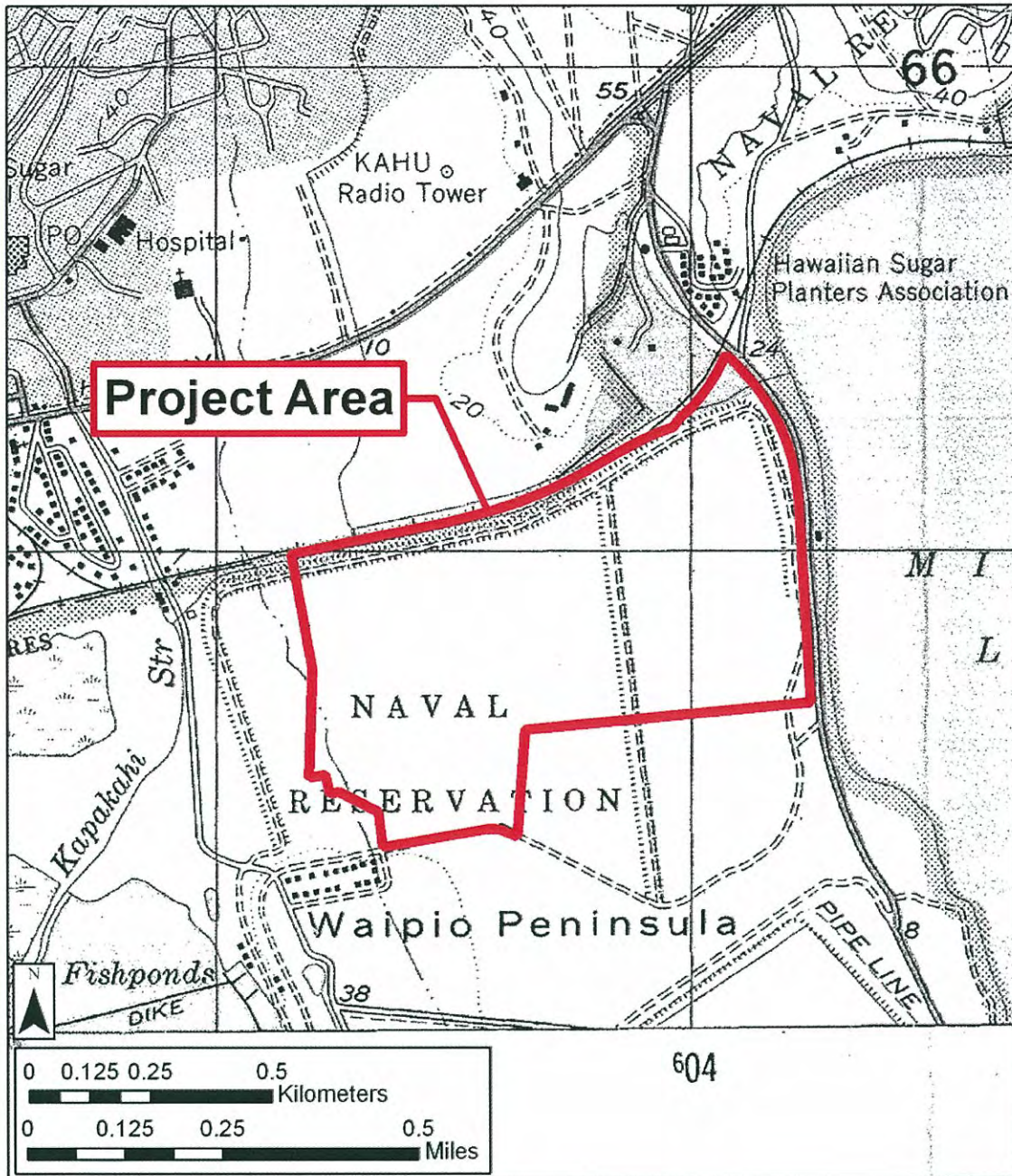


Figure 12. 1956 U.S. Army Map Service map showing project area location



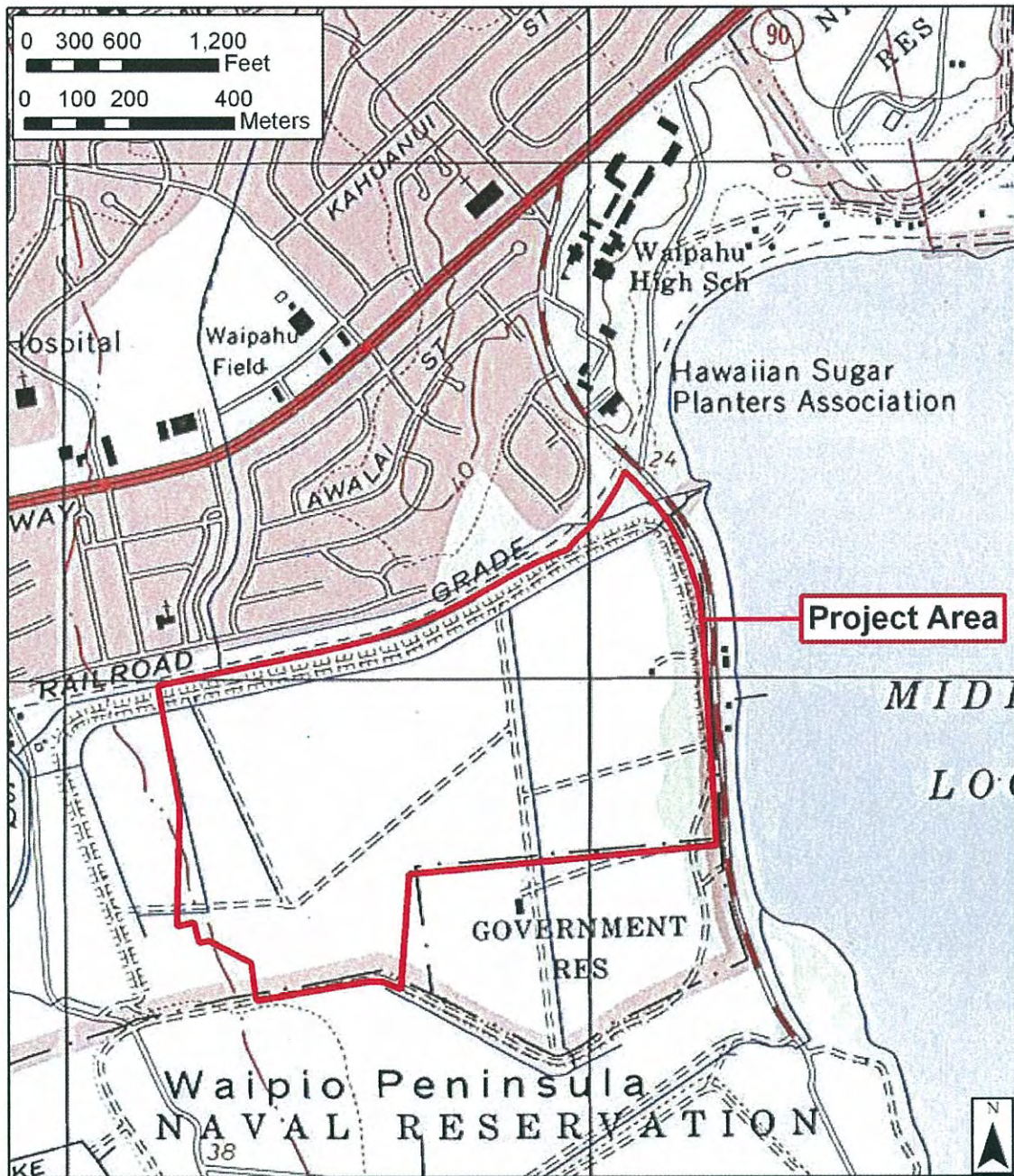


Figure 13. 1968 Dept of Defense Map showing project area location



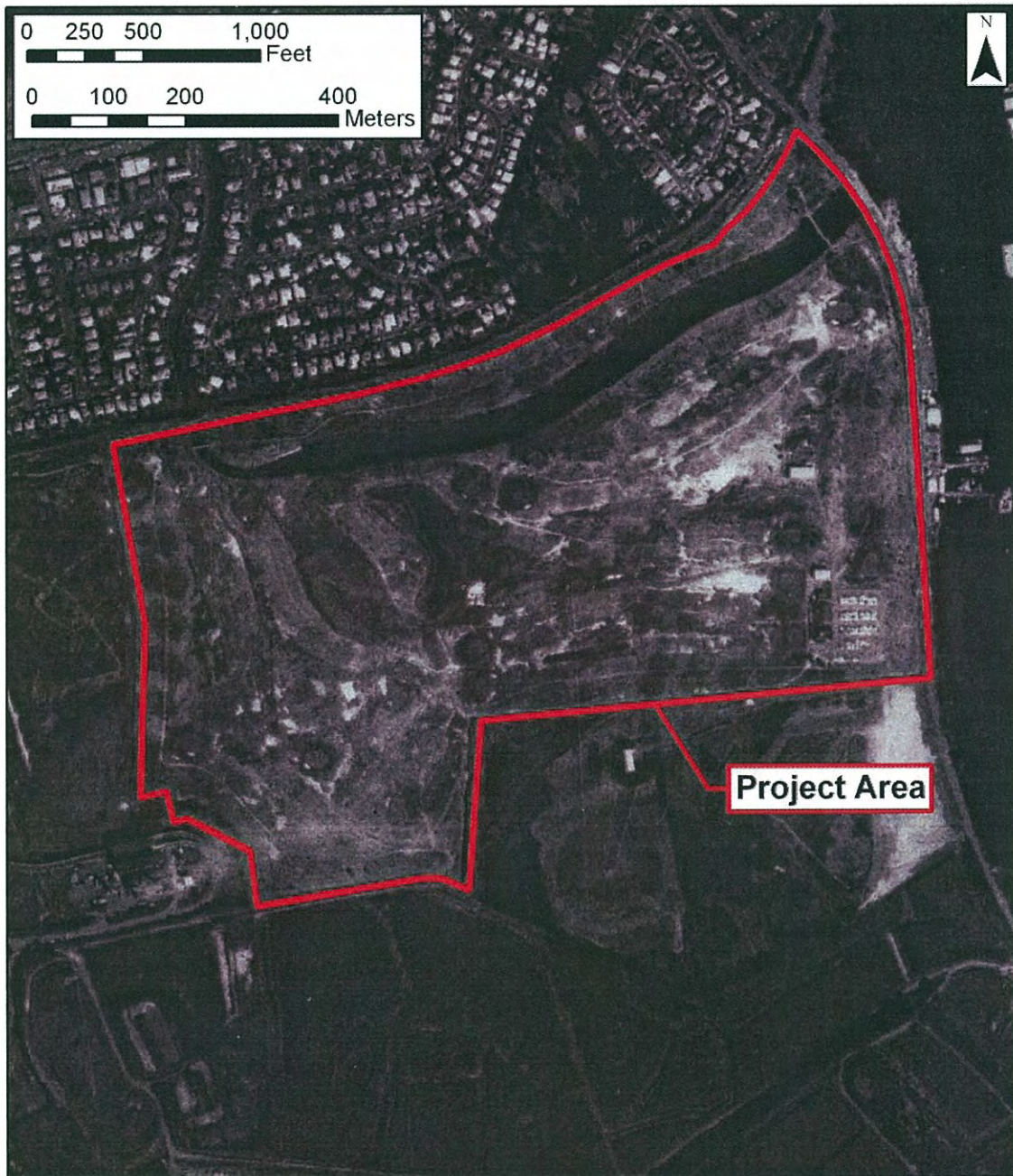


Figure 14. 1977 aerial photograph showing the location of the project area (source: USGS orthoimagery)

## 3.2 Previous Archaeological Research

Previous archaeological studies in the vicinity of the current project area are presented in Table 2 and shown in Figure 15. Historic properties identified in the vicinity of the project area are shown on Figure 16. The following is a summary of these archaeological studies.

The earliest archaeological documentation in Waipi'o Ahupua'a was conducted by J. Gilbert McAllister in the 1930s. McAllister described several sites in Waipi'o, most of which were located either near the marine resources and fishponds of Pearl Harbor or on the wide coastal plain in proximity to the Waipi'o Peninsula (McAllister 1933:106-107). McAllister identified two sites in the vicinity of the project area: Site 122 ('Ahu'ena Heiau) and Site 123 (Loko 'Eo) (Figure 17).

Site 122 is the now destroyed 'Ahu'ena Heiau (meaning "red-hot heap"), located just north of the project area. McAllister describes what was left of the *heiau* (altar, oracle tower, shrine, etc.) during his site visit:

Site 122. Ahuena heiau, Halaulani, Waipio, just seaward of the Experimental Station of the Hawaiian Sugar Planters' Assn.

Only a small portion of paving of very small waterorn stones at the edge of the 25 foot elevation remains of what must have been an important heiau, for the site is known and remembered by all the old Hawaiians (kamaaina) in the district. There is a vague memory that this heiau was formerly located in the mountains in Honouliuli at Punahawele. Thrum ststes "Hon. John Ii used to be the custodian of its idols." (McAllister 1933 in Sterling & Summers 1978: 19)

Site 123 consists of Loko 'Eo, a large fish pond, approximately 137 acres, surrounded on three sides by a wall (Figure 18). Loko 'Eo is located within the project area, but was drained and filled in by the military during the 1950's.

