Department of Water
County of Kaua'i

FILE COPY SEP 23 2011

Water has no substitute.....Conserve it

RECEIVED

'11 SEP 13 A10:06

OFC. OF ENVIRONMENTAL QUALITY CONTROL

September 13, 2011

Mr. Gary Hooser, Director
Office of Environmental Quality Control
State of Hawaii
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Hooser,

Subject: Draft Environmental Assessment; Kapahi Homesteads Storage Tanks and Exploratory Well; Department of Water, County of Kauai; TMK: 4-6-011:003; Kawaihau, Kauai, Hawaii

The Department of Water, County of Kauai has reviewed the Draft Environmental Assessment (DEA) for the proposed water tanks and exploratory well in Kawaihau, Kauai and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish a notice of availability for this project in the September 23, 2011 issue of *The Environmental Notice*.

We have enclosed a completed OEQC Publication Form, a hard copy of the Draft EA, and a PDF file of the Draft EA and MS Word file of the completed Publication Form on disk.

Please call Mr. Glen Koyama of Belt Collins Hawaii at (808) 521-5361 if you have any questions.

Sincerely,

David R. Craddick
Manager and Chief Engineer

AZ:bdm
Rambo/Kapahi Hmstd Well

Enclosure

4398 Pua Loke St., P.O. Box 1706, Lihue, HI 96766 Phone: 808-245-5400
Engineering and Fiscal Fax: 808-245-5813, Operations Fax: 808-245-5402, Administration Fax: 808-246-8628

OEQC Publication Form
The Environmental Notice

RECEIVED
'11 SEP 13 A10:06
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Instructions to Applicant or Agency:

1. Fill out this Publication Form and email to: oeqc@doh.hawaii.gov
2. Send one (1) pdf and one (1) hardcopy of the EA / EIS to OEQC

Name of Project:	Kapahi Homesteads Storage Tanks and Exploratory Well
Applicable Law:	Chapter 343, Hawaii Revised Statutes
Type of Document:	Draft Environmental Assessment
Island:	Kauai
District:	Kawaihau District
TMK:	Fourth Division, 4-6-11: 3
Permits Required:	Class IV Zoning Permit, Use Permit, Well Construction Permit, and potential National Pollutant Discharge Elimination System (NPDES) Permit
Name of Applicant or Proposing Agency:	Department of Water, County of Kauai
Address	4398 Pualoke Street
City, State, Zip	Lihue, Hawaii 96766
Contact and Phone	David Craddick, Manager & Chief Engineer, Ph. (808) 245-5408
Approving Agency:	Department of Water, County of Kauai
Address	4398 Pualoke Street
City, State, Zip	Lihue, Hawaii 96766
Contact and Phone	David Craddick, Manager & Chief Engineer, Ph. (808) 245-5408
Consultant	Belt Collins Hawaii Ltd.
Address	2153 North King Street, Suite 200
City, State, Zip	Honolulu, Hawaii 96819
Contact and Phone	Glen Koyama, Project Planner, Ph. (808) 521-5361

Project Summary: Summary of the direct, indirect, secondary, and cumulative impacts of the proposed action (less than 200 words).

The Department of Water (DOW), County of Kauai is proposing to construct two 0.5-million gallon (MG) reservoirs, named Kapahi Homesteads Tanks, and drill an exploratory well at the 0.836-acre Ornellas Storage Tank site in Kawaihau, Kaua'i, Hawai'i. The new tanks will supplement the site's existing 0.2-MG storage facility, while the exploratory well will determine whether a new source of water can be developed at that location for the County's Wailua-Kapa'a Water System. The overall objective of the proposed action is to improve water service for the Wailua-Kapa'a community.

The development of two 0.5-million gallon reservoirs instead of one 1.0-million gallon reservoir is expected to result in a facility more in scale with the neighboring community. The portion of the project site that is not occupied by the existing Ornellas Storage Tank was previously in idle use. No archaeological or structural features have been found in that area.

The proposed improvements will not require daily on-site staffing for equipment operations, but will require periodic visits by DOW for monitoring, maintenance, and repair.

Construction of the proposed improvements is estimated to cost approximately $14 million and projected to begin by the end of 2011 or in early 2012.

DRAFT ENVIRONMENTAL ASSESSMENT

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL

KAWAIHAU, KAUA‘I, HAWAI‘I

Department of Water County of Kaua'i

DRAFT ENVIRONMENTAL ASSESSMENT

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL

KAWAIHAU, KAUA‘I, HAWAI‘I

September 2011

Prepared for:

Department of Water
County of Kaua‘i

Prepared by:

Belt Collins Hawaii Ltd.
Honolulu, Hawai‘i

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

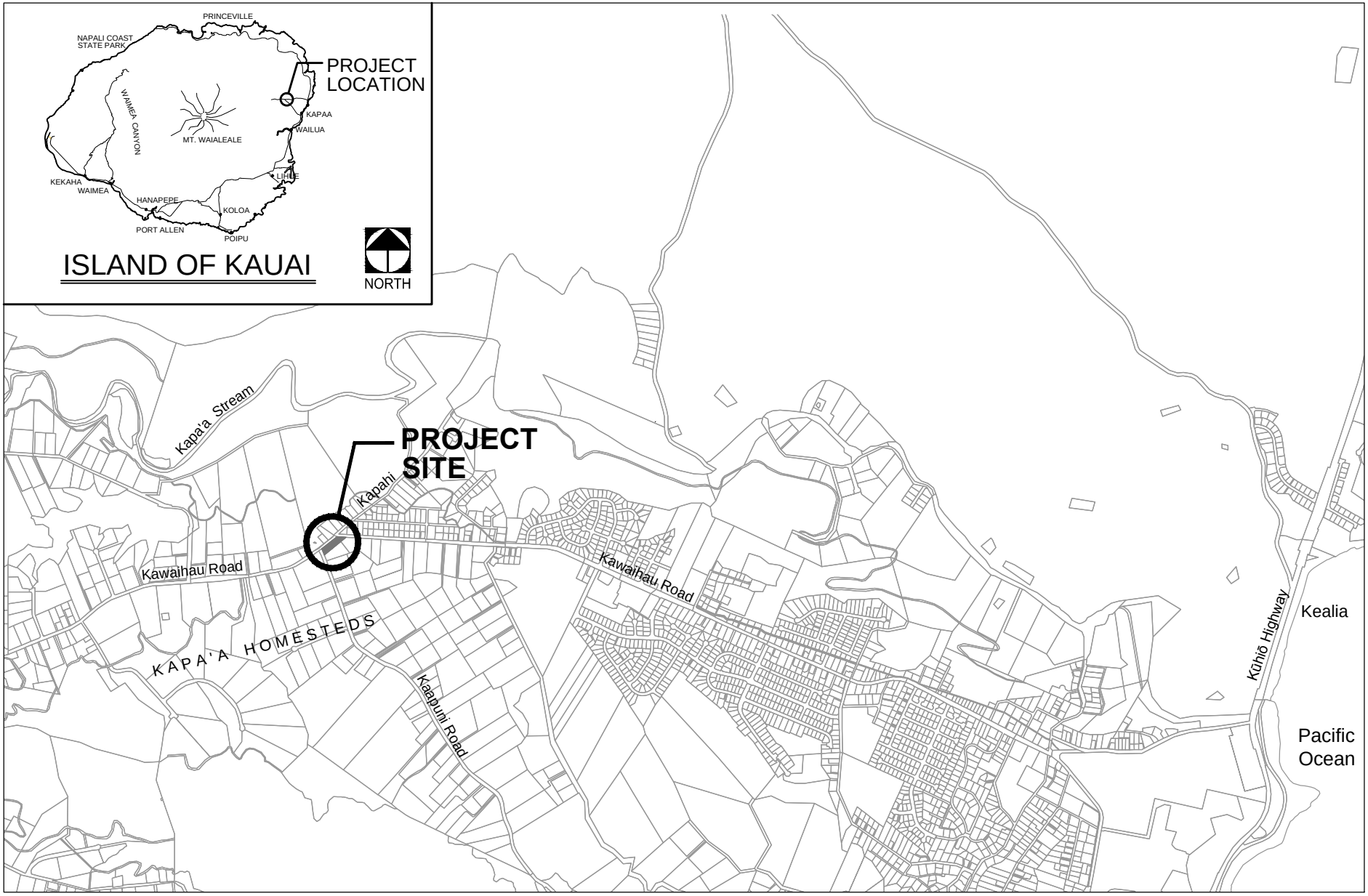
BLNR	Board of Land and Natural Resources, State of Hawai‘i
BMP	Best Management Practices
CZM	Coastal Zone Management
CSH	Cultural Surveys Hawaii, Inc.
CZO	Comprehensive Zoning Ordinance
DFW	Division of Forestry and Wildlife
DLNR	Department of Land and Natural Resources, State of Hawai‘i
DOH	Department of Health, State of Hawai‘i
DOW	Department of Water, County of Kaua‘i
DWSRF	Drinking Water State Revolving Fund
EA	Environmental Assessment
EIS	Environmental Impact Statement
EKWUC	East Kauai Water Users’ Cooperative
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HAR	Hawai‘i Administrative Rules
HRS	Hawai‘i Revised Statutes
HsB	Hanamaula silty clay
KIUC	Kaua‘i Island Utility Cooperative
KUL	Kolokolo extremely stony clay loam
MDD	Maximum day demand
MG	million gallon
MGD	million gallon per day

NAAQS	National Ambient Air Quality Standards
NFIP	National Flood Insurance Progam
NPDES	National Pollutant Discharge Elimination System
OEQC	Office of Environmental Quality Control
SDWA	Safe Drinking Water Act
SHPD	State Historic Preservation Division
SHPO	State Historic Preservation Office
SMA	Special Management Area
TMK	Tax Map Key
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

SUMMARY

PROPOSING AGENCY:	Department of Water (DOW), County of Kaua‘i
APPROVING AGENCY:	DOW, County of Kaua‘i
GENERAL PROJECT DESCRIPTION:	The DOW is proposing to construct two 0.5-million gallon (MG) reservoirs, named Kapahi Homesteads Tanks, and drill an exploratory well at the Ornellas Storage Tank site in Kawaihau, Kaua‘i, Hawai‘i. The new tanks will supplement the site’s existing 0.2-MG storage facility, while the exploratory well will determine whether a new source of water can be developed at that location for the County’s Wailua-Kapa‘a Water System. The overall objective of the proposed action is to improve water service for the Wailua-Kapa‘a community.
PROJECT LOCATION:	The Ornellas Tank site is located at the intersection of Kawaihau Road and Kaapuni Road at the 305-foot elevation of the Kapa‘a Homesteads in Kawaihau, Kaua‘i (see Figure 1). The 0.836-acre property, which is identified by Tax Map Key (TMK) as (4) 4-6-11: 3 (see Figure 2), is owned by the State of Hawai‘i and used by the County of Kaua‘i via Executive Order No. 1091.
DETERMINATION:	Anticipated Finding of No Significant Impact (FONSI)
CONSULTED AGENCIES: (see Appendix A)	**State Agencies** Office of Environmental Quality Control (OEQC) Environmental Planning Office, Department of Health (DOH) Land Division, DLNR State Historic Preservation Division, DLNR (SHPD) **County Agencies** Department of Planning Department of Public Works Fire Department **Utility Companies** Kauai Island Utility Cooperative Hawaiian Telcom

Thu, 08 Sep 2011 – 11:52am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 1.dwg



BELT COLLINS

NORTH

0 500' 1000' 2000'
SCALE IN FEET

Figure 1
LOCATION MAP

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

Thu, 08 Sep 2011 – 11:54am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 2.dwg

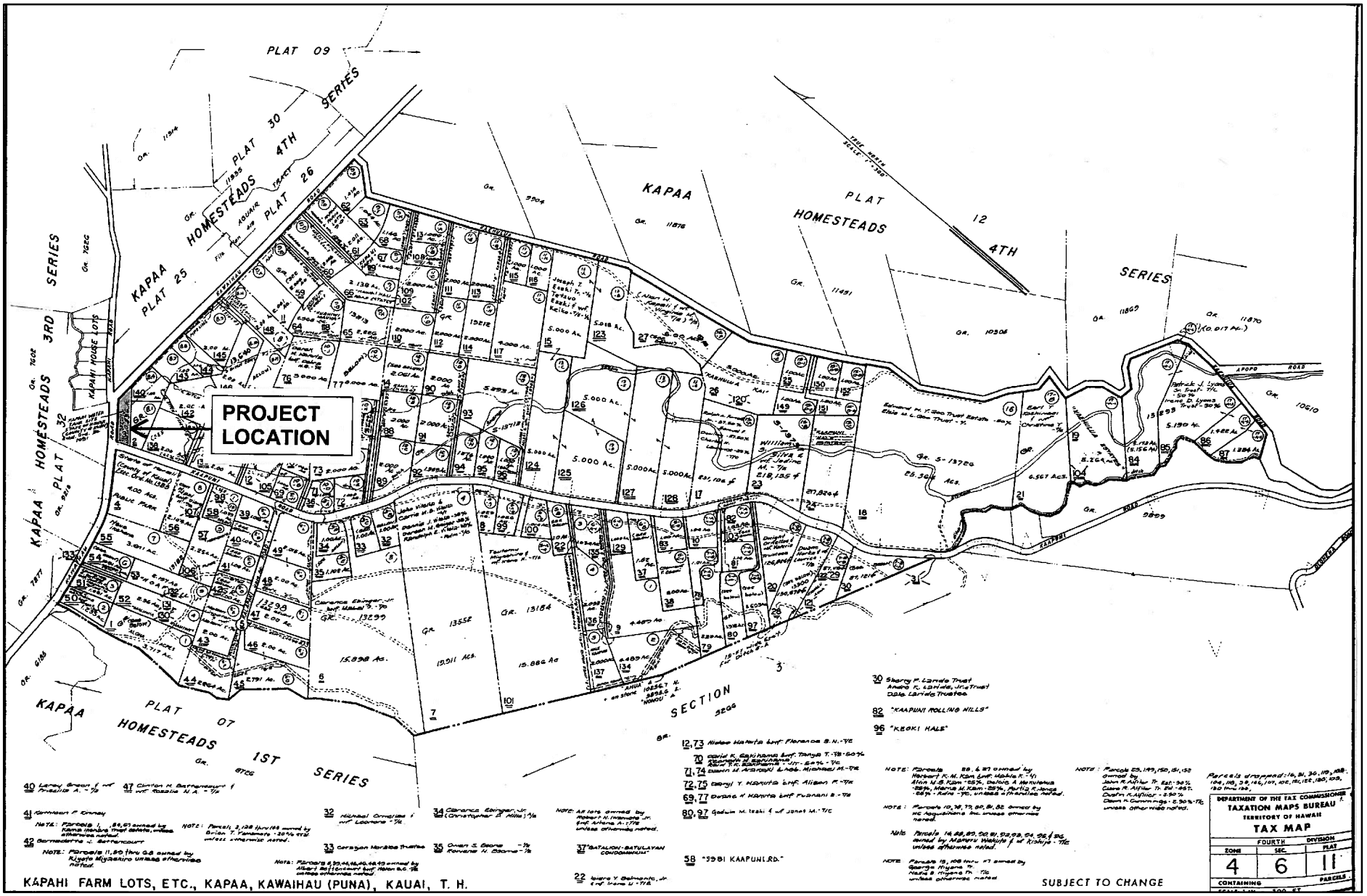


Figure 2
TAX MAP KEY

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

NOT TO SCALE

1 DESCRIPTION OF THE PROPOSED ACTION

1.1 Project Objective

The water system that presently serves the Wailua-Kapaʻa community in the Kawaihau District of Kauaʻi lacks adequate storage capacity to meet Maximum Day Demand (MDD) and County fire flow requirements. In the event of prolonged periods of peak day demand or during events of extreme emergencies, inadequate storage capacity may cause a negative effect on DOW's capability to sufficiently serve its customers.