In 1995, the International Archaeological Research Institute, Inc. conducted subsurface archaeological investigations of Loko 'Eo (Athens et al. 2000). These investigations consisted of the extraction of four sediment cores within the perimeter of the filled in fish pond. Analysis of the cores revealed that sediment associated with fish pond layers existed beneath approximately 7 meters of fill. The study also determined that the pond was initially filled by the O'ahu Sugar Company and used as a settling pond for capturing topsoil from irrigation water (Athens et al. 2000). The topsoil would periodically be removed with heavy equipment causing disturbance to the naturally deposited sediments below.

In 1998, Pacific Legacy conducted an archaeological inventory survey for the Waipi'o Sports Complex, which abuts the southern boundary of the current project area (Goodman & Cleghorn 1998). Two historic properties were identified: State Inventory of Historic Properties (SIHP) # 50-80-13-5597, a sugarcane irrigation complex consisting of two concrete pumping stations and associated irrigation ditches; and SIHP # 50-80-12-9714, a railroad berm remnant and an iron bridge associated with the O.R. & L. Right-of-Way. Subsurface testing determined that "the peninsula has at least 3.0 m of fill on it, effectively burying any evidence of prehistoric use" (Goodman & Cleghorn 1998: 33).



Table 2. Previous Archaeological Studies in the Vicinity of the Project Area

Reference	Location	Nature of Study	Results
McAllister 1933	Island of O'ahu	Island-wide archaeological survey	Identified 'Ahu'ena Heiau (Site 122) and Loko 'Eo fishpond (Site 123)
Goodman & Cleghorn 1998	Waipi'o Sports Complex	Archaeological inventory survey	Two historic properties identified: SIHP #50-80-13-5597, a sugarcane irrigation complex consisting of two concrete pumping stations and associated irrigation ditches; and SIHP #50-80-12-9714, a railroad berm remnant and an iron bridge associated with the O.R. & L. Right-of-Way.
Hammatt & Chiogioji 2000	TMK [1] 9-3-002: por. 009	Archaeological & cultural assessment	No surface archaeological sites were found during a one-day field inspection.
Athens et al. 2000	Loko 'Eo, TMK [1] 9-3-002: por. 034	Archaeological investigations of Pearl Harbor fish ponds	Established the presence of approximately 7 m of fill above fish pond sediments.
Perzinski et al. 2004	TMK [1] 9-4-038: 083 & [1] 9-4-050: 59	Archeological inventory survey	Identified three historic properties: SIHP 50-80-09-6671, the historic remnants of the Brown estate, SIHP -6672, pre- and post-contact cultural layer, and SIHP -6673, pre- and post-contact cultural layer with two associated pre-contact burials.

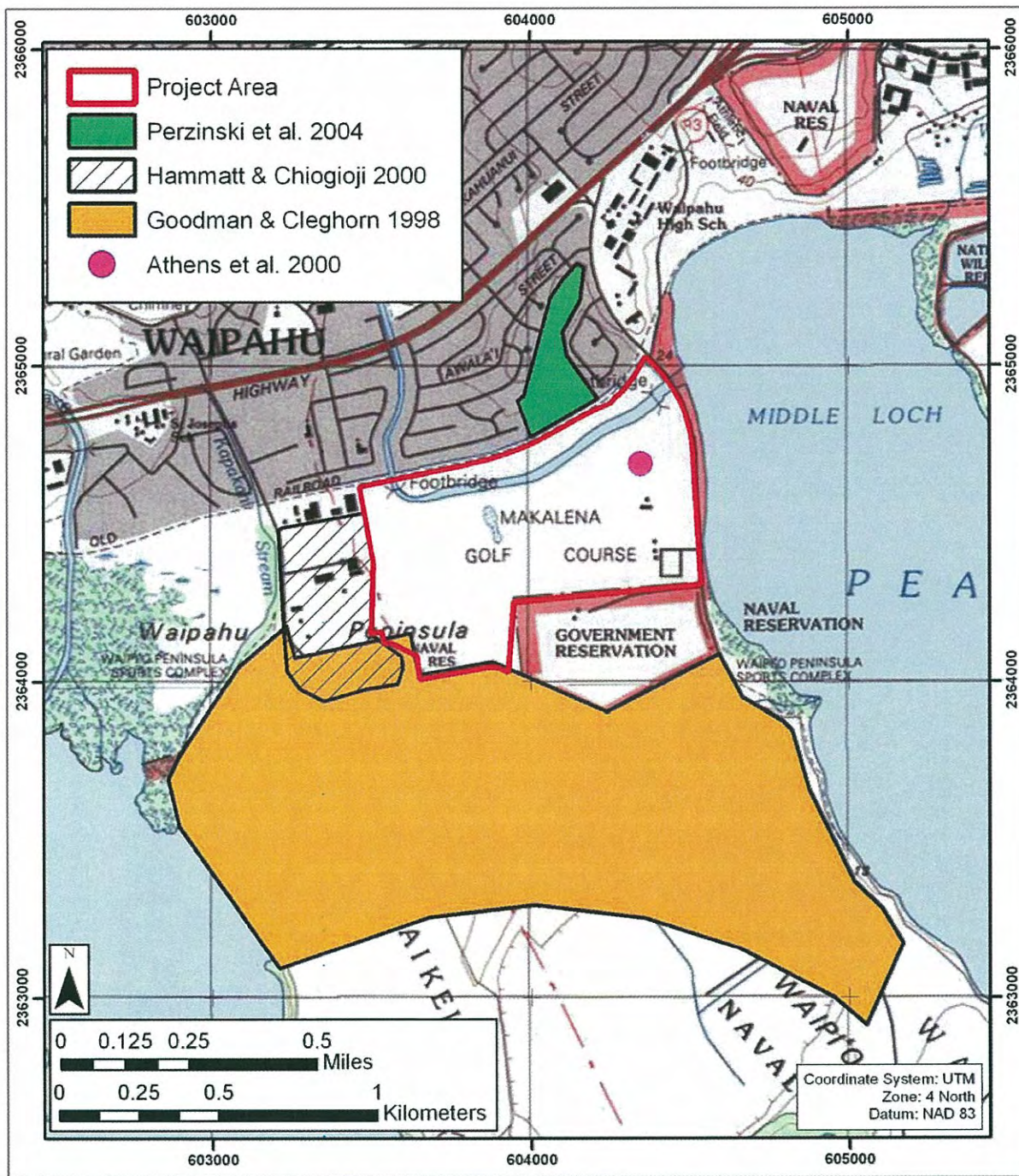


Figure 15. USGS 7.5-Minute Series Topographic Map, Pearl Harbor quadrangle (1999), showing archaeological studies in the vicinity of the project area



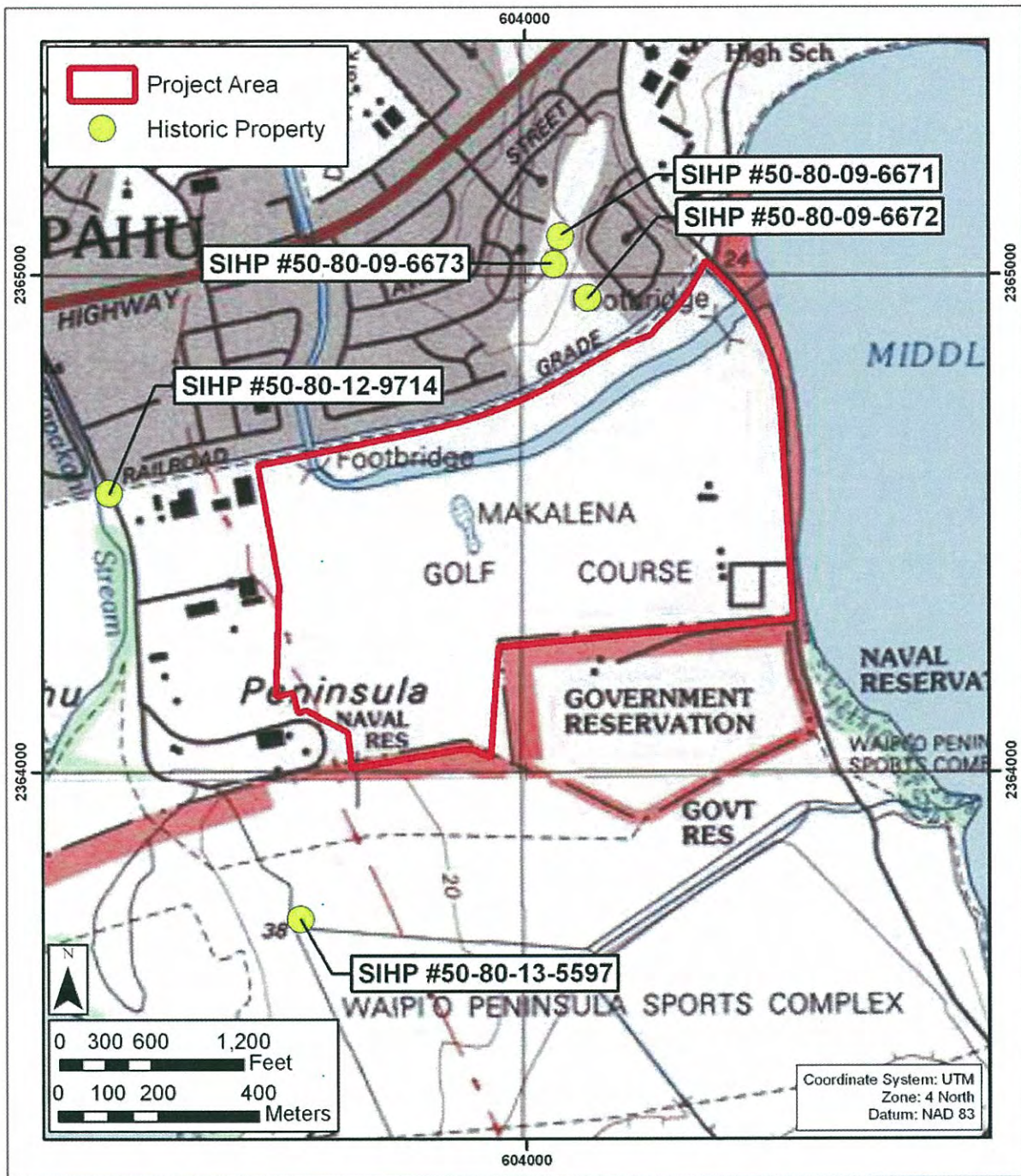


Figure 16. USGS 7.5-Minute Series Topographic Map, Pearl Harbor quadrangle (1999), showing historic properties in the vicinity of the project area







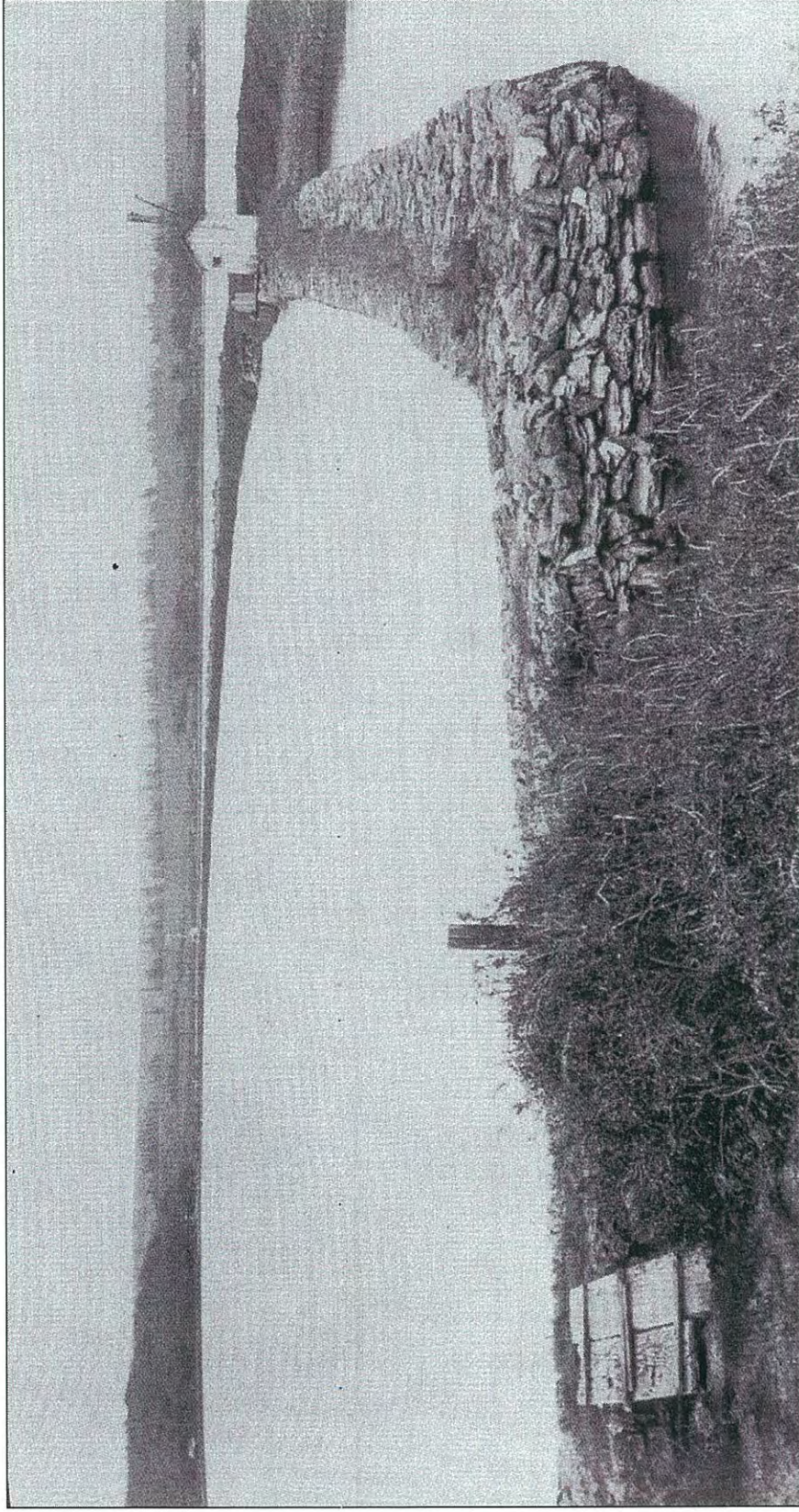


Figure 18. Historic Photograph of Loko 'Eo (Source: Chong 1998:109)

In 2000, CSH conducted an archaeological and cultural assessment of a City and County of Honolulu-owned parcel on Waipi'o Peninsula, located immediately west of the current project area (Hammatt and Chiogioji 2000). No surface archaeological sites associated with traditional Hawaiian occupation were observed in any portion of the study area. An existing land fill and modern building activities have eliminated any remnant sites. Additionally, it was determined that intact subsurface evidence of traditional Hawaiian occupation would have been similarly eliminated during the decades of rice farming documented within the study area. No further archaeological investigation of the study area was recommended.