An expansion of water storage facilities for the Kapaʻa Sector of the Wailua-Kapaʻa Water System will be required to meet the area's needed reserve. The additional storage should be located at an elevation that will effectively sustain the required pressure for the designated service area.

The selected location for the new storage facility is on the site of the existing 0.2-MG Ornellas Storage Tank (elevation 305') (see Figure 3). It is strategically situated within a high growth area of Kapaʻa and is in a pressure zone that can effectively serve its area customers.

No new distribution line is being proposed with this project. The new storage facility will supplement the site's existing storage tank and connect with existing pipelines adjacent to the property.

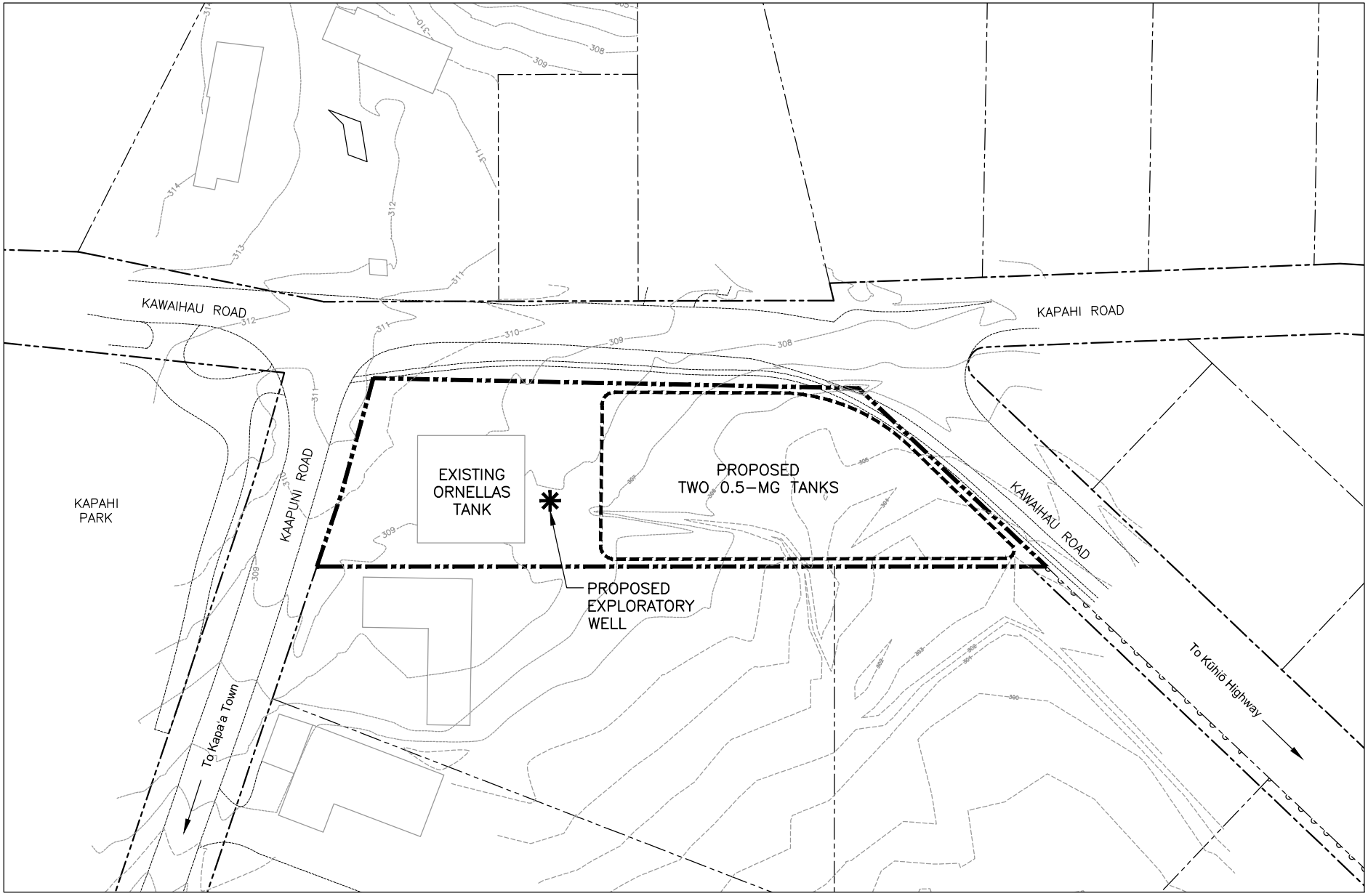
As resident population in the region continues to grow, additional sources of water would be required to service the area. Currently, new sources are being explored to supply the Wailua-Kapaʻa Water System. Preliminary hydro-geological studies suggest that a potential groundwater resource with a sustainable yield may be available in the Kapaʻa Homesteads area. DOW's preference for the Wailua- Kapaʻa Water System is to have a new well located at a practical elevation for cost savings purposes, in an appropriate pressure zone where the well can effectively integrate with its existing water system, and at a site that is readily available for use

1.2 Background

The Wailua-Kapaʻa Water System serves an area that has continued to grow over the past 20 years with a population of 13,449 in 1990 to a population of 17,267 in 2010.[1] Its service area includes Wailua-Waipouli Resort area, Wailua Houselots, Wailua Homesteads, Kapaʻa town, and Kapaʻa Homesteads. New developments have and will continue to include residential and agricultural subdivisions, individual homes, and new business enterprises, which will result in a continued increase in the demand for water in the project service area.

[1] U.S. Census – Census Tract 402.02 (1990 & 2000)/402.05 & 402.05 (2010) and Census Tract 403 (1990, 2000 & 2010).

Thu, 08 Sep 2011 – 11:54am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 3.dwg



NORTH

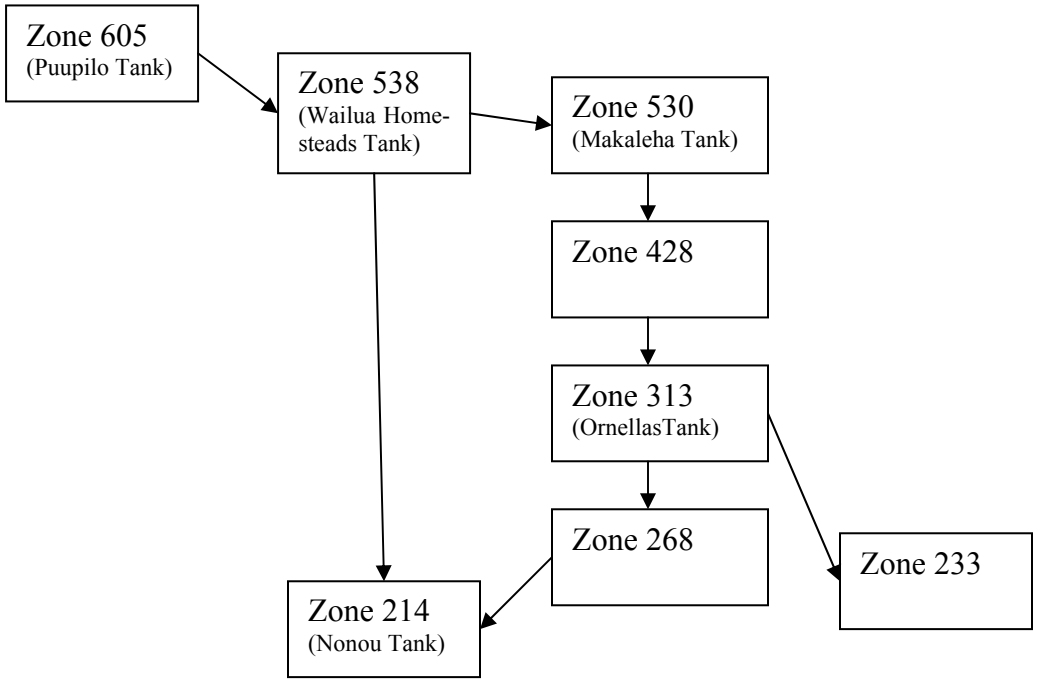
0 20' 40' 80'
SCALE IN FEET

Figure 3
PROJECT SITE

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

There are eight primary pressure zones within the Wailua-Kapa‘a service area to control the flow of water through DOW’s pipeline network (see Table 1). These pressure zones are determined by the system’s various elevational sections. Existing storage tanks and pressure reducing valves are used to control the flow of water through the different zones.

Table 1. Wailua-Kapa‘a Water System Pressure Zones



Source: DOW

According to DOW’s Water Plan 2020, a long-range planning guide for the County agency, Wailua-Kapa‘a is deficient in storage capacity for several pressure zones. Notably, all storage deficiencies within the system are based on MDD criteria. Future deficiencies are based on projected population growth and projected MDD.

Zone 313 pressure zone, serviced by the Ornellas Tank, is currently deficient by more than 730,000 gallons and will be deficient by more than 770,000 gallons by 2020. The two pressure zones (Zone 268 and Zone 233), immediately makai of Zone 313, are currently deficient by a combined total of 59,000 gallons. By 2020, they will be deficient by approximately 74,000 gallons. Thus, the current deficiency in the Ornellas Tank pressure zone and its two adjoining makai zones is 789,000 gallons. This overall deficiency is projected to increase to 844,000 gallons by 2020. The proposed two 0.5-MG supplemental storage facilities at the Ornellas Tank site will provide the needed additional capacity to adequately accommodate the deficiency and long-term needs of the area.

The prospect of a new source of water in Zone 313 is ideal for the Wailua-Kapa‘a Water System. A hydrological and well site selection study was conducted and its findings demonstrated that

there are favorable conditions at the Ornellas Tank site for potable groundwater development. As a result of that study, DOW is proposing to drill an exploratory well to ascertain the potential yield of this groundwater source. If the test results are positive, steps will be taken to convert the well into a production well. A separate environmental assessment will be prepared for the well conversion.

1.3 Description of the Proposed Action

1.3.1 Reservoir

The two new 0.5-MG tanks and ancillary improvements will be located on the existing Ornellas Tank site, identified as TMK (4) 4-6-11: 3. The 0.836-acre parcel is relatively level with an overall gradient of approximately 2.5 percent (see Figure 3). The area on which the new tanks will be constructed is presently vacant and covered by a variety of overgrown shrub and groundcover. The remainder of the parcel is occupied by the 0.2-MG Ornellas Tank, a square, concrete masonry unit (cmu) water storage facility with partial sheet-metal siding and sheet-metal roofing. The entire parcel will be enclosed within a secured chain link fence.

The two new storage tanks will be cylindrical in configuration, each measuring approximately 72 feet in diameter and approximately 22 feet in height (see Figures 4 and 5). They will have a finish floor elevation of approximately 307' (existing site elevation is 305').

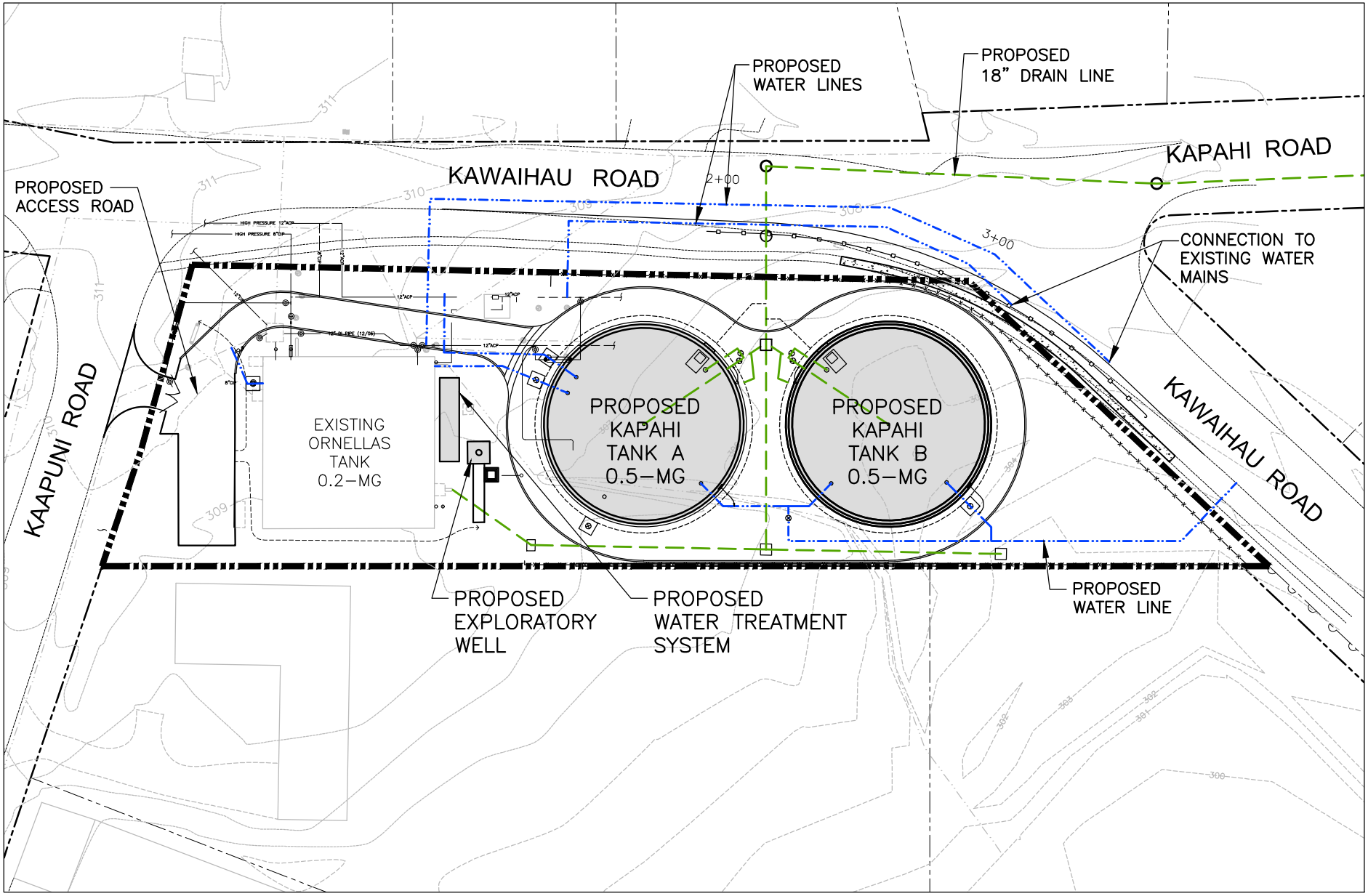
The tanks are being designed to efficiently fit within the narrow parcel and, visually, to be at scale with the surrounding land uses. The proposed tanks will be constructed of reinforced concrete and be in a neutral-tone or off-white color. A driveway will be constructed from Kaapuni Road to provide access into the site and around the new storage tanks. The chain link fence presently surrounding the existing Ornellas Tank will be expanded to encompass the new storage facilities. Minor landscaping, consisting of hedges, groundcover and trees, will be provided for visual enhancement and erosion control.

The existing 12" diameter inline that enters the tank site from the west along Kawaihau Road will connect to a new on-site water treatment (filter) system (measuring approximately 22' length x 5' width x 6' height). The water that flows through the treatment system is filtered via hollow-fiber membranes and then passed on and stored in the tanks.

The two new tanks will connect with the DOW distribution system via a 12-inch line to one of two existing 12-inch lines fronting the property in Kawaihau Road. The connecting line from the Ornellas Tank will be refitted and connected to the other 12-inch line in Kawaihau Road. These existing 12-inch mains presently serve as the primary distribution and service lines to the lower Wailua-Kapa‘a Water System.

The washout and overflow line from the existing tank will connect with the washout and overflow line from the new tanks. Additionally, a perimeter drain line from the new tanks will connect with the new 18" diameter drain line from the property. The new 18" drain line will extend into Kawaihau Road on the northwest side of the site and run down Kapahi Road approximately 950 feet (primarily under the road pavement) to discharge its flow into an existing 18" diameter drainage line within Kapahi Road right-of-way (see Figure 6).

Thu, 08 Sep 2011 – 11:55am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 4.dwg



NORTH

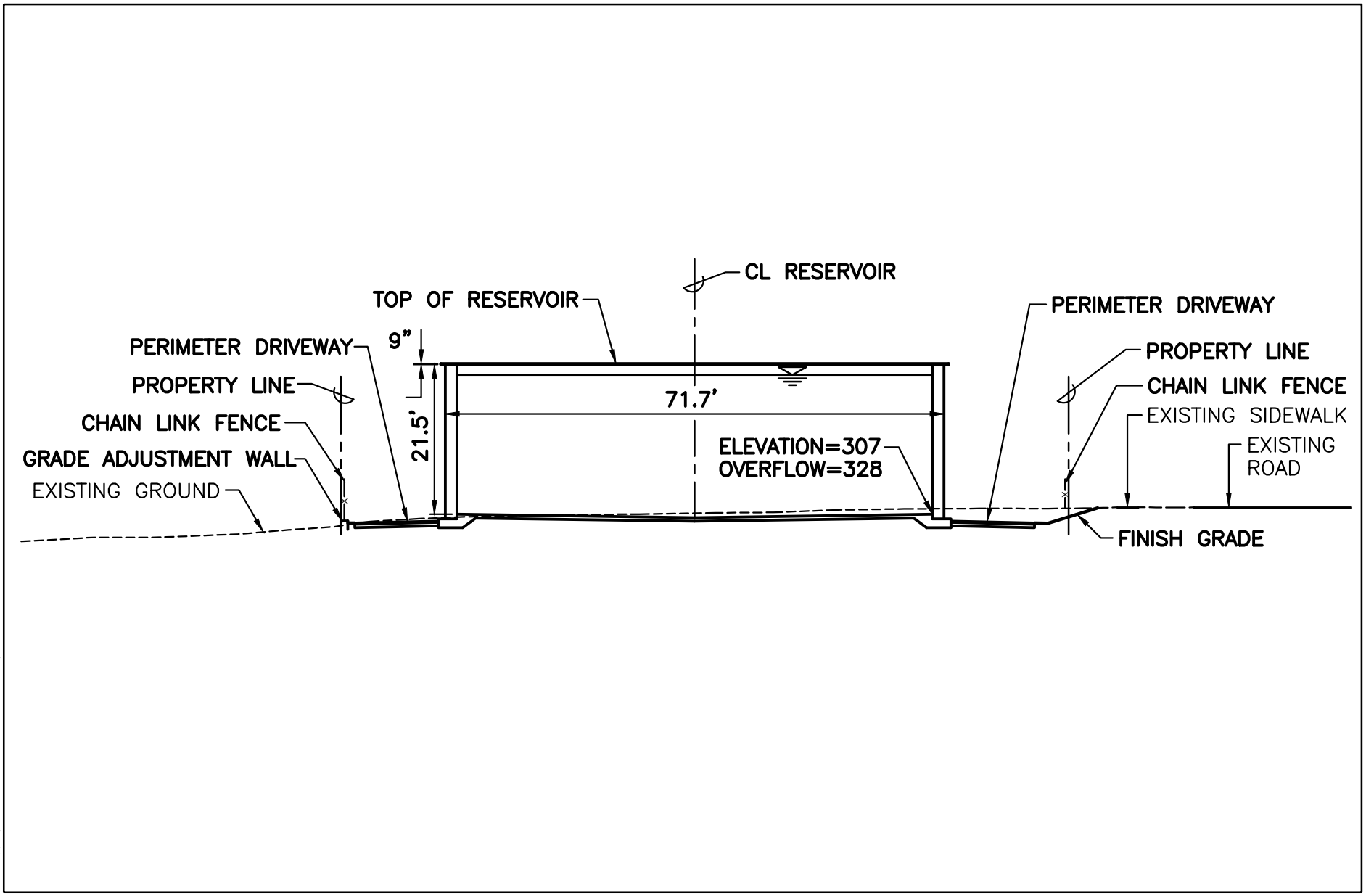
0 12.5' 25' 50'
SCALE IN FEET

Legend

- Proposed Water Line
- Proposed Drain Line

Figure 4
PROPOSED IMPROVEMENTS
KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

Thu, 08 Sep 2011 – 11:55am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 5.dwg

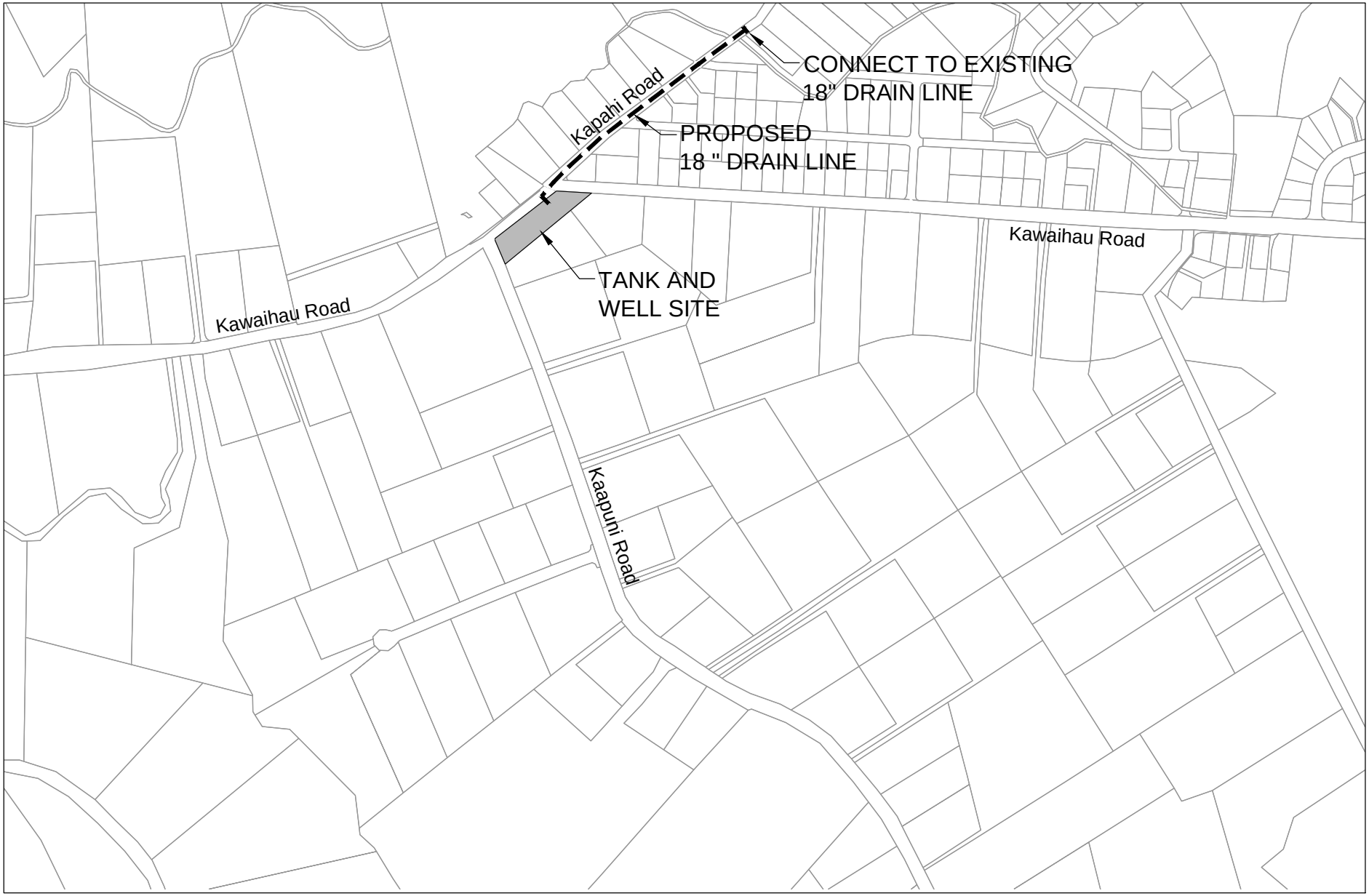


0 5' 10' 20'
SCALE IN FEET

Figure 5
STORAGE TANK SECTION

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

Thu, 08 Sep 2011 – 11:55am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 6.dwg



BELT COLLINS

NORTH

0 125' 250' 500'
SCALE IN FEET

Figure 6
PROPOSED DRAIN LINE FROM TANK SITE

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

1.3.2 Exploratory Well

An exploratory well will be drilled between the existing Ornellas Tank and the new 0.5-MG tanks. A drilling rig will be set up at the site to accommodate the drilling operations. Accessory equipment such as a portable power generator, mini-crane, and supply of drilling shaft componenets will be placed on the site.

Drilling is expected to reach a depth of at least 550 feet below the surface (see Figure 7). The borehole will be 19 inches minimum in diameter to accommodate a 12-inch diameter solid casing to a depth of approximately 490 feet. The final depth of the well will be adjusted based on actual conditions encountered.

Drilling Operations

Drilling will be done by either percussion or reverse circulation rotary method. A self-contained, mobile engine run on diesel fuel will be employed to power the drilling operation. The percussion method uses a repeated raising and dropping of a heavy bit within the hole followed by a periodic bailing of the cuttings. None of the bailed material is expected to contain contaminants.

The alternative reverse circulation rotary method employs a drill bit that rotates in the borehole while circulating fluid is pumped down the drill stem. The fluid containing drill cuttings is brought to the surface. Solids are removed as the fluid recirculates down the borehole.

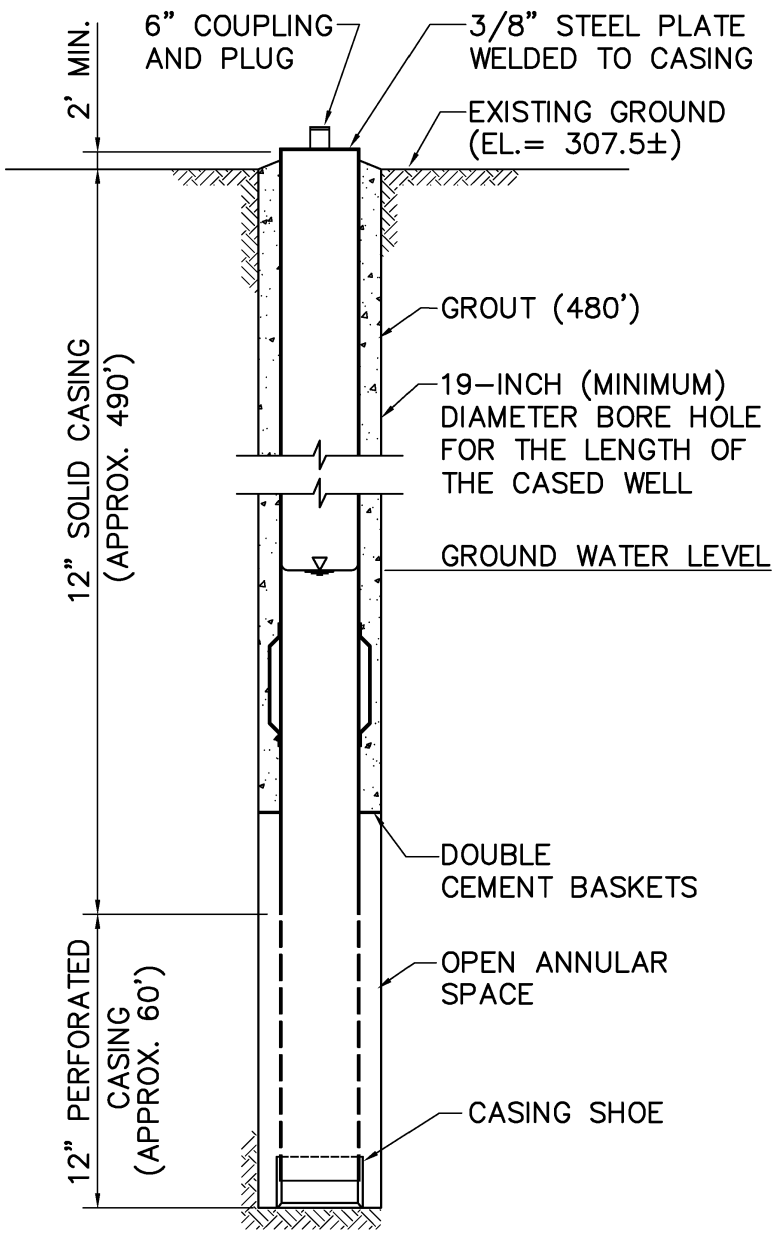
Pump Test

After drilling, casing, and grouting of the annular spacing, the well is pump tested to ascertain its potential yield. The water will also be sampled for all regulated water constituents and the results will be provided in an engineering report to the State Department of Health.

The piezometric head of the aquifer is anticipated to be at 10’ to 15’ above sea level, but the aquifer itself is substantially below sea level. Drilling at depth will enable the solid casing to be extended below sea level and function as a shroud if a submersible pump and motor is used for the permanent pump.

The first set of pump tests, known as the step-drawdown test, will consist of pumping the water from the well at various pumping rates to estimate the well’s hydraulic capacity (quantity withdrawn per foot of drawdown).

After the step-drawdown test is concluded, a 96-hour constant rate pump test would be performed to determine the quality of the water that the well will produce on a continuous basis. The pumped water would be discharged into a proposed 18” drain line that will be installed along Kapahi Road to an existing drainage line within the same road right-of-way.