In 2004, CSH conducted an archaeological inventory survey of a 13-acre parcel located immediately north of the current project area (Perzinski et al. 2004). Three historic properties were identified: SIHP #50-80-09-6671, the historic remnants of the Brown estate consisting of concrete and cinder block foundations; SIHP #50-80-09-6672, a subsurface cultural layer containing evidence of both pre- and post-contact land use; and SIHP #50-80-09-6673, a pre- and post-contact cultural layer containing two pre-contact flexed human burials.

### 3.3 Background Summary and Predictive Model

The Waipi'o Peninsula and the surrounding loch waters of Pearl Harbor contained abundant marine resources and arable land which would have been extremely favorable to pre-contact Hawaiian populations for the development of large scale taro cultivation and the implementation of aquaculture in the form of large fish ponds or *loko*. A 1928 map of Land Court Application 1000 shows a massive fish pond, Loko 'Eo, surrounded by LCAs within the project area (see Figure 7) LCA documentation indicates that by the mid-eighteenth century the entire project area consisted of a complex network of irrigation ditches, agricultural fields, fish ponds, and habitations, probably developed over many centuries. Previous archaeological research has identified pre-contact subsurface cultural layers and human burials just north of the project area (Perzinski et al. 2004), providing further evidence of the pre-contact Hawaiian occupation of the area.

During the late nineteenth century the Oahu Sugar Company established sugarcane operations in Waipi'o. A 1925 Oahu Sugar Company map indicates that the current project area was within the boundaries of Oahu Sugar Company operations (see Figure 8). The project area does not appear to have been planted with cane, but may have been utilized for other aspects of sugar cane operations such as a staging area for irrigation and/or railroad maintenance equipment. Subsurface archaeological investigation by the International Archaeological Research Institute, Inc. have suggested that Loko 'Eo, which comprises approximately 75% of the project area, was filled by the O'ahu Sugar Company and used as a settling pond for capturing topsoil from irrigation water (Athens et al. 2000).

Early in the twentieth century, the U.S. Government began acquiring the coastal lands of 'Ewa for the development of a naval base at Pearl Harbor. By 1909, the government appropriated the entire Waipi'o peninsula. A 1956 U.S. Army Map Service map shows the entire project area as part of a "naval reservation" with Loko 'Eo completely drained and filled in (see Figure 12). Subsurface testing just south of the project area determined that "the peninsula has at least 3.0 m of fill on it, effectively burying any evidence of prehistoric use" (Goodman & Cleghorn 1998: 33).



During the 1960's the project area was demilitarized and land jurisdiction was transferred to the City and County of Honolulu. Following the transfer of jurisdiction, the City and County developed the project area into a municipal golf course. The Ted Makalena Golf Course was opened in 1971 and continues to be in operation.

Based on background research, no historic properties (i.e. archaeological sites) are expected to be encountered during the field inspection of the project area. Land modifications within the project area associated with historic sugar agriculture and military operations, as well as modern golf course development have caused extensive land disturbances (i.e. grading, leveling, filling, etc.) which would have destroyed and/or buried any evidence of both pre- and post-contact land use. In the unlikely event that surface historic properties are encountered, they would be in the form of post-contact irrigation infrastructure (i.e. ditches, flumes, pumping stations, etc.) and/or historic military base remnants (i.e. cement foundations, abandoned utility boxes, etc.).

## Section 4 Results of Field Inspection

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No historic properties were observed during the field inspection of the project area, which confirmed the findings of background research. The field inspection consisted of a walk-through reconnaissance along the proposed route of the golf cart realignment corridor (see Figure 4). The actual route traveled by the archaeologists is shown in Figure 19.

The absence of historic properties can be attributed to extensive land modifications associated with historic sugar cultivation and military operations, as well as the modern golf course development observed throughout the project area. Observed land modifications consisted of a dredged drainage canal running within the northern boundary of the project area (Figure 20 & Figure 21), leveled and graded areas utilized as fairways (Figure 22), artificial knolls and sand traps, wooden and concrete structures for golf patrons and maintenance staff (Figure 23), and a green waste dumping area (Figure 24). Of note is the fact that approximately half of the proposed golf cart realignment corridor overlaps existing asphalt paved golf cart paths (Figure 25 & Figure 26).

Particular attention was to given areas along the proposed golf cart realignment corridor which were in the vicinity of the LCAs documented within the western portion of the project area (Figure 27). Significant land disturbance associated with golf course infrastructure was observed throughout this area. A restroom facility, a segment of the drainage canal, and leveled and graded areas were observed in the northwestern portion of the project area within and in the vicinity of LCA locations (Figure 28 & Figure 29). The western and southwestern portions of the project area consisted of artificial land surfaces developed during golf course construction (Figure 30). Also observed in this area were exposed patches of asphalt beneath golf course fairways probably remnants of prior military operations (Figure 31). No surface remains associated with the LCAs were observed.

Additionally the project area was inspected for any remnants of Loko 'Eo. Background research has indicated that the fish pond was completely filled in during the historic utilization of the area by the Oahu Sugar Company and subsequently by the U.S. military, however a recently dredged (circa 1971) drainage canal cuts thru a portion of the known location of Loko 'Eo and provided an opportunity to prospect for fish pond wall remnants and/or sediment deposits. These investigations focused on of the eastern segment of the drainage canal, which was not lined with concrete and contained exposed soil banks (Figure 32). No remnants of Loko 'Eo were observed.