SECTION THRU WELL

NOT TO SCALE

Figure 7
SECTION THRU EXPLORATORY WELL

KAPAHI HOMESTEADS STORAGE TANK AND EXPLORATORY WELL
KAWAIHAU, KAUAI

After completing the pump tests, the contractor's temporary pump is removed and the well is capped. Data compiled from the pump tests will provide a decision point. If the tests show that the site will not provide sufficient yield or has organic contamination that may require treatment, an alternative site will be sought. The capped well will be backfilled with cement, the drill rig and support equipment will be taken off the site, and the area surrounding the well will be restored to its previous condition. Alternatively, the abandoned well is not be backfilled with cement but used periodically for groundwater monitoring purposes.

If the pump tests produce favorable results, an engineering report will be generated to recommend use of the exploratory well as a production well. A new Environmental Assessment would also be prepared to assess the probable impacts that might result from the operations of the new well.

1.4 Estimated Cost

Construction of the proposed action is estimated to cost approximately $14 million. This estimate includes the cost of the new tanks, exploratory well, ancillary equipment, and site improvements. Funding for the project will come from the DOW, but supplemental funding could be provided by the federal government through the Drinking Water State Revolving Fund (DWSRF) program. If DWSRF funds are used, the project must meet all Hawai‘i DWSRF program requirements.

1.5 Construction Schedule

Construction of the storage tanks is projected to begin in 2012, after the new drain line is installed along Kapahi Road and drilling and testing occurs on the exploratory well. Completion of the tank construction and site landscaping is projected to occur approximately eight months thereafter.

Drilling of the exploratory well may begin as early as late 2011. Drilling operations normally take approximately six months to complete, and pump testing generally run for approximately one week.

2 DESCRIPTION OF THE AFFECTED ENVIRONMENT

2.1 Regional Setting

The project site is located in the Kawaihau District of Kaua‘i, in a region extending from the ocean to the Makaleha Mountains. This region includes the small coastal town of Kapa‘a, beach resorts of Wailua, and upland rural residences, small agricultural farms, grazing lands, and large open spaces of Wailua Homesteads and Kapa‘a Homesteads.

The people of the region are a mix of long-time residents, newcomers, and visitors. Kūhiō Highway is the main access through Kapa‘a, extending approximately 30 miles from Līhu‘e to Hanalei. The two-lane coastal State highway has numerous local side streets that provide access

to the shoreline and upland areas. The Ornellas Tank site is located more than two and one-half miles from the shoreline in the rural/agricultural section of Kawaihau.

2.2 Land Use and Existing Water System

Plans call for the proposed storage tanks to connect with the Wailua-Kapaʻa Water System, the County's largest water system on Kauaʻi. Operated by DOW, the Wailua-Kapaʻa System services Wailua-Waipouli Resort, Wailua Houselots, Wailua Homesteads, Kapaʻa town, and Kapaʻa Homesteads. Feeding the system are three tunnels and seven operational wells (see Table 2). The two sources that feed the Kapaʻa Sector of the Wailua- Kapaʻa System are the Makaleha Tunnel in the Keālia Forest Reserve (approximately 1,400 feet above the existing Makaleha Tank, elevation 510 feet) and the Kapaʻa Homesteads Well No. 1 located in the Makaleha Tank site.

Table 2. Wailua-Kapaʻa System Sources

Source	Elevation (in feet)	Capacity (in gallons per minute)
Tunnels		
Makaleha Tunnel	574	350
Molelepe Tunnel	568	300
Akulikuli Tunnel	360	not in service
Wells		
Nonou 9-1A	155	not in service
Nonou 9-1B	157	425-450
Nonou 9-1C	72	850
Kapaʻa Homesteads Well No. 1	525	750
Kapaʻa Homesteads Well No. 2*	approximately 500+	500
Wailua Homesteads Well "A"	462	470
Wailua Homesteads Well "B"	458	500

* This well was expected to be in service in mid 2002.
Source: Water Plan 2020, March 2001.

All storage facilities in the Wailua-Kapaʻa System are listed in Table 3 below.

For operational purposes, the Wailua- Kapaʻa Water System contains three service areas incuding: (1) the coastal area of Wailua-Waipouli Resort and Kapaʻa town, (2) Wailua Homesteads, and (3) Kapaʻa Homesteads. The proposed storage tanks will be located in the Kapaʻa Homesteads service area or the Kapaʻa Sector of the Wailua-Kapaʻa System. This service area is connected to two storage tanks: the 1.0-MG Makaleha Tank at elevation 510 feet and the 0.2-MG Ornellas Tank at elevation 305 feet.

Table 3. Storage Facilities in the Wailua-Kapa‘a Water System

Storage Facility	Elevation (in feet)	Capacity (in million gallons)
Makaleha Tank	510	1.0
Ornellas Tank	305	0.20
Nonou Tank	193	2.0
Wailua Homesteads Tank	519	0.5
Pu‘upilo Tank	587	0.125

Source: Water Plan 2020, March 2001

The Wailua-Kapa‘a Water System is divided into eight pressure zones, each designated by elevations.

The water system includes a network of 2- to 12-inch diameter distribution lines in the upper elevations and 6-, 8-, and 12-inch pipelines in the lower sections. There are also various types of valves including backpressure valves, pressure reducing valves, solenoid valves, and altitude valves.

2.3 Land Tenure

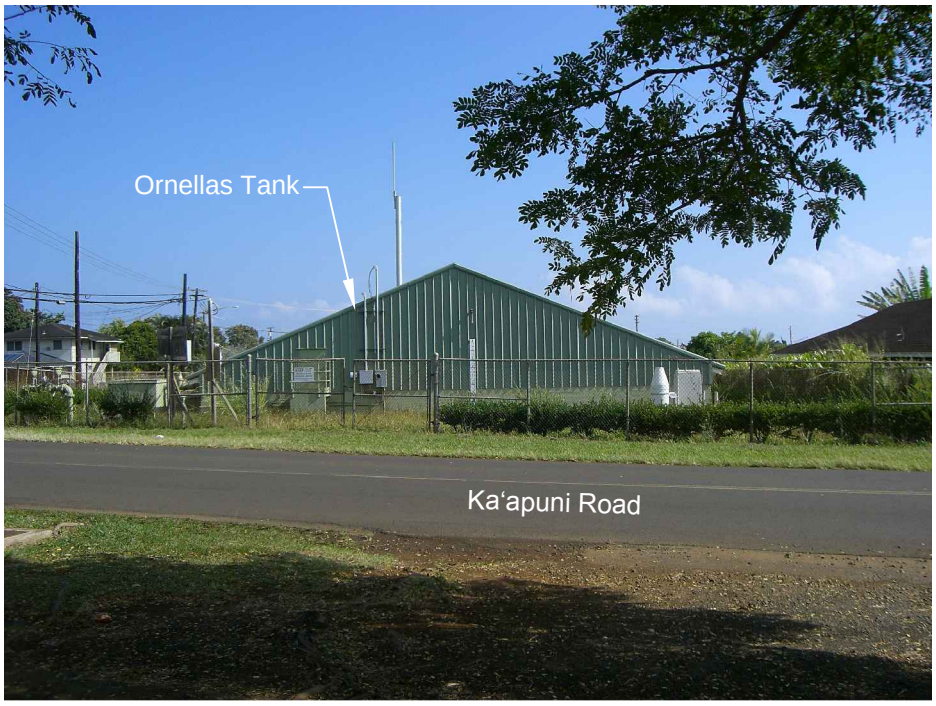
The Ornellas Tank site is owned by the State of Hawai‘i. Executive Order 1091, November 28, 1944, sets aside the Ornellas Tank site for public purpose and to be under the control and management of the County of Kauai.

2.4 Physiography

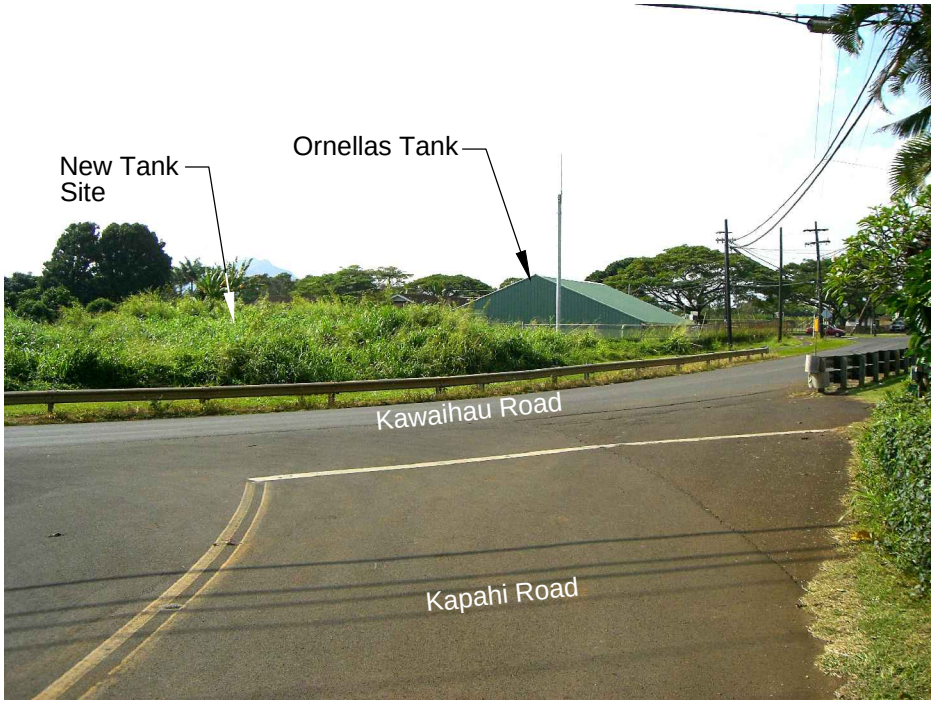
The project site is located in Kawaihau at the approximately 305-foot elevation of the Kapa‘a Homesteads. The terrain is relatively even and its gradient is approximately 2.5 percent descending generally from west to east (see Figures 8 and 9). There are no prominent or distinguishable geographic features on the property or in the immediate vicinity.

2.5 Geology

Kaua‘i is the oldest of the major Hawaiian Islands and, geologically, the most weathered or eroded. It consists of at least one extinct volcano and was formed by lavas from the shield, post shield, and rejuvenated stages. The island has a lack of rift zones, but has an enormous caldera complex with a graben, or down-dropped block on the caldera’s south side. Rejuvenated-stage lavas have covered much of the eastern half of the island. Through time, numerous landslides have modified Kaua‘i’s northern, northeastern, eastern, and southern sides.



EXISTING ORNELLAS TANK (LOOKING NORTHEAST)

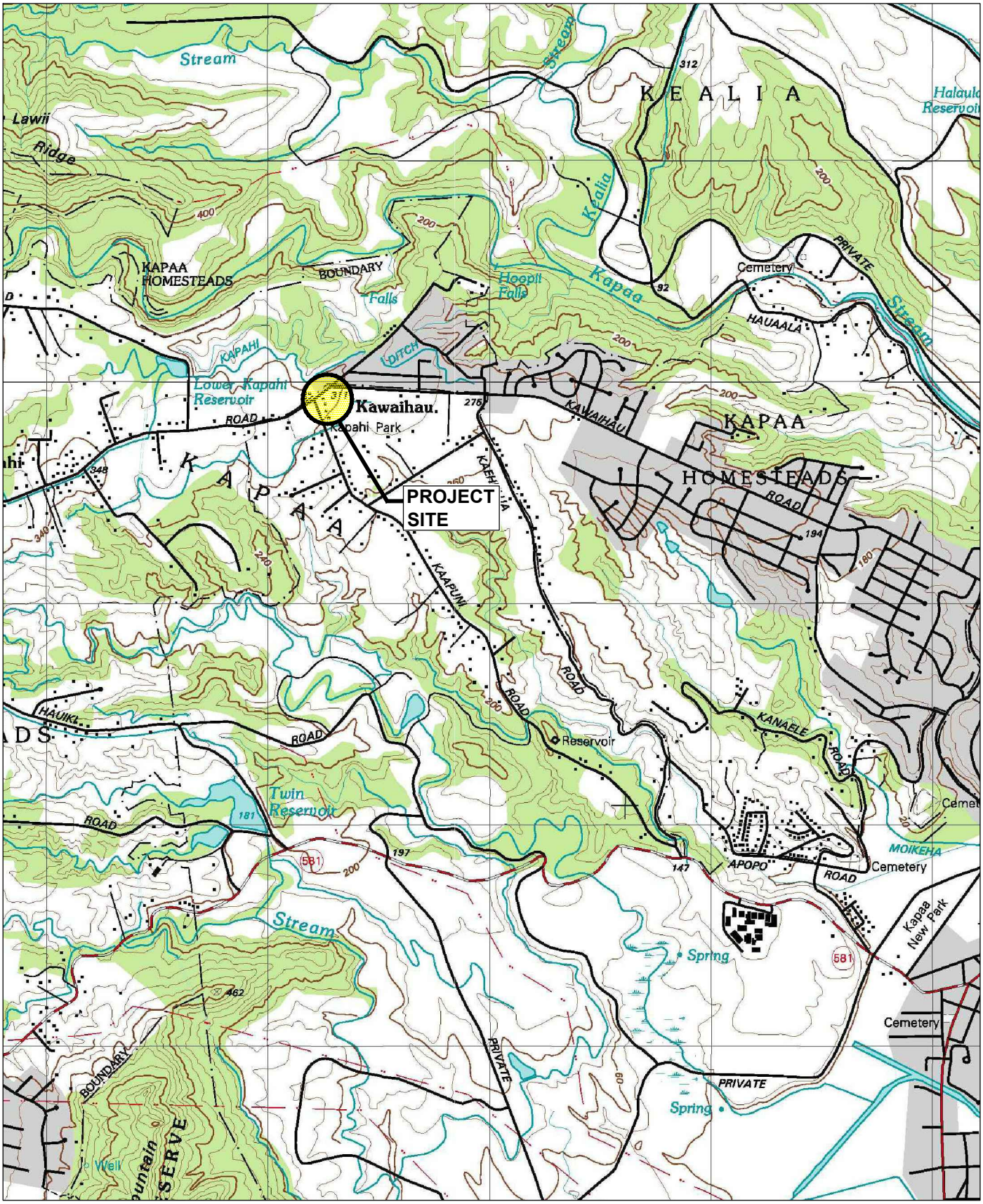


PROJECT SITE LOOKING SOUTHWEST

Figure 8
SITE PHOTOS

KAPAHI HOMESTEADS STORAGE TANK AND EXPLORATORY WELL
KAWAIHAU, KAUAI

Thu, 08 Sep 2011 – 11:57am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 9.dwg



BELT COLLINS

NORTH

0 500' 1000' 2000'
SCALE IN FEET

Figure 9
U.S.G.S. MAP

KAPAHI HOMESTEADS STORAGE TANK AND EXPLORATORY WELL
KAWAIHAU, KAUAI

Rocks of the Koloa Volcanic Series cover most of the eastern half of the island including the project area. The Ornellas Tank site is situated on a gently sloping plateau along the foot of the Makaleha Mountains. This region, which is underlain by weathered soils and basaltic rock belonging to the Koloa Volcanic Series, is known as the Kapa‘a dissected upland. Geologically, it is considered to be composed of alluvium deposits.

2.6 Hydrology

2.6.1 Groundwater

The Koloa Volcanic Series, which blankets the project region, is the island’s later stage volcanics laid down long after the original Waimea Volcanic Series. The original island-building Waimea volcanics is generally very permeable and yields water readily to wells. In comparison, the Koloa Volcanic Series is generally moderate to poor in permeability. With a few notable exceptions, wells drawing water from the Koloa volcanics have had relatively modest yields. The depth of the Koloa series is not known, but it is undoubtedly substantial.

The prospect of developing a well that extends through the Koloa volcanics and associated unconformities to the Waimea series below would require drilling to an impractically expensive depth. As such, DOW is focused on exploring whatever potential source that might be found in the Koloa volcanics.

A number of wells have been developed in the Kapa‘a Homesteads area: some are being used as production wells; some are being used for groundwater monitoring purposes; and others have been tested and abandoned. Those that have proven to be productive are drawing from the Anahola Aquifer in which the project site is located (see Figure 10). The State Commission on Water Resource Management lists the total sustainable yield for the Anahola Aquifer as 17 MGD. The current usage by active wells, tunnels, and shafts in the aquifer, is a small fraction of this amount.

Groundwater levels in the project vicinity appear to be in the 12-foot range (above mean sea level). Table 4 below lists the wells in the project area and includes information on the year drilled, ground elevation, well depth, and static head.

In 2008, Tom Nance Water Resource Engineering conducted a well site selection study for the DOW (see Appendix B). The purpose of the study was to investigate potential well locations in the 313- and 214-foot service zones of the Wailua-Kapa‘a Water System. Data from all existing wells within or near those zones were reviewed. Any selected drilling site should be viewed as having an inherent risk of not producing the desired yield, regardless of the depth drilled.

Under that premise, the study identified six potential sites for possible test drilling: three sites at an upland location and three sites in the lower elevations (see Table 5).

Table 4. Nearby Wells

Well No.	Well Name	Owner/User	Year Drilled	Ground Elevation	Well Depth (Total)	Initial Water Level (in Elev.)	Initial Head (in Elev.)
0419-05	Kapaʻa Highlands 1	No record	2006		260		
0519-01	Kapaʻa	State HHA	1986	8	221	12	12
0519-04	Kapaʻa Home-steads 3	State DLNR	2004	8	263		12
0519-05	Lydgate 1	Ogden L B	2005	48	234		12
0521-03	Kulana 17	Kapaʻa 382 LLC	2001	282	495		
0618-01 to 07	Kealia 1-7	Lihue Plantation	1898-1928	8-15	213-402	8-10	8-10
0618-09	Kealia 1A	Kealia Water Company Holdings, LLC	2001	10	195		7
0618-10	Kealia 2A	Kealia Water Company Holdings, LLC	2001	10	195		7
0620-01	Kapaʻa Cannery	T. Baker Assoc.	1960	249	466	12	12

Source: Commission of Water Resource Management, DLNR, State of Hawaiʻi

Thu, 08 Sep 2011 – 11:57am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 10.dwg

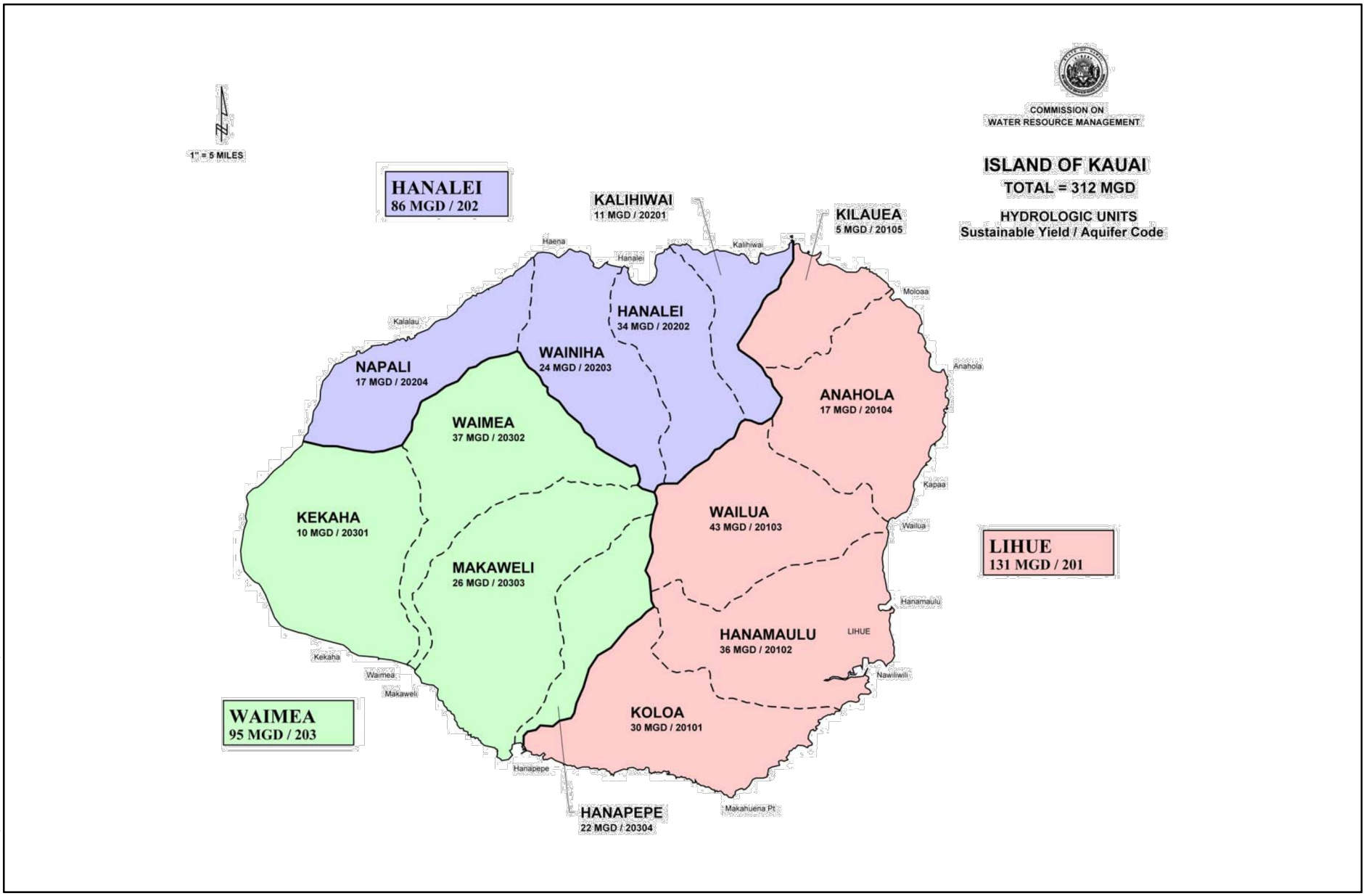


Figure 10
GROUND WATER HYDROLOGIC UNITS AND 2008 SUSTAINABLE YIELDS

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

Table 5. Potential Well Sites

WELL SITE	LANDOWNER
Inland Sites	
Kulana Tank Site (TMK 4-4-03:__; 313-foot El.; 0.25 MG tank)	Private Owner (planned to be dedicated to County of Kauai)
Stable Tank Site (TMK 4-3-03: 12; 1.8 Ac.; 214-foot El., 1.0 MG tank)	County of Kaua‘i
Ornellas Tank Site (TMK 4-6-11: 3; 0.8 Ac.; 313-foot El., 0.2 MG tank)	County of Kaua‘i
Lower Elevation Sites	
TMK 4-3-03: 01 (80-foot El.; 163.1 acs.)	Private Owner
TMK 4-3-03: 20 (120-foot El.; 16.6 acs.)	State of Hawai‘i
TMK 4-5-15: 30 (40-foot El.; 35.9 acs.)	State of Hawai‘i

The three upland locations are at existing County tank sites. These sites provide immediate advantages over the lower-elevation (non-County owned) sites. There would be no land acquisition cost for the well, start and stop operations of the well pump could be controlled by water levels in the adjacent tank, and contact time for chlorine in the system could be provided by storage in the same tank.

The disadvantage of the lower elevation sites is that, as a practical matter, they would have to pump directly into a distribution system rather than into a nearby storage facility.

In the final analysis, the study recommended the Ornellas Tank site for DOW’s initial exploration well. This site would provide DOW with the greatest flexibility for distributing the water within the two service zones of Kapa‘a.

2.6.2 Surface Water

No water feature traverses the property. The nearest stream is Kapa‘a Stream located approximately 1,800 feet to the north of the property. An un-named drainage channel or tributary to Kapa‘a Stream and Kapahi ditch are closer, approximately 450 feet and 270 feet, respectively (see Figure 9). The USGS Map shows an irrigation ditch located approximately 360 feet to the southeast of the project site.

In 2000, Amfac Company ceased farm operations on Kauai and as a result closed its East Kauai Water Company that operated an irrigation system consisting of reservoirs and ditches serving approximately 6,000 acres above Kapa‘a. Part of this system still operates today under the control of the East Kauai Water Users’ Cooperative (EKWUC). Nearly all of the system

conduits or ditches are State-owned, either because they are on large parcels or State land or because the State owns a 15-foot wide right of way through private lands.

The proposed drain line from the Ornellas Tank site will discharge its stormwater runoff, pump test water, or storage tank water into an existing public drainage line in Kapahi Road. Water from that line discharges into a tributary of Kapa‘a Stream.

2.7 Soils

A geotechnical exploration was conducted on the project site in 2008 by Geolabs, Inc., a soils engineering company based in Honolulu, Hawai‘i. The field investigation encountered medium stiff to stiff residual soil underlain by stiff saprolite soil. Both soils generally contain clayey silts with some embedded sand and gravel. The saprolite soil extends to the maximum depth explored that of approximately 41 feet below the ground surface. Laboratory tests showed the soils to have low expansion potential but high moisture content.

According to the U.S. Soil Conservation Service's *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*, the soils on the property consist of the Puhi series soil. This series is known to contain well-drained soils of the island's upland areas. They are developed in material derived from basic igneous rock.

The soil in the specific project area is classified as *Puhi silty clay loam, 3 to 8 percent slopes* (PnB). Runoff on this soil is characterized as slow with an erosion hazard of slight. The soil is typically used for agricultural crops, pasture, woodland, wildlife habitat, water supply, and homesites. Its Capability Classification is IIe, irrigated or non-irrigated, which on a scale of I to VIII indicate that the soil has "moderate limitations that reduce the choice of plants or that require moderate conservation practices." Class I soils have few limitations; Class VIII soils have limitations that preclude their use for commercial plant production. The "e" indicates that the main limitation in the soil is the risk of erosion, unless close-growing plant cover is maintained.

2.8 Flora

Vegetation on the property consists of lawn grass in the existing tank area and California grass, scattered koa haole, wedelia, and morning glory in the unoccupied portion of the property.

The identified species are all introduced and common in urban settings. None of these species are native, rare, threatened or endangered.

2.9 Fauna

Phillip L. Bruner, Environmental Consultant, conducted an avifaunal and feral mammal survey on the unoccupied portion of the property in July 2004 (see Appendix C).

No native or migratory birds were recorded in the survey area. Considering the present habitat, none were expected. Table 6 below lists the 12 species of alien (non-native) birds recorded over the course of the survey. The only mammal observed was a mule (*Equus caballus x Equus asinus*). The animal was tied up and allowed to graze a portion of the site fronting Kawaihau

Road. Today, the mule no longer grazes the site and high vegetation has overtaken the area. During the night survey, no Hawaiian Hoary Bat was observed. Cats (*Felis catus*) were seen near the property, but were likely pets from adjoining residential properties.

The recorded avifauna would thrive with the abundance of on-site dense vegetation. Despite the present high vegetation, the tank site is not expected to draw a different group of wildlife species, including native avifauna and rare, endangered, or threatened species.

Table 6. Observed Avifauna Species

Common Name	Scientific Name		Common Name	Scientific Name
Cattle Egret	*Bubulcus ibis*		Red Junglefowl	*Gallus fallus*
Spotted Dove	*Streptopelia chinensis*		Zebra Dove	*Geopelia striata*
Japanese White-Eye	*Zosterops japonicas*		Common Myna	*Acridotheres tristis*
Red-crested Cardinal	*Paroaria coronate*		Northern Cardinal	*Cardinalis cardinalis*
House Finch	*Carpodacus mexicanus*		House Sparrow	*Passer domesticus*
Nutmeg Mannikin	*Lonchura punctulata*		Chestnut Munia	*Lonchura atricapilla*
Java Sparrow	*Padda oryzivora*			

Source: Phillip L. Bruner, 2004

2.10 Climate

Rainfall in the project area is approximately 80 to 90 inches per year. Average monthly temperatures range from the mid-70s (degrees Fahrenheit) to the mid-80s. Winds are predominantly from the northeast.

2.11 Natural Hazards

Mount Waialeale, the dominant volcano on the island, is extinct and will not be a threat to the proposed storage tanks and exploratory well.

The project site is located approximately two and one-half miles from the shoreline and will not be affected by shoreline erosion, high surf, or tsunami inundation.

According to Flood Insurance Rate Map (FIRM) No. 1500020201E (Revised September 16, 2005), the property is located in Flood Zone X. The National Flood Insurance Program (NFIP) does not have any regulations for development in these zoned areas.

Located in a rural community surrounded by residential and agricultural development, the property would not be subject to wildfire or heavy brush fire.

2.12 Air Quality

There are no major air pollutant generators, including incinerators, quarries, manufacturing plants, or mass drying beds in the project area. The surrounding lands are comprised primarily of rural residential homes, agricultural lands, grazing pastures, and open space.

Development of the storage tanks will involve earthwork for foundation and finish grade, placement of water lines, and construction of concrete structures. Installation of the drilling rig will consists of minimal site alterations. Together, the tank construction and drilling operation would generate temporary fugitive dust. The quantity of dust from the construction work, however, is expected to be minor and dust control measures are expected to be in place to reduce potential impacts to surrounding properties.

2.13 Acoustical Environment

Major sources of sounds in this rural/agricultural community include predominantly low-volume vehicular traffic, activities from nearby rural residences, ranches, and agricultural properties, play activities from the adjacent County park, and sounds from wildlife.

The dominant source of noise during project construction would likely be the construction equipment involved in site clearing and grading, deep shaft drilling, installation of pipelines, and construction of the water tank's foundation and structure.

During the operational stage of the storage tanks, project impact would be minimal except when facility repair or maintenance is performed. These operations are typically minor and do not generate significant noise. Operations of the water treatment system will require a pump to draw water through the system's filter membranes and backpulse the membranes on a periodic basis. Compressed air is used to scour the membranes. Plant air can be used if available, or an optional air compressor can be used to handle this duty.

When the exploratory well is installed, pump tests will be conducted to determine the availability of water and the capacity to draw from the resource at a sustainable rate over a long period of time. Noise from the drilling operations and pump testing procedures are expected to occur over a six month period during regular day-light working hours. Noise levels are expected to be in the same general range as the other construction activities on the property.