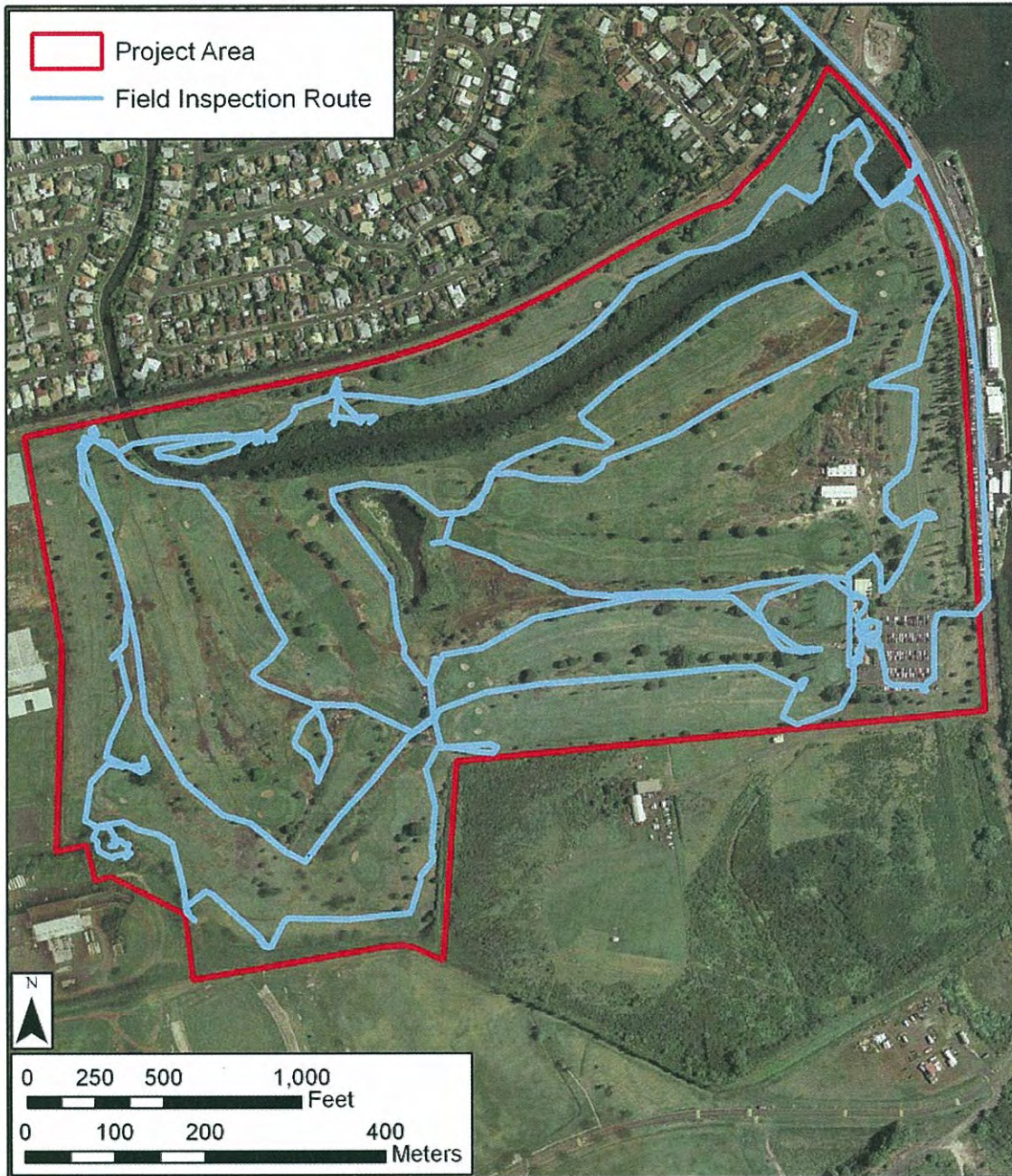


Figure 19. Aerial photograph showing the route of field inspection through the project area (source: U.S.G.S Orthoimagery 2005)



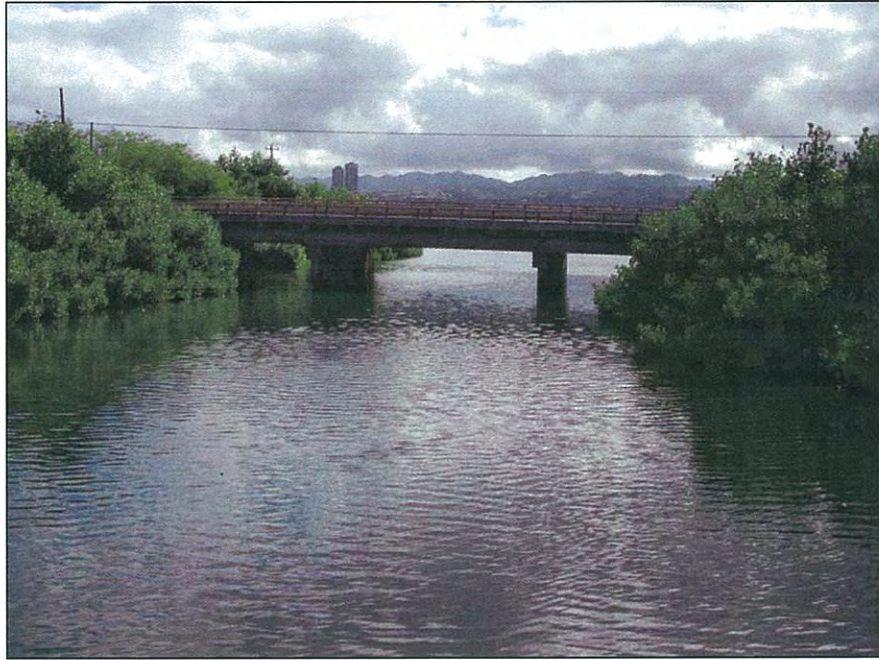


Figure 20. Photograph of drainage canal emptying into Middle Loch of Pearl Harbor, view to northeast



Figure 21. Photograph of concrete lined drainage canal, taken from northwestern portion of project area, view to south





Figure 22. Photograph of leveled and graded area utilized as a fairway, taken from northern portion of project area, view to southwest



Figure 23. Photograph of golf patron club house and golf cart maintenance facility, view to east





Figure 24. Photograph of green waste dumping area located in the center of the project area, view to west



Figure 25. Photograph of eastern edge of project area overlooking proposed golf cart realignment path overlapping an existing cart path, view to north





Figure 26. Photograph of central portion of project area overlooking proposed golf cart realignment path overlapping an existing cart path, view to west



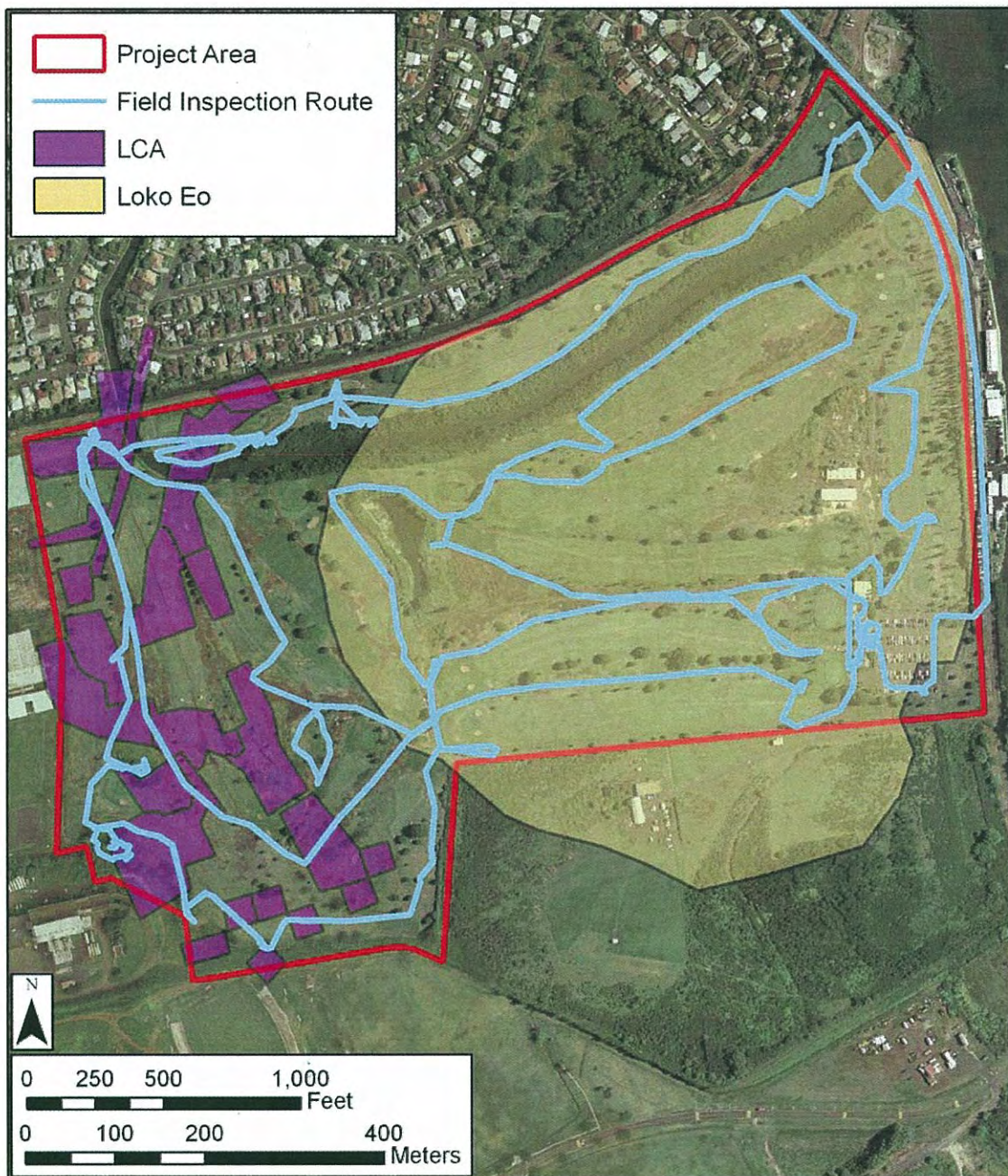


Figure 27. Aerial photograph showing project area with overlay of LCAs and Loko 'Eo (source: U.S.G.S Orthoimagery 2005)





Figure 28. Photograph of restroom facility situated atop LCAs within the northwestern corner of the project area.



Figure 29. Photograph of drainage canal bisecting LCAs within the northwestern corner of the project area.





Figure 30. Photograph of artificial land surface covering western portion of project area known to contain LCAs, view to east



Figure 31. Photograph of exposed asphalt surface beneath golf course fairway, taken in western portion of project area, view to southeast



Figure 32. Photograph of exposed soil bank along drainage canal, view to west



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## Section 5 Traditional Cultural Practices

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Traditional cultural practices are based on a profound awareness concerning harmony between man and our natural resources. The Hawaiians of old depended on these cultural practices for survival. Based on their familiarity with specific places and through much trial and error, Hawaiians communities were able to devise systems that fostered sustainable use of nature's resources. Many of these cultural practices have been passed down from generation to generation and are still practiced in some of Hawai'i's communities today.

This portion of the investigation seeks to identify on-going traditional cultural practices and resource procurement within the project area. This section will assess the likelihood that such activities are on-going within the project area and its vicinity. It will also assess the likelihood that the current project will affect on-going traditional cultural practices.