2.14 Scenic Resources

The visual characteristics of the project area could be described as rural, agricultural, and open space with narrow, paved country roads. In the upland areas, rainfall is abundant and the

landscape is predominantly green. Distant views toward the west include open space, pasture lands, shrub lands, forest lands, and mountains.

The project site is located at the corner of Kawaihau Road, Kapahi Road, and Kaapuni Road. The new tanks will be visible from the three County rights-of-way. The appearance of these tanks, however, will be shorter than a typical storage facility of the combined size. The two 0.5-MG reservoirs each will be approximately 72 feet in diameter and 30 feet in height. The site will be landscaped and will include indigenous plants to screen the new facility.

2.15 Archaeological Resources

In June of 2004, an archaeological study was conducted by Cultural Surveys Hawaii, Inc. (CSH) on two sites in Kapaʻa: one at the Makaleha Tank site at elevation 510 feet and the other at the project site (see Appendix D). The study included historical research of archival sources, historic maps, Land Commission Awards, and previous archaeological reports, to determine the history of land use in the area and if archaeological sites have ever been recorded on or near the property. The study also included a field inspection to identify any surface archaeological features and an assessment of potential impacts to such sites.

The study's findings indicated there are no archaeological features on the property. CSH recommended that no further historic preservation work is necessary for the area. The State Historic Preservation Division (SHPD) of the DLNR reviewed the area and determined that improvements to the site will have "no effect on historic properties".[2] Considering that underground cultural deposits may still be a possibility, the County is committed to the responsibility of stopping work in the immediate area of any unexpected discovery during construction, and promptly notifying the SHPD. Work will not resume in the construction area until specifically authorized by the SHPD.

2.16 Cultural Resources

In addition to the archaeological survey, a cultural impact assessment (CIA) was conducted (see Appendix E) and included in the CSH study. Historic research was carried out to identify cultural resources or traditional cultural practices associated with the area.

Hawaiian traditions that centered on Kapaʻa in pre-contact times suggest the significance of and association with the aliʻi. A survey of traditional mythological literature shows that Kapaʻa was prominently associated with some of the most famous legendary and historical figures including Maui, Kawelo, Mōʻikeha, Maweke, Palila, Pākaʻa and Kanaka Nunui Moe. The 14 documented heiau of Kapaʻa is a testament to both the substantial population and social/political/religious importance of the ahupuaʻa.

Historic research has also provided information on sugar cane cultivation, settlement patterns, rice cultivation, the opening of Hawaiian Canneries, and the construction of the Ahukini Terminal & Railway Company in 1820.

---

[2] SHPD Letter, dated February 25, 2010.

Previous research of the region shows that the majority of archaeological studies were conducted within urban Kapaʻa near the shore and that little data was obtained for more inland areas.

Throughout the course of the CIA preparation, efforts were made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about traditional cultural practices that specifically related to the project area. The effort was made by letter, e-mail, telephone, and in-person contact. From an attempt to contact 21 parties, 4 of the 6 individuals who responded had no cultural concerns. Two of the organizations contacted (the Kauaʻi/Niihau Island Burial Council and the Kauaʻi County Planning Department, Historic Preservation Review Commission) indicated an intention to discuss the matter at their September 2004 meetings. No comments or concerns have been received from those agencies by CSH.

In consideration of the above, CSH believes the proposed project will have minimal or no impact on Hawaiian culture, its practices, or its traditions.

3 SOCIO-ECONOMIC SETTING

3.1 Socio-Economic Background of the Region

The Wailua-Kapaʻa region can be identified by three geographic subareas: the coastal urban area of Wailua-Waipouli Resort and Kapaʻa town, the inland homestead lands of Wailua, and the mauka homesteads of Kapaʻa.

The Wailua-Waipouli Resort and Kapaʻa town area has become a resort and town center with hotels and shopping complexes for visitors as well as a business and shopping district for local residents. Wailua-Kapaʻa is the largest populated area on Kauaʻi. Its growth has spurred the development of support businesses and services and created traffic needs that justify major roadway improvements. The population of this region is currently about 17,300.[3]

The lands mauka of the coastal urban areas were subdivided for agricultural homesteads during the days of the Territorial Government. Agriculture was the primary activity, but with the economy and culture changing and the area is now more in residential use.[4] Home building continues to increase as small land holdings are divided up, contributing to the increase in Wailua-Kapaʻa's population. Local roads and water systems, as a result, are not keeping up with the new land uses, which in turn are affecting the provision of adequate access and fire protection for the community.

3.2 Economic Impacts Assessment

Installation of the new tanks for the Wailua-Kapaʻa Water System will help fulfill the need to upgrade the existing system and remove some of its storage capacity deficiencies. During the construction phase of the project, short-term economic impacts would be generated, including

[3] U.S. Census, 2010.

[4] County of Kauaʻi, Planning Department. November 2000. *Kauai General Plan.*

the mobilization of labor in the construction industry and its impact and multiplier effect on the rest of the island economy.

During the tanks' operational stage, repair and maintenance on the storage facilities will be administered by existing DOW staff. Over the long-term, operations of the project will contribute to the continued economic stability of the region's ongoing agricultural and small business activities. Having a solid economic base will help maintain strong personal and business incomes and produce continued property and sales taxes for government revenues.

3.3 Social Considerations

The proposed action is not considered a land use that generates direct social impacts. Its purpose is to provide a utility that serves and supports land uses, such as residential homes, commercial centers, agricultural lands, public facilities, institutions, etc. The proposed twin tanks are not a new source of water, but a supplemental storage facility to improve the County's capacity to accommodate anticipated water demand during prolonged peak day periods in high usage seasons, have sufficient reserve for fire flow protection needs, and maintain adequate control over water pressure flow within the respective pressure zones.

The exploratory well is presently being programmed for investigative purposes. When the pump tests are completed and a decision is made to place the well into long-term use as a production well, another EA will be prepared to assess the long-term impacts of groundwater withdrawal on the regional aquifer, impacts on the Wailua-Kapaʻa community, and impacts on the surrounding natural environment.

The focus of public concerns on the twin tanks, if any, would be on impacts generated during construction, particularly if there would be any fugitive dust, sedimentation from stormwater runoff, construction noise, and deterioration of water quality in nearby streams. During the project's operational stage, there would be primarily monitoring, maintenance, and repair activities on the tanks. Overall, these activities would have negligible impact on the environment.

4 PUBLIC FACILITIES AND SERVICES

4.1 Circulation and Traffic

Kawaihau Road provides access to the project site from Kūhiō Highway. It is the main access through the uplands of Kapaʻa Homesteads.

Kaapuni Road provides an alternative route to the project site from Kapaʻa town. Both Kawaihau Road and Kaapuni Road are two-way, paved County rights-of-way. Kaapuni Road connects with Kawaihau Road at a T-intersection at the western corner of the project site. Traffic signs control vehicular movement through the intersection.

Approximately 350 feet to the east of the Kaapuni Road – Kawaihau Road intersection and directly across the tank site, Kapahi Road connects with Kawaihau Road at a T-intersection.

Traffic movement through this intersection is controlled also by traffic signs with vehicles on Kawaihau Road having the right-of-way.

The typical section of these rural roads consists of a road pavement for two lanes (bi-directional) and grass shoulders. In the shoulder area of Kawaihau Road fronting the project site is an asphalt-concrete pedestrian sidewalk. At the curve of Kawaihau Road, a steel guardrail is installed as a safety guard for pedestrians on the sidewalk.

There is no sidewalk on the Kaapuni Road shoulder fronting the project site. The shoulder area presently contains a grass drainage swale.

The posted speed limit is 25 miles per hour (mph) on Kawaihau Road and Kaapuni Road. The volume of traffic on Kawaihau Road in the project area is low and reflective of the agricultural/rural character of the upland area.

4.2 Water, Sewer, Electricity and Telephone

The Ornellas Tank presently connects with the Wailua-Kapaʻa Water System which serves the Wailua-Waipolu Resort area, Wailua Houselots, Wailua Homesteads, Kapaʻa town, and Kapaʻa Homesteads. As described in the Background Section of this document, sources for this water system have been developed throughout the region. In the project area, distribution lines that serve the community are located along Kawaihau Road, Kaapuni Road, and Kapahi Road (see Figure 11). These lines provide water service to homes and properties below the existing water tank. Fire hydrants are connected to these lines along the County rights-of-way including one located within 400 feet of the property.

There are no public wastewater collection and disposal systems in the project area. Only private individual wastewater systems are presently in use.

Overhead electrical and telephone lines are located on utility poles along Kawaihau Road, Kapahi Road, and Kaapuni Road. Electrical power for the DOW facility is provided by Kauaʻi Island Utility Cooperative (KIUC), and telephone service is provided by Hawaiian Telcom.

4.3 Solid Waste

Debris that is generated from the project construction site will be removed from the property and hauled to the County landfill in Kekaha.

No solid waste will be generated during the facility's normal daily operations, except for wastes that are produced by DOW's periodic repair and maintenance activities. The quantity of these wastes will be nominal and infrequent and will be removed from the site by DOW maintenance personnel.

4.4 Public Facilities and Services

The nearest fire station is located in Waipouli, which is approximately four miles from the project site via Kaapuni Road. A new fire station is being constructed in Kapaʻa along Kuhio

Thu, 08 Sep 2011 – 11:57am
M:\Kapaa Homesteads Tank\2004740100 Kapahi Tank\CAD\Figures EA\FIGURE 11.dwg

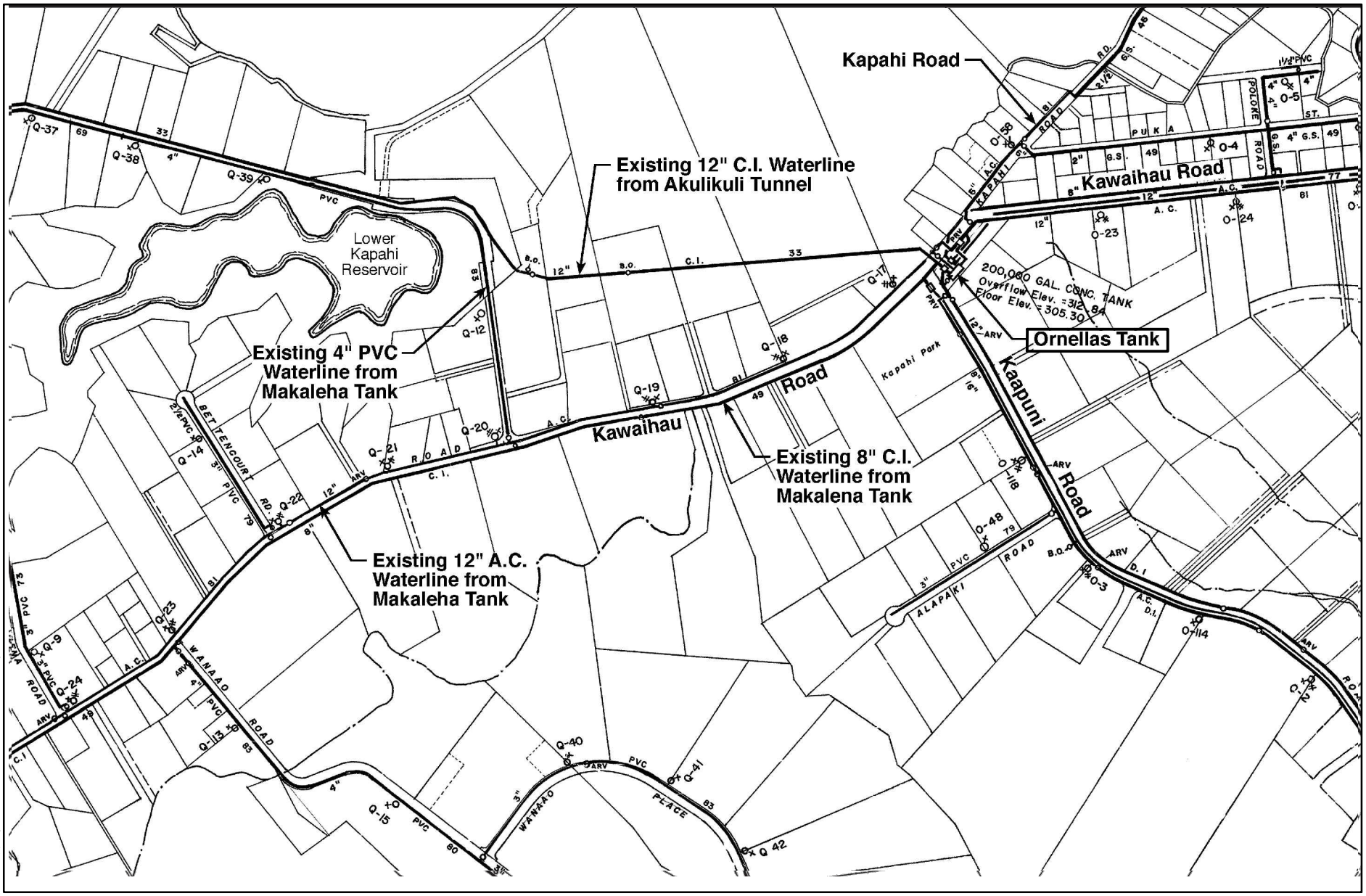


Figure 11
COUNTY WAILUA-KAPA'A WATER SYSTEM IN PROJECT VICINITY

KAPAHI HOMESTEADS STORAGE TANKS AND EXPLORATORY WELL
KAWAIHAU, KAUAI

Highway, approximately three miles from the DOW facility via Kawaihau Road. The response time for emergencies at the project site would be reduced with the completion of the new station.

Police headquarters is located in Līhuʻe and a district substation is located in Kapaʻa town approximately six miles from the property. Although regular police surveillances do not occur in the project area, police service is provided to all locations on the island. Since the project site is located along upper Kawaihau Road, a long response time to the property can be anticipated.

Mahelona Medical Center, located in lower Kawaihau adjacent to Kapaʻa High School, provides long-term care service with 70 beds and a small, 9-bed psychiatric ward. There are no emergency services at the Center, so such services would be obtained from the Wilcox Hospital in Lihue.

Other public facilities in Kapaʻa include elementary and middle schools, a public library, parks, beach parks, a refuse transfer station, a green waste diversion site, and a U.S. Post Office.

The County currently provides public bus service to the Kapaʻa upland area. A bus line runs along Kawaihau Road with a bus stop at the corner of Kawaihau Road and Kaapuni Road. Another stop is located on Kawaihau Road at the property's makai property line.

Across Kaapuni Road from the project site is Kapahi Park, a County neighborhood park. The large open play field includes play areas for baseball, soccer, and a basketball court. There are also playground apparatus and equipment for young children.

5 RELATIONSHIP TO PUBLIC LAND USE POLICIES

5.1 Hawaiʻi State Plan

The Hawaiʻi State Plan was established by State law to serve as a guide for the future long-range development of the state. It is intended to identify the goals, objectives, policies, and priorities for the state government to: (1) provide a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources; (2) improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and (3) establish a system for plan formulation and program coordination to provide for an integration of all major state and county activities.

The relevant objectives of the State Plan on water and for the Wailua-Kapaʻa service area are:

- assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use, and
- support water supply services to areas experiencing critical water problems.

5.2 State Land Use Law

The State Land Use District Maps, administered by the State Land Use Commission, designate the project site in the Agricultural District. The proposed action is a permitted land use in this designated district.

5.3 State Environmental Policy

The proposed action is consistent with the State Environmental Policy, as stated in Hawai‘i Revised Statutes (HRS) Chapter 344, to “enhance the quality of life” by “creating opportunities for the residents of Hawai‘i to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments.” The proposed action will provide the necessary utility and infrastructure to support such economic opportunities, allowing them to flourish and establish themselves in the county.

Further, the following guidelines of the State Environmental Policy relate to the management of the proposed project:

- Encourage management practices that conserve and fully utilize all natural resources.
- Encourage management practices that conserve and protect watersheds and water sources, forest, and open space areas.

5.4 Kaua‘i County General Plan

The General Plan was updated and adopted by the County of Kaua‘i in November 2000. The plan sets forth policies that govern the future development of the county. It is intended to improve the physical environment of the island and the health, safety, and general welfare of its people.

The General Plan recognizes that the DOW needs to continually improve its water system to accommodate the increasing demand for the island’s precious resource. One such improvement includes providing additional storage facilities for its water system.[5]

The Land Use Map of the General Plan designates the project area as “Residential Community.” One of the intent of the Residential Community designation is to include lands that would be used predominantly for low- to high-density housing in towns and other residential areas. Densities for these residential areas should be one to 20 units per acre. They apply to locations throughout the island and include lands previously designated “Urban Residential” and “Rural Residential” as well as outlying areas such as Wailua Homesteads, Omao, and Anahola. Residential Community may be used also for commercial and industrial businesses, government facilities, and institutions.

The proposed action will support the County’s policies on Residential Community designation. Further, the new facility will be located adjacent to an existing water tank and will not affect any rare, endangered, or threatened wildlife or botanical habitat. The site has been surveyed and there

[5] Sections 7.4 and 6.2.3.1 of the Kauai General Plan.

are no recorded archaeological features. The proposed action will be designed to maintain the overall character of the land and account for any potential soil erosion or flooding condition.

Overall, the proposed action is a utility that is designed to serve the public and support its basic needs.

5.5 Kapa‘a-Wailua Development Plan

Adopted in 1975, the Kapa‘a–Wailua Development Plan sets forth the County’s development guidelines for the Kapa‘a–Wailua region. It establishes specific provisions that are more detailed than the islandwide General Plan.

Although the project site is located in the Development Plan’s study region, it is not specifically covered by the plan’s land use provisions. The primary focus of the plan is in the region’s built-up areas. A description of needed water system improvements, however, is provided through a reference to *A General Plan for Domestic Water/Island of Kaua‘i*, which was prepared by the State DLNR in cooperation with the County Department of Water in 1972. The County DOW currently uses the *Water Plan 2020* as its guide for water system improvements on the island.

5.6 Water Plan 2020

The *Water Plan 2020* is an update of DOW’s previous long-range water system improvement plan for Kaua‘i. It is a 20-year comprehensive planning document that includes the objective to ensure that the department continues to provide safe, affordable, and sufficient drinking water to the island community. The plan reviews existing facilities and service standards, and provides an outline for new and replacement facilities, a capital improvement program for the next 5 to 7 years, a financial plan, and a water rate study.

The *Water Plan 2020* currently identifies a need for an additional 2,233,000 gallons of storage by the year 2020 for the Wailua-Kapa‘a service area, based on current deficiencies and projected demand. The present storage capacity of the Wailua-Kapa‘a System is 3.825 MG. Thus, the proposed action is part of DOW’s effort to meet the present and near-term storage requirement for the area.

5.7 Kaua‘i County Zoning Ordinance

The Comprehensive Zoning Ordinance (CZO) of the County of Kaua‘i regulates land use on the island of Kaua‘i. Land use regulations consist of development standards, application procedures, and criteria for granting permits and other approvals. The CZO currently designates the project site as Agricultural which permits the proposed use with a Class IV Zoning Permit and Use Permit. The design of the new facility will comply with the development standards as set forth in the CZO. Should the maximum building coverage for the project site be exceeded, a variance approval will be sought from the County Planning Commission.

5.8 Special Management Area

The proposed action is located outside of the Special Management Area (SMA) and, as a result, is not subject to the SMA Rules and Regulations of the County of Kaua‘i.

5.9 Required Permits and Approvals

As a public facility in the County’s Agricultural zoning district, the proposed action will require a Class IV Zoning Permit and Use Permit from the County of Kaua‘i.

The new facility will occupy a site less than one acre in size, but may have discharges to a nearby stream. If that occurs, a National Pollutant Discharge Elimination System (NPDES) general permit application will be submitted to the State Department of Health (DOH).

For the construction of the twin tanks, a grading permit will not be required. As a County agency, the DOW will apply its grading standards in the project’s site preparation and grading work.

A Well Construction Permit will be required from the State Commission on Water Resource and Management for the exploratory well.

5.10 Compliance with the DWSRF Program Requirements

The proposed project may be funded in part by federal funds through the State’s Drinking Water State Revolving Fund (DWSRF) Program. This low-interest loan program was established to promote projects that help prevent contamination through source water protection and enhanced water system management. This EA includes the environmental information required for compliance with the DWSRF Program.

5.10.1 Crossing-Cutting Federal Authorities

The following sections address the proposed action’s relationship to the federal “cross-cutting” authorities.

5.10.1.1 Archaeological and Historic Preservation Acts

An archaeological-cultural study was conducted (see Appendices D and E) on the project site in 2004. Its findings and recommendations indicate that the proposed action is consistent with the Archaeological and Historic Preservation Act of 1974, as amended. Although no archaeological sites were identified on the property, the DOW is committed to the procedures that require the temporary stoppage of all work in the immediate area, should any archaeological deposit be uncovered during construction. A project archaeologist will evaluate the significance of the feature and make recommendations to the State Historic Preservation Division (SHPD). The SHPD will subsequently determine what mitigative measure or treatment is required before construction is permitted to resume.

5.10.1.2 Clean Air Act

The U.S. Environmental Protection Agency (EPA) compares concentrations of criteria pollutants to established National Ambient Air Quality Standards (NAAQS) to evaluate and characterize air quality. Criteria pollutants at the national level include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter, ozone (O_3), and lead (Pb). Based on ambient air monitoring data, the EPA has classified the island of Kaua‘i and the state as being in attainment of federal standards. Pollutant concentrations within the islands also comply with the more stringent state standards.

The proposed action will not have long-term emissions due to the nature of its operations. Short-term construction-related emissions, however, such as fugitive dust, would be generated and subject to compliance with the provisions of the Hawai‘i Administrative Rules (HAR) 11-60.1. These local provisions are designed to control emissions of substantial size and would require that fugitive dust be minimized. Hence, no significant impact on air quality is expected to occur.

5.10.1.3 Coastal Zone Management Act

The Hawai‘i Coastal Zone Management (CZM) Program was promulgated in 1977 as a result of the Federal Coastal Zone Management Act of 1972. Jurisdiction of the CZM Program encompasses the entire state including its uplands, coastal plains, and coastal waters. The policies of the CZM Program on the environment relate to recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources.

Other elements of the program are a permit system to control development within the SMA and the state’s shoreline setback area, a Hawai‘i Ocean Resources Management Plan to provide a comprehensive, integrated ocean policy and management framework for Hawai‘i’s marine waters, and a federal consistency program that requires all federal activities, permits, and financial assistance to be consistent with the Hawai‘i CZM Program.

Located at the 305-foot elevation of the Kapa‘a Homesteads, the proposed action is more than two and one-half miles from the shoreline. The town of Kapa‘a is situated on the coast below the project site.

The remote location of the proposed action will involve no construction or changes to land use on or near the shore. It will not interfere with any existing beach accesses, negatively affect significant historic or prehistoric resources, obstruct coastal scenic and open space resources, nor impair any valuable coastal ecosystems.

The proposed action will include opportunities for public participation, via the provisions of HRS Chapter 343, will allow the State to implement its ocean resources management program, and is consistent with the objectives and policies of the Hawai‘i CZM Program.

5.10.1.4 Endangered Species Act

Floral and faunal species on the project site have been identified as typical or common to the island. None of the species are identified as rare, endangered or threatened.

5.10.1.5 Environmental Justice, Executive Order 12898

The project site is located in upland Kapa‘a which is occupied primarily by rural, agricultural, and ranching activities. In the region’s mid and lower elevations, resident occupation is denser and more predominant.

All water customers in the Kapa‘a area, regardless of ethnic groups or income group, will benefit from the proposed improvements.

The proposed tanks will be located on an existing DOW tank site and will not displace any existing residences or structures. The new improvements will be designed to minimize any adverse effects on the human environment.

5.10.1.6 Floodplain Management, Executive Order 11988

The proposed action is located more than two and one-half miles from the ocean and away from any rivers or streams. FEMA’s Flood Insurance Rate Maps confirm that the project site is outside of any major riverine floodways or floodplains.

5.10.1.7 Protection of Wetlands, Executive Order 11990

Results from a geotechnical study indicate that there are no wetlands on the property. Further, the site is covered predominantly by introduced or non-native plants.

5.10.1.8 Farmland Protection Policy Act

The proposed action calls for construction and operation of two water storage tanks on an unoccupied section of an existing water tank parcel. No farmlands or agricultural properties are involved.

5.10.1.8.1 Fish and Wildlife Coordination Act

The proposed action will not result in the alteration of any stream or natural water feature nor any critical wildlife habitat.

5.10.1.9 National Historic Preservation Act

During an archaeological survey of the project site by Cultural Surveys Hawaii in June 2004, no archaeological features were identified. In a letter dated February 25, 2010 from the State Historic Preservation Division (SHPD), the State agency, which is responsible for compliance with the National Historic Preservation Act, concurred that there are no historic properties on the project site (See Appendix A).

5.10.1.10 Safe Drinking Water Act

The U.S. Safe Drinking Water Act (SDWA) is the primary federal law that ensures the acceptable quality of our drinking water. Under this Act, the EPA sets standards for drinking

water quality and oversees the states, local municipalities, and water suppliers who implement those standards.

One of the purposes of the proposed action is to upgrade the existing DOW system in Kapa‘a to meet the current and projected demand for water in the community. In providing an efficient and reliable delivery system for the water, DOW must be in compliance with SDWA and the State DOH drinking water quality standards.

During the project construction stage, the two 0.5-MG storage tanks will be cleaned, tested for leaks, and disinfected in accordance with the Water System Standards of the DOW. Discharge of the effluent water will comply with DOH's NPDES requirements. No discharge will be made directly to State waters or to any injection well.

5.10.1.11 Wild and Scenic Rivers Act

No streams, watercourses, or other identifiable water features occupy the project site. Kapa‘a Stream, which is located approximately 2,000 feet to the north, is not part of the National Wild and Scenic Rivers System, and is therefore, not subject to the protection of the Wild and Scenic Rivers Act.

Discharges from overflows and tank cleaning will seldom occur, and will be conducted in a manner that complies with all NPDES Permit conditions. Precautionary measures will be taken to assure that the quality of any nearby streams are not impaired or deteriorated as a result of the proposed action.

6 SUMMARY OF MAJOR IMPACTS

6.1 Construction Methodology and Impacts

6.1.1 Reservoir Construction

Heavy equipment and construction vehicles will be used during the site preparation stage of the project construction. The site presently contains overgrown groundcover which will require grubbing, clearing, and removal. Excavation and grading equipment will be used to prepare the site foundation for the proposed facilities. Geotechnical reports indicate that the foundation for the proposed tanks will require 3-foot diameter, grout-filled shafts to depths of approximately 60 feet for structural support. Coring for the shafts would be performed by mobile drilling rigs. Rebar cages would then be installed in each shaft and grout would be pumped into the hole to form the solid base. The finish floor elevation of the tanks will be at elevation 307 feet sitting atop the grout-filled deep-set shafts.

Alternatively, micropiles may be used in lieu of grout-filled shafts if their construction costs are more favorable. Micropiles are approximately 7 inches in diameter and would be installed to approximately the same depths as the grout-filled shafts. A drilling rig would be similarly set up on the property to drill the deep shafts for the micropile placements.

It is anticipated that construction of the new tanks will involve the use of such heavy equipment and construction vehicles as a flatbed truck, concrete truck, asphalt concrete truck, backhoe, loader, dump truck, boom-mounted truck, and dozer. Dust and noise are expected to be generated during the site preparation and tank construction stages. Groundwater is not expected to be encountered while drilling the deep-set shafts. Construction equipment will be stored on-site to minimize off-site mobilization which would include the transferring of equipment on the local roadways between the construction yard and project site. Once the tanks are completed, the new facility will be cleaned, tested, and disinfected before they are placed into operation.

Connection of the water lines from the storage facilities to the existing DOW distribution lines and installation of the project's new drain line will involve work within the rights-of-way of Kawaihau Road and Kapahi Road. The new lines will occur primarily under the road pavement, not the shoulder area, and therefore will impact traffic.

Landscaping will occur as the last stage of construction, and then all construction debris and waste materials will be removed from the construction area.

Potential runoff and sedimentation from the construction area to adjacent properties are not likely to occur during heavy rainfall. Best management practices or BMPs will be employed to retain potential runoff within the project site. A description of the potential measures is provided in Section 7.1.1 of this document.

6.1.2 Exploratory Well Installation

The drilling operation, either by the percussion or reverse circulation rotary, as described in Section 1.3.2, will occur prior to the construction of the storage tanks. The drilling operation is expected to take approximately six months to complete. Cuttings and slurry produced from the drilling operations will be deposited in on-site sedimentation basins. The subsequent pump testing operation would take approximately one week to be completed.

The anticipated impacts from the well construction and testing are expected to be temporary and minor. The drilling operation will be performed by a drilling rig run by a diesel engine. Noise levels are expected to be in the range of other construction activities on the property.

Only minor fugitive dust is expected to be generated and to occur primarily during the drilling rig installation and other equipment setup. Despite the anticipated low volume of dust, dust control measures will be employed, if needed.

Pump testing will involve withdrawal of continuous volumes of water from the aquifer over a four- to five-day period. Discharging this water to the local drainage system will be required. A new 12-inch diameter drain line along Kaapuni Road will be installed prior to the pump tests. The line will extend from the tank site to an existing drainage or irrigation ditch approximately 1,400 feet from the project site. It will be located primarily under the road pavement section of the County right-of-way and, as a result, will require trenching, pipeline installation, backfilling, and repaving of the road area. During this construction period, the construction contractor will be required to implement a traffic management plan that would maintain traffic flow through the construction area in a safe and reasonably undisruptive manner.

6.2 Operation Impacts

6.2.1 Reservoir Operations

The proposed action calls for un-manned fixtures that do not have active operational activities, except for periodic monitoring and maintenance. Traffic impacts from project operations would, therefore, be minimal. Other project impacts would be primarily visual, but minor in scale, particularly when landscaping will be provided to screen the general view of the new tanks.