### 5.1 Gathering for Plant Resources

The present project area was completely graded, leveled, and filled in since circa 1956 when the area was utilized as a naval reservation (see Figure 12). Following the military occupation of the project area, it was developed into a municipal golf course circa 1971 (see Figure 14). Prior to western contact this area consisted of a marsh environment with rich alluvial soil deposits and was utilized by traditional Hawaiian for the cultivation of taro. It is unlikely that any gathering of plant resources occurred within the project area other than the harvesting of cultivated crops. Additionally, there are no known gathering practices that have occurred within the project area during modern times.

### 5.2 Marine and Freshwater Resources

The Waipi'o Peninsula and the surrounding loch waters of Pearl Harbor contained abundant marine resources which would have been extremely favorable to pre-contact Hawaiian populations for the procurement of marine resources and the development of fish ponds or *loko*. A 1928 map of Land Court Application 1000 shows a massive fish pond, Loko 'Eo, surrounded by LCAs within the project area (see Figure 7) LCA documentation indicates the presence of numerous small fish ponds feeding off of the larger Loko 'Eo, all situated within the project area.

Historic land modifications to the project area have drained and filled in the fish pond that once existed within the project area. Currently a drainage canal runs thru the northern portion of the project area, emptying into the Middle Lock of Pearl Harbor. While fish and shellfish were observed within the canal, the fertilizer and pesticide runoff from the golf course, coupled with the pollution from naval activities observed immediately to the east, would make the marine resources within the canal very undesirable. No procurement of marine resources was observed during the field inspection of the project area.

The proposed development within the project area does not impact the drainage canal and would not appear to have any effect on marine or freshwater resources.



### 5.3 Historic Properties

No historic properties were observed during the field inspection of the project area.

### 5.4 Burials

As the project area currently functions as a municipal golf course there is no evidence pertaining to on-going cultural practices relating to burials on the property or in the immediate vicinity.

No human burials have been documented within the project area; however, two human burials (SIHP #50-80-09-6673) were identified approximately 200 m north of the project area (Perzinski et al. 2004) (see Figure 16). Both sets of remains consisted of pre-contact flexed burials situated within alluvial sediments approximately 45 cm below the existing surface. Charcoal collected from the burial pits of both burials yielded calibrated 2-sigma date ranges of 1300-1480AD and 1450-1660AD, respectively. Also of note is fact that both burials were either within or in the immediate vicinity of an LCA.

While no burials have been documented within the project area, it is known to contain nineteen LCAs, many of which indicate habitation as a primary land use (see Section 3.1.4 above). The proximity of SIHP #50-80-09-6673 and the density of LCAs suggest the possibility that human burials may be located within the project area. Any burials that may be present would be limited to the western portion of the project area, as this is the location of the LCAs and the remainder of the project area was once a large fish pond which would not have been utilized for interment. However if burials are present they would have been buried by fill associated with historic military land modifications and modern golf course development as indicated by the Soil Survey of the State of Hawai'i (Foote et al. 1972). These fill deposits are approximately 3 to 7 meters thick, based on subsurface investigations conducted within the project area by International Archaeological Research Institute, Inc. (Athens et al. 2000) and investigations conducted by Pacific Legacy in the Waipi'o Peninsula Sports Complex located just south of the project area (Goodman & Cleghorn 1998).

Due to the presence of extensive fill layers within the project area the proposed golf cart realignment project, involving excavations with a maximum a depth of 8 inches, is not expected to effect any burials that may be present within the project area.

### 5.5 Trails

A review of historic maps spanning from 1877 to 1956 does not indicate any major trail systems traversing through the project area (see Figure 6, Figure 7, Figure 8, Figure 9, Figure 10, Figure 11, & Figure 12).

### 5.6 Summary of Traditional Cultural Practices

During pre- and early post-contact times the project area would have been burgeoning with traditional Hawaiian activity in the form of habitation, agriculture, and aquaculture. The gathering of plant resources, utilization of marine and freshwater resources, development of trail systems, and the utilization of the area for burial are all traditional cultural practices which were

likely to have occurred within the project area. However, historic sugar cultivation and military activities, coupled with modern golf course development have transformed the local environment, through episodes of filling, leveling, and grading, making it no longer viable for traditional Hawaiian land use. Currently there are no known traditional cultural practices being conducted within or in the immediate vicinity of the project area.

The currently proposed project is relatively small in scope, consisting largely of improvements to golf cart paths. If there were as yet unidentified on-going traditional cultural practices within the project area, for example marine or plant resource procurement, it is extremely unlikely that the proposed project would affect these on-going practices.

## Section 6 Summary and Recommendations

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At the request of Gerald Park, CSH completed this archaeological literature review and field inspection study for the Ted Makalena Golf Course Improvements Project. This investigation does not fulfill the requirements of an archaeological inventory survey investigation per the rules and regulations of the SHPD/DLNR (per HAR Chapter 13-276); however, the level of work is sufficient to determine if there are any major archaeological concerns within the project area.

Background research has indicated that during pre- and early post-contact times the project area was burgeoning with traditional Hawaiian activity in the form of habitation, agriculture, and aquaculture. LCA documentation indicates that by the mid-eighteenth the entire project area consisted of a complex network of irrigation ditches, agricultural fields, fish ponds, and habitations. However, successive land modifications associated with historic sugar cultivation and military operations, as well as modern golf course development have caused extensive land disturbances (i.e. grading, leveling, filling, etc.) throughout the project area which have destroyed and/or buried any evidence of both pre- and post-contact land use. As expected, no historic properties were observed during the field inspection of the project area

CSH recommends consultation with SHPD/DLNR prior to land alteration within the project area. This document should be used to support this consultation with SHPD to establish the appropriate cultural resource management requirements for the project.

Based on the results of this investigation, no additional cultural resource management work is recommended for the project. This is based on the results of the field inspection, in which no historic properties were observed, as well as a review of previous archaeological work within the project area and in the immediate vicinity, which suggest that the entire project area contains fill layers that are approximately 3 to 7 meters thick (Goodman & Cleghorn 1998; Athens et al. 2000). The proposed Ted Makalena Golf Course Improvements Project involves minimal ground disturbance involving 8-inch deep and 10-foot wide excavations for the installation of 8 feet wide reinforced concrete golf cart paths. The shallow excavations proposed for this project would be confined within fill layers and would not impact naturally deposited sediments, thus avoiding any subsurface archaeological deposits that may be present. Additionally, based on all available information, it is extremely unlikely that the proposed project will affect on-going traditional cultural practices.



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# Appendix A LCA Documentation



DOCUMENT DELIVERY

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Mahele Database Documents  
Number: 11199

Claim Number:	<b>11199</b>		
Claimant:	<b>Kauaila, wahine</b>		
Other claimant:			
Other name:			
Island:	<b>Oahu</b>		
District:	<b>Ewa</b>		
Ahupuaa:	<b>Waipio</b>		
Ili:	<b>Kalualaaui, Puuopae</b>		
Apana:	<b>2</b>	Awarded:	<b>1</b>
Loi:	<b>0</b>	FR:	
Plus:		NR:	
Mala Taro:	<b>0</b>	FT:	<b>172v9</b>
Kula:	<b>0</b>	NT:	
House lot:	<b>1</b>	RP:	<b>4998</b>
Kihapai/Pakanu:	<b>0</b>	Number of Royal Patents:	<b>1</b>
Salt lands:	<b>0</b>	Koele/Poolima:	<b>No</b>
Wauke:	<b>0</b>	Loko:	<b>Yes</b>
Olona:	<b>0</b>	Lokoia:	<b>No</b>
Noni:	<b>0</b>	Fishing Rights:	<b>No</b>
Hala:	<b>0</b>	Sea/Shore/Dunes:	<b>No</b>
Sweet Potatoes:	<b>0</b>	Auwai/Ditch:	<b>Yes</b>
Irish Potatoes:	<b>0</b>	Other Edifice:	<b>No</b>
Bananas:	<b>0</b>	Spring/Well:	<b>No</b>
Breadfruit:	<b>0</b>	Pigpen:	<b>No</b>
Coconut:	<b>0</b>	Road/Path:	<b>No</b>
Coffee:	<b>0</b>	Burial/Graveyard:	<b>No</b>
Oranges:	<b>0</b>	Wall/Fence:	<b>No</b>
Bitter Melon/Gourd:	<b>0</b>	Stream/Muliwai/River:	<b>No</b>
Sugar Cane:	<b>0</b>	Pali:	<b>No</b>
Tobacco:	<b>0</b>	Disease:	<b>No</b>

Koa/Kou Trees:	0	Claimant Died:	No
Other Plants:	0	Other Trees:	0
Other Mammals:	No	Miscellaneous:	

No. 11199, Kauila (Wahine), Claimant  
F.T. 172-173v9

Kaia, sworn says, he knows the land of Claimant. It is a moo kalo called Kaeloko in the ili of Kalualau, Waipio, Ewa, Oahu. It consists of one loko kalo with 2 auwais with 2 fish ponds (puuone) all in once piece. Also a kahuahale in Puuopae, in another place.

Apana 1 is bounded:  
Mauka by the land of Ewa, Oahu  
Honokulu by the land of Ewa, Oahu  
Makai by land of Kikahij?  
Waianae by Kalualau of Konohiki.

Claimant received the land from her father, Koluia, in the time of Kamehameha I and has held the same in quiet until now.

Nahua, sworn, testifies to the correctness of the above testimony and says it is also his own.

[Award 11199; R.P. 4998; Kalualau & Poupa'e Ili, Waipio Ewa; 2 ap.; 1.63 Acres]

 Number: 11200

Claim Number:	11200		
Claimant:	Kihewa		
Other claimant:			
Other name:			
Island:	Oahu		
District:	Ewa		
Ahupuaa:	Waipio		
Ili:	EOIKI, Puuopae		
Apana:	2	Awarded:	1
Loi:		FR:	
Plus:		NR:	
Mala Taro:		FT:	173v9
Kula:		NT:	
House lot:		RP:	2861
Kihapai/Pakanu:		Number of Royal Patents:	1
Salt lands:		Koele/Poolima:	No
Wauke:		Loko:	No
Olonu:		Lokoia:	No
Noni:		Fishing Rights:	No
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:		Auwai/Ditch:	No
Irish Potatoes:		Other Edifice:	No



Bananas:	Spring/Well:	No
Breadfruit:	Pigpen:	No
Coconut:	Road/Path:	No
Coffee:	Burial/Graveyard:	No
Oranges:	Wall/Fence:	Yes
Bitter Melon/Gourd:	Stream/Mulivai/River:	No
Sugar Cane:	Pali:	No
Tobacco:	Disease:	No
Koa/Kou Trees:	Claimant Died:	No
Other Plants:	Other Trees:	
Other Mammals: No	Miscellaneous:	

No. 11200, Kihewa, Claimant  
F.T. 173-174v9

Kaia, sworn says, he knows the land of Claimant. It is a loko kalo and kula, called Poiki in Waipio, Ewa, Oahu in one piece, and a kahuahale in Puuopae in another.

Apana 1 is bounded:  
Mauka by the loko Eonui  
Honolulu by loko Kaaina  
Makai by loko o konohiki called Namahana  
Waianae by aina o Moku.

Apana 2 - kahuahale ma Puuopae Waipio bounded:  
Mauka by kahuahale Humehume  
Honolulu by kula of konohiki  
Makai by kahuahale Kauponai[?]  
Waianae by the Paaina.

Claimant received the land from KaKaha in the time of Liholiho, and has held quiet possession of the same until now.

Nahua, sworn says, the testimony of Kaia is correct (He adds as konohiki) that since there are mono (note: rooms literal) on the land to pay the land tax, a portion of the production of the land has been taken by him, to satisfy the konohiki's demands. Ua makua(?) ia ka aina e ia, i loaa i ke kalo, auhau no ka mea ole name e hana i ka la o konohiki.

[Award 11200; R.P. 28861; Eoiki Waipio Ewa; 1 ap.; 1.4 Acs]



Number: 05811

Claim Number:	05811
Claimant:	Kumumu
Other claimant:	
Other name:	
Island:	Oahu
District:	Ewa
Ahupuaa:	Waipio, Waikete
Ili:	Hanaloa

Apana:	4	Awarded:	1
Loi:	9	FR:	
Plus:		NR:	144v5
Mala Taro:		FT:	113v9
Kula:	1	NT:	260v9
House lot:		RP:	2864
Kihapai/Pakanu:		Number of Royal Patents:	1
Salt lands:		Koela/Poalima:	Yes
Wauke:		Loko:	No
Olona:		Lokoia:	Yes
Noni:		Fishing Rights:	No
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:		Auwai/Ditch:	No
Irish Potatoes:		Other Edifice:	No
Bananas:		Spring/Well:	No
Breadfruit:		Pigpen:	No
Coconut:		Road/Path:	No
Coffee:		Burial/Graveyard:	No
Oranges:		Wall/Fence:	Yes
Bitter Melon/Gourd:		Stream/Mulivai/River:	No
Sugar Cane:		Pali:	No
Tobacco:		Disease:	No
Koa/Kou Trees:		Claimant Died:	No
Other Plants:		Other Trees:	
Other Mammals:	No	Miscellaneous:	Henuhenu fish pond

**No. 5811, Kumumu  
N.R. 144v5**

To the Honorable Land Commissioners of the Hawaiian Islands, Greetings: I hereby state my claim for land, it is at Hanaloa in Waipio, Ewa, Island of Oahu. It is bounded on the north by the lo'i of Kaahuwahu, on the east by the Pond of Kamaunu, on the south by a kula, on the west by a land boundary wall.

My second land claim is bounded on the north by the lo'i of Koleaka, on the east by a lo'i ko'ele, on the south by the lo'i of Kaahuwahu, on the west by the lo'i of Kuaona.

My third land claim is bounded on the north by a land boundary wall, on the east by the mo'o of Lauheaiku, on the south by lo'i ko'ele, on the west by ko'ele.

My third /sic/ claim for land is at Waikela, a Pond. It is bounded on the north by the lo'i of Kahumua, on the east by the Pond of Kamanunu, on the south by the Pond of Pauao, on the west by the lo'i of Hana. Lo'i Kauaa ?/  
KUMUMU

**F.T. 113-114v9  
No. 5811, Kumumu, Cit.**

Ohule, sworn says, the land of Claimant is a mooaina called Kahuaiki in the ili Hanaloa, Waipio, Ewa.

It contains

1st - 6 lois and a kula in one piece &  
2d - three lois & 1 fishpond called Henuhenu in the same ili of Hanaloa.

Apana 1 is bounded:  
Mauka by the mooaina Kamooiki  
Honolulu by Punui a moo of Ku  
Makai by the moo Kanukakua  
Waianae by the paaina.

Apana 2 is bounded:  
Mauka by the fishpond Kapapawaa  
Honolulu by paaina & Waikele  
Makai by paaina & Waikele  
Waianae by ili Kahakuohia.

Claimant received his land from Paki in the time of Kinau & has held it in quiet until now.

Kulani, sworn says, the testimony of Ohule is true & is his own.

**N.T. 260v9**  
No. 5811, Kumumu (court action)

Ohule, sworn, he has seen his land Kaluaiki, a moo land in the ili of Hanaloa in Waipio Ewa, Oahu - 6 patches and a pasture in 1 section. Section 2 - 3 patches and (?) sand dunes of Henuhenu.

Section 1:  
Mauka by Kamooiki moo land  
Honolulu by Punui moo land  
Makai by Kamooiakua moo land  
Waianae by Land enclosure.

Section 2:  
Mauka by Kapapawaa pond  
Honolulu by Land enclosure  
Makai by Land enclosure  
Waianae by Kahakuohia ili.

Land from Paki during Kinau's time. No objections.

Kulani, sworn, testimony similar to Ohule.

[Award 5811; R.P. 2864; Hanaloa Waipio Ewa; 2 ap.; 4.65 Acs]

 Number: 06076

Claim Number:	06076
Claimant:	Humehume
Other claimant:	
Other name:	Hunahuma
Island:	Oahu
District:	Ewa
Ahupuaa:	Waipio



Ili:	Puopae		
Apana:	3	Awarded:	1
Loi:		FR:	
Plus:		NR:	229v5
Mala Taro:		FT:	124v9
Kula:		NT:	271v9
House lot:		RP:	818
Kihapai/Pakanu:		Number of Royal Patents:	1
Salt lands:		Koele/Poolima:	Yes
Wauke:		Loko:	Yes
Olonā:		Lokoia:	Yes
Noni:		Fishing Rights:	No
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:		Auwai/Ditch:	Yes
Irish Potatoes:		Other Edifice:	No
Bananas:		Spring/Well:	No
Breadfruit:		Pigpen:	No
Coconut:		Road/Path:	No
Coffee:		Burial/Graveyard:	No
Oranges:		Wall/Fence:	Yes
Bitter Melon/Gourd:		Stream/Muliwai/River:	No
Sugar Cane:		Pali:	No
Tobacco:		Disease:	No
Koa/Kou Trees:		Claimant Died:	No
Other Plants:		Other Trees:	
Other Mammals:	No	Miscellaneous:	loko kalo and an auwai

No. 6076, Hunahuma, Waipio, December 3, 1847  
N.R. 229v5

To the Honorable Land Commissioners of the Hawaiian Islands, Greetings: I hereby state my claim for land. This is at Homaikai in Waipio, Ewa, Island of Oahu. It is bounded on the north by the lo'i of Kala, on the east by Eo, on the south by the pond of Kailua, on the west by lo'i ko'ele. My second land claim is bounded on the north by a ko'ele, on the east by the mo'o of Moku, on the south by a ko'ele, on the west by Homaikaia.  
I am respectfully, your obedient servant.  
HUNAHUMA X

F.T. 124-125v9  
[No.] 6076, Humehume Claimant

Naia, sworn says, the land of Claimant is a lokokalo, an auwai & a fish pond in three pieces. The auwai is separated from the other by the koele.

Apana 1 is bounded, viz., the lokokalo  
Mauka by the fish pond Eo  
Honolulu by fish pond of Kuewa  
Makai by koele of Nahui

Waianae by loko kalo Kalualaea.

Apana 2 the auwai, bounded:  
Mauka by the koele Kalualaea  
Honolulu by Keio  
Makai by loko of Honomoana  
Waianae by Puou.

Apana 3, kahuahale in the kula of Puopae bounded:  
Mauka by the kula of konohiki  
Honolulu by paaina  
Makai by kahuahale of Kigewa  
Waianae by loko.

Claimant received the land from Kakinukawa in the time of Kinau and has held quiet possession until the present.

Kailehua, sworn, confirms the above testimony as true & calls it his own.

**N.T. 271v9**  
No. 6076, Humehume, (court action)

Kaia, sworn, he has seen his land, 1 taro deposit, a sand dune and a ditch. The ditch is in the koele of Eo, ili in Waipio, Ewa, Oahu.

Section 1:  
Mauka, Eo stonewall, pond  
Honolulu, Kihewa's sand dune  
Makai, Kahu's koele  
Waianae, Kalualaka.


Section 2 - The ditch.  
Mauka, Kalualaea koele  
Honolulu, Keio koele  
Makai, Honomoana pond  
Waianae, Puou's 3 ponds.

Section 3 - House site at Puopae.  
Mauka, the konohiki's pasture  
Honolulu, land enclosure  
Makai, Kihewa's house site  
Waianae, Kihewa's pond.

No one objected to Humehume.

Kailehua, sworn, he has known in the same way as Kaia.

[Award 6076; R.P. 818; Kalualaea Waipio Ewa; 2 ap.; 1.198 Acs]

 Number: 08241BB

Claim Number: 08241BB  
Claimant: Koleaka  
Other claimant:

Other name:			
Island:	Oahu		
District:	Ewa		
Ahupuaa:	Waipio		
Ili:	Homaikaia		
Apana:	2	Awarded:	1
Loi:		FR:	
Plus:		NR:	512v5
Mala Taro:		FT:	
Kula:		NT:	
House lot:		RP:	1
Kihapai/Pakanu:		Number of Royal Patents:	820
Salt lands:		Koele/Poolima:	No
Wauke:		Loko:	No
Olonā:		Lokoia:	No
Noni:		Fishing Rights:	No
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:		Auwai/Ditch:	No
Irish Potatoes:		Other Edifice:	No
Bananas:		Spring/Well:	No
Breadfruit:		Pigpen:	No
Coconut:		Road/Path:	No
Coffee:		Burial/Graveyard:	No
Oranges:		Wall/Fence:	No
Bitter Melon/Gourd:		Stream/Muliwai/River:	No
Sugar Cane:		Pali:	No
Tobacco:		Disease:	No
Koa/Kou Trees:		Claimant Died:	No
Other Plants:		Other Trees:	
Other Mammals:	No	Miscellaneous:	See 8241 for Native Register document, 1 house

**No. 8241BB, Koleaka, Claimant  
F.T. 174v9**

Kahaakoi, sworn says, he knows the land of claimant. It consists of 2 loko kalo that is cultivated called Ainalo[?] and Nuiawiea in the ili of Homaikaia, Waipio, Ewa, Oahu, and a kula kahua hale in Lepari (2 apana).

It is bounded:  
Mauka by Kaiokaloa  
Honolulu by auwai of Keahupuaa  
Makai by auwai of Hanaloa  
Waianae by the path between Waipio and Waikele.

Apana 2 Kahua hale in Lepari is bounded:  
Mauka by kahua hale of Kaumiumi  
Honolulu by Kula of Konohiki




Makai by Kula of Konohiki  
Waianae by Kula of Konohiki.

Claimant received the land from ii, in the time of Kamehameha I, and has held the same in quiet possession until now.

Kahiamoe, sworn says, he knows the land of claimant and the testimony above is true, and her own accords with it.

[Award 8241BB; R.P. 820; Homaikaia Waipio Ewa; 1 ap. 1.81 Acs.; Lepau Waipio Ewa; 1 ap. .256 acs.; See 8241 for Native Register document]

 Number: 08241CB

Claim Number:	08241CB		
Claimant:	Keawekolohe		
Other claimant:			
Other name:			
Island:	Oahu		
District:	Ewa		
Ahupuaa:	Waipio		
Ili:	Homaikaia, Hanaloa		
Apana:	2	Awarded:	1
Loi:	1	FR:	
Plus:		NR:	512v5
Mala Taro:		FT:	177v9
Kula:		NT:	
House lot:		RP:	804
Kihapai/Pakanu:		Number of Royal Patents:	1
Salt lands:		Koele/Poolima:	Yes
Wauke:		Loko:	Yes
Olona:		Lokoia:	No
Noni:		Fishing Rights:	No
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:		Auwai/Ditch:	No
Irish Potatoes:		Other Edifice:	No
Bananas:		Spring/Well:	No
Breadfruit:		Pigpen:	No
Coconut:		Road/Path:	No
Coffee:		Burial/Graveyard:	No
Oranges:		Wall/Fence:	No
Bitter Melon/Gourd:		Stream/Muliwai/River:	No
Sugar Cane:		Pali:	No
Tobacco:		Disease:	No
Koa/Kou Trees:		Claimant Died:	No



Bananas:	Spring/Well:	No
Breadfruit:	Pigpen:	No
Coconut:	Road/Path:	No
Coffee:	Burial/Graveyard:	No
Oranges:	Wall/Fence:	No
Bitter Melon/Gourd:	Stream/Muliwai/River:	No
Sugar Cane:	Pali:	No
Tobacco:	Disease:	No
Koa/Kou Trees:	Claimant Died:	No
Other Plants:	Other Trees:	
Other Mammals: No	Miscellaneous:	claims 2 loko, See 8241 for Native Register document, 1 house

No. 8241GH, Moku  
F.T. 189v9

Nahua, sworn say, he knows the land of claimant. It is a moo aina in Kaluaalea in the ahupuaa of Ewa, Oahu, Waipio. It contains 2 apana and a kahuahale in Puuopae.

Apana 1 contains 2 lokos and an auwai and a small loi. It is bounded:  
Mauka by the land of konohiki of Eo  
Honolulu lby the land of Kihewa  
Makai by the land of konohiki  
Waianae by land of Hueu.

Apana 2 is situated in Kukio in Waipio and contains 1 auwai and is bounded:  
Mauka by the ili of Hanaloa  
Honolulu by the konohiki  
Makai by konohiki (or Pi)  
Waianae by Pi.

Claimant inherited the land from his fathers of old and has held quiet possession of the same until now.

Apana 3, kahuahale. It is situated in kula of Hanaloa and is bounded:  
Mauka by the house of Kaia  
Honolulu by kula of Hanaloa  
Makai by kula of Hanaloa  
Waianae by paaina.

Humehume, sworn, confirms the testimony of the above, and says it is also his own.

[Award 8241GH; R.P. 822; Puopae Waipio Ewa; 1 ap. .255 Acs.; See 8241 for Native Register document]

 Number: 08241GO

Claim Number: 08241GO  
Claimant: Kawahinelawaia  
Other claimant:



Other name:	Nawahinelawaia		
Island:	Oahu		
District:	Ewa		
Ahupuaa:	Waipio		
Ili:	Keio		
Apana:	1	Awarded:	1
Loi:	2	FR:	
Plus:		NR:	512v5
Mala Taro:		FT:	163v9
Kula:		NT:	
House fot:		RP:	798
Kihapai/Pakanu:		Number of Royal Patents:	1
Salt lands:		Koele/Poolima:	No
Wauke:		Loko:	No
Olonā:		Lokoia:	No
Noni:		Fishing Rights:	No
Hala:		Sea/Shore/Dunes:	No
Sweet Potatoes:		Auwai/Ditch:	No
Irish Potatoes:		Other Edifice:	No
Bananas:		Spring/Well:	No
Breadfruit:		Pigpen:	No
Coconut:		Road/Path:	No
Coffee:		Burial/Graveyard:	No
Oranges:		Wall/Fence:	No
Bitter Melon/Gourd:		Stream/Muliwai/River:	No
Sugar Cane:		Pali:	No
Tobacco:		Disease:	No
Koa/Kou Trees:		Claimant Died:	No
Other Plants:		Other Trees:	
Other Mammals:	No	Miscellaneous:	See 8241 for Native Register document, 1 house

**No. 8241GO, Kawahinelawaia, Claimant  
F.T. 163v9**

Uma, sworn says, he knows the land of claimant. It is a moo kalo called Keio in the ili of Keio, Waipio, Ewa, Oahu. It contains 2 [lois?] in one piece and a kahuahale in the kula Puleo, Kepookala, Waipio, in another.

Apana 1 is bounded:  
Mauka by the koele of Keio  
Honolulu by loko of Eo  
Makai by land of Keia  
Waianae by the koeles of Keio.

Apana 2, Kahuahale, bounded: On all sides by kula and sea of Konohiki.

Claimant received the land from Kekaha in the time of Kaahumanu and has held Ikuqiet possession

of the same until now.

Awala, sworn, says the testimony of Uma is correct and is also his own.

[Award 8241GO; R.P. 798; Keio Waipio Ewa; 1 ap. 1.09 Acs; See 8241 for Native Register document]