Runoff from the property will be directed to the yard area of the tank site or to a sedimentation basin within the property for general ground percolation. On occasion, overflows from the tanks will be directed or discharged through the site's washout/overflow line to an existing off-site drainage system. No discharge will be made directly to an adjacent private property or to existing State waters.

Electrical power from the island's power grid will be required to operate the DOW's water treatment system.

6.2.2 Well Operations

Once the borehole of the well is capped, the exploratory well will be in an idle state until a decision is made to convert the well for production or for monitoring of the region's groundwater. As an idle well, there will be no generated impacts to the surrounding environment. Should the well later be converted into a production well, another EA will be prepared to assess the probable short-term and long-term impacts of the converted well on the aquifer's groundwater resource and the region's land use and resident population.

7 PROPOSED MITIGATION MEASURES

7.1.1 Mitigation Measures for Reservoir Construction and Operations

Mitigation measures will be employed to minimize or prevent potential impacts that might be generated by the proposed action. To address potential runoff and sedimentation on the adjacent properties during construction, the contractor will develop a best management practices (BMP) plan for County review. The plan will describe how on-site generated runoff and sediment movement will be controlled and prevented from entering other properties, and how the applicant will implement the plan. The plan will not be approved unless the applicant first meets all of the grading standards that are designed to safeguard life and limb, protect property, promote public welfare, and preserve and enhance the natural environment including but not limited to water quality.

Potential mitigation measures for controlling runoff and sediment movement include the development of sedimentation basins, cut-off swales and ditches, rock filter berms, hydromulching, and wattles. These may be included in the BMP, if appropriate, and will be submitted to the County for review.

Discharges from overflows and tank cleaning will seldom occur, and will be conducted in a manner that complies with all NPDES Permit conditions. Precautionary measures will be taken to assure that nearby streams are not directly impaired or deteriorated by the proposed action.

Groundwater is not expected to be encountered during the project's grading, excavating, and deep-shaft drilling (for foundation support) operations. Hence, it would not be necessary to address concerns regarding dewatering and discharging to State waters.

In order to control dust generated by earthwork on the construction site, mitigation measures such as the installation of dust screens, covering of dirt stockpiles, and sprinkling of water on exposed dirt areas, may be employed.

Construction noise will be generated but temporary and restricted to daylight hours and regular weekdays. The construction contractor will comply with the noise control requirements of HAR Chapter 11-46, Community Noise Control, and their compliance will be part of the project's construction contract. Potential noise from the operations of the water treatment system will also be subject to State Community Noise Control regulations.

According to the project archaeologist, no archaeological sites were found on the property. As a result, no further archaeological work or assessment is necessary. Should any unexpected archaeological features be uncovered during construction, all work within the immediate area of the find will be halted and the SHPD will be contacted for proper treatment. Work will not resume in the affected area until authorized by the SHPD.

All solid waste or debris generated by the construction work will be collected and hauled away to a County-approved landfill or authorized commercial disposal site.

The planned landscaping of the tank site will enhance the visual appearance of the public facility, but will also soften the visual effect of the two large storage tanks.

A traffic management plan for the water line and drain line construction along Kawaihau Road and Kapahi Road will be prepared and submitted to the County for review and approval. The plan will include traffic controls and management provisions designed to maintain safe vehicular passage through or around the project construction area.

7.1.2 Mitigation Measures for Exploratory Well Construction and Testing

Although project-generated noise is expected to be at or within acceptable levels, noise reduction procedures would still be available should the construction contractor choose to employ them as a precautionary measure. These procedures would include: the provision of a temporary baffle enclosure for the diesel generator, use of mufflers and other noise attenuation devices on power equipment, use of landscape screens, and strategic location of noise generators within the project site.

Fugitive dust control measures that would be available for the reservoir construction would also be available for the drilling rig and well construction.

Dirty emissions from the portable generator may be removed or minimized by the use of cleaner burning fuel or better maintained equipment. Mufflers on the generator have filters than can scrub emissions as they pass through its exhaust system.

8 ALTERNATIVES CONSIDERED

8.1 No Action

If the proposed action were not implemented, the site would remain vacant and unproductive. The present water system would continue to under serve its customers, and the system's deficiency would continue to persist as the service area's population grows. In particular, the system in the Kapa‘a sector would lack adequate storage reserve to meet maximum day demand and fire flow requirements. An inadequate storage system may result in an interruption of service during peak day demand through the highest usage season and inadequate supply during severe fire emergencies.

No exploration of potable groundwater at the project site would trigger the search for other water resources in the region or a termination for now of any further investigation of potential sources to serve the Kapa‘a region. Additional discussions on alternative sites are provided in Section 8.4, Alternative Location. Termination of any search for potential sources in the project area may result in an exploration of other ideas or concept to bring water into the region; whether that calls for piping water from another water system or region, restricting further residential growth in Kapa‘a, developing permanent water conservation practices, and/or establishing a water re-use program or dual-water system consisting of potable water for domestic use and brackish water for irrigation, washing activities, and wastewater flushing.

The concept of constructing a transmission line to bring water into the project area from another aquifer may be a major endeavor that will require a substantial budget. Funding for this endeavor would require a well-established financial source and likely assistance from the State or Federal government.

Restricting further residential growth in Kapa‘a would be counter-productive to the implementation of the County General Plan which has officially adopted long-term growth policies for the region. Changing these policies would require amending the General Plan and obtaining approval from the County Council.

Implementing water conservation practices, if voluntary, would involve heavy ad programs or, if mandatory, changes to government rules and regulations. Information on conservation measures and other public outreach material are listed and available on DOW's website. Engaging the community to fully participate in the County's water conservation program may take time and initially have limited effects. Establishing mandatory conservation practices may require a long legislative or agency review and approval process for setting the changes.

A dual-water system will initially require a feasibility study, a policy change, financing, and then construction. It would require a serious commitment by the County to implement at a large scale to have any significant results.

8.2 Increasing Existing Tank Size

Although increasing the size of the existing tank is an alternative, it is usually dismissed from consideration. Existing tanks are typically designed to structurally support its original holding capacity. Further, it would be a very complex operation to undertake a tank expansion while

continuing to serve the system's customers and maintain a high water quality in the storage facility. These problematic uncertainties raise risks which are not worthwhile to the DOW.

8.3 Alternative Tank Configurations

Different designs for the 1.0-MG tank were considered for the proposed project. The small, narrow configuration of the project site presented a constraint on the design for the 1.0-MG facility. Several designs were considered including a circular-shaped tank and a multi-sided shaped tank. Some designs encroached into the adjacent property.

Also considered were tanks with floor elevations below existing grade. The final design of two circular 0.5-MG tanks is the result of a fittable layout on the property. As a bonus, the final design will also have visual benefits as the overall height of the new tanks will be less imposing.

8.4 Alternative Location

8.4.1 Storage Tank Location

An alternative site to the north of the project site near the Kapa‘a Stream and in the same pressure zone was evaluated and found to be physically unfeasible. The State-owned land contained topographic constraints that would have resulted in a costly development. Other vacant State or County sites in the same pressure zone were investigated but were not available.

8.4.2 Exploratory Well Location

In the well site investigative study by Tom Nance Water Resource Engineering, six sites were reviewed and evaluated. Three sites were in upland locations around Kapa‘a Homesteads and three sites were in the lower elevations of Kawaihau. The sites in the lower elevations were good potential candidates because they were in an area occupied by very productive wells. Unfortunately, a well in the lower elevations would pump directly into the distribution system rather than into a nearby storage tank. In effect, there would be no storage opportunity for the water to serve as a reserve for peak period demand and fire flow emergencies.

The three upland wells were all at existing tank sites which have adequate room for a potential well. The Kulana Tank site (elevation 313'), which is planned to be dedicated to DOW, will be occupied by a 0.25 MG tank. If tests of an exploratory well on this site prove successful, a production well could be developed. However, there would be limited opportunity to expand or construct a supplemental storage tank on the smallish property to accommodate a full operational production well.

The Stable Tank site is located in the lower pressure zone at elevation 214'. It has an existing 0.20 MG tank that is planned for demolition and replacement with a 1.0 MG tank. Sufficient space is available on the site for a well and control building.

The present project site is located in the 313' pressure zone and occupied by the existing 0.2 MG storage tank. There is sufficient space for a well and control building as well as a 1.0 MG storage tank. Development of a production well at this site would provide better distribution advantages

to service zones 313 and 214 than the Stable Tank site. Hence, the present project site was selected as the preferred site for the exploration well project.

9 PRELIMINARY DETERMINATION

This EA has preliminarily determined that the proposed action will have no significant adverse impact on the environment and that an Environmental Impact Statement (EIS) is not warranted. Therefore, a Finding of No Significant Impact (FONSI) is anticipated for this project.

10 FINDINGS AND REASONS SUPPORTING PRELIMINARY DETERMINATION

The following findings and reasons indicate that the proposed action will have no significant adverse impact on the environment based on the 13 criteria for significant impact as provided in Hawai‘i Administrative Rules 11-200-12.

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

Alternative plans in project location, size, and configuration were considered in determining the best design for upgrading and improving the Wailua-Kapa‘a Water System while minimizing or avoiding negative impacts on natural and cultural resources. The proposed action will not result in a significant loss or destruction of the project area’s natural or cultural resources.

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

The proposed action calls for the construction of additional storage facilities to supplement an existing storage tank at the 305-foot elevation of the Wailua–Kapa‘a Water System. No new or different land use is being proposed on the project site. The new facility will not require changes that would curtail the range of beneficial uses of the environment.

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

As demonstrated in Section 5.3, *State Environmental Policy,* of this document, the proposed action is consistent with the state’s long-term environmental policies and guidelines as expressed in HRS Chapter 344.

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

The proposed action is expected to sustain and improve the positive economic and social benefits that an adequate utility provides to a community. The economic stimulus associated with the construction of the proposed project, however, will not be substantial on the local economy as the size of the projected construction work will be moderate.

No negative effects from improvements to the water system are anticipated on the social welfare of the local community.

5) Substantially affects public health.

The proposed action would not result in the use of hazardous materials or construction methodology that could be detrimental to the public health and safety of the area residents. Existing State Department of Health regulations are in effect to protect water quality in the communities. Construction and operational noise will be minimized through compliance with HAR Chapter 11-46, Community Noise Control.

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

There will be no significant adverse social impact generated by the proposed action. The new water storage facilities will supplement an existing storage tank on the project site. They will not change the character of the immediate vicinity nor generate direct undue increased resident population. The unmanned storage tanks will not result in any notable long-term negative impact on traffic or overburden existing public facilities or services.

7) Involves a substantial degradation of environmental quality.

The proposed action is located in a developed environment surrounded by existing homes and public roads. The site is on an existing water tank parcel overgrown with common vegetation. Development of the site will be consistent with existing uses in the area and will not result in long-term degradation of the natural environment.

8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger action.

The proposed action is designed to supplement an existing storage tank. It is a one-time expansion not designed to spur the development of additional facilities on the property. No future on-site phases are planned and no further commitment to a larger action is being contemplated.

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

A review of existing natural resources in the project area indicates that no federally- nor state-listed rare, threatened, or endangered wildlife or flora species would be negatively impacted by the proposed action.

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

The anticipated impacts associated with the project construction, such as dust and noise, will be short-term and temporary. These impacts would be minimized by the implementation of mitigation measures in accordance with applicable laws, statutes, ordinances, and rules and regulations of the federal, state, and county governments. Erosion/sedimentation controls and best management practices will be employed to prevent construction-related runoff from impacting adjacent properties.

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

The proposed action will be located away from the shoreline area and outside of any major flood zones. Flooding from severe storms will not be a hazard to operators of the new storage facility, as regular operations of the new storage tanks will be unmanned.

12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.

The proposed action will have minor visual impacts on the general public. The new storage tanks each will be approximately 30 feet high and 72 feet wide. Configuration of the new storage facility into two smaller tanks will help reduce the overall mass and visual impact on motorists traveling on Kawaihau Road. Additionally, planned landscaping around the storage facility will provide a visual screen for the project.

13) Requires substantial energy consumption.

The proposed action will require nominal energy consumption for its operation and as a result will not result in a significant drain on power supply for the County.

11 REFERENCES

Bruner, Philip L. July 2004. Avifaunal and feral mammal survey.

County of Kaua‘i, Planning Commission. December 1973. *Kapaa–Wailua Development Plan.* Prepared by LMLI Architects/Planners, Inc. and Hawaii Real Estate Research, Inc.

County of Kaua‘i, Planning Department. November 2000. *Kauai General Plan.*

County of Kaua‘i, Department of Water. March 2001. *Water Plan 2020.* Prepared by R.W. Beck and CH2M Hill.

County of Kaua‘i, Department of Water. February 1990. *Kauai Water Use and Development Plan.* Prepared by R.M. Towill Corporation.

Cultural Surveys Hawaii, Inc. June 2004. Archaeological study.

Federal Emergency Management Agency. Flood Insurance Rate Map Community – Panel No. 150002 0130 D. Revised December 30, 1995.

State of Hawai‘i, Department of Land and Natural Resources. 1972. *General Plan for Domestic Water/Island of Kauai.*

State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management. October 1, 2007. *Water Resource Protection Plan (Public Review Draft).* Prepared by Wilson Okamoto Corporation.

State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management. February 2005. *2004 Hawaii Water Reuse, Survey and Report, Final.* Prepared by The Limtiaco Consulting Group.

State of Hawai‘i, Office of Governor. *The Hawaii State Plan.*

State of Hawai‘i, State Land Use Commission. No date. *State Land Use District Maps.*

U.S. Department of Agriculture, Soil Conservation Service. 1972. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.*

University of Hawai‘i, Department of Geography. *Atlas of Hawaii.* Second Edition, 1983 and Third Edition, 1998.

APPENDICES

Appendix A

Letters Received During Early Consultation Period

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O.BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD/SDWB

March 24, 2010

Mr. Glen T. Koyama
Belt Collins Hawaii, Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

SUBJECT: PROPOSED RESERVOIR ADDITION AND EXPLORATORY WELL
ORNELLAS TANK SITE; TMK: (4) 4-6-11:3
KAPAA, KAUAI, HAWAII
REFERENCE NO. 1-3074

The Safe Drinking Water Branch has reviewed the subject document and offers the following comments:

The proposed addition of the 1.0 MG reservoir and exploratory well at the Ornellas Tank site will serve the Kauai Department of Water Lihue-Kapaa water system (Public Water System 400). Hawaii Administrative Rules, Title 11, Chapter 20, *Rules Relating to Potable Water Systems*, requires the Kauai Department of Water to comply with the following: .

- Projects that propose development of new sources of potable water serving or proposed to serve a public water system must comply with the terms of Section 11-20-29 of Chapter 20. This section requires that all new public water system sources be approved by the Director of Health prior to its use. Such approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29.

- The engineering report must identify all potential sources of contamination and evaluate alternative control measures which could be implemented to reduce or eliminate the potential for contamination, including treatment of the water source. In addition, water quality analyses for all regulated contaminants, performed by a laboratory certified by the State Laboratories Division of the state of Hawaii, must be submitted as part of the report to demonstrate compliance with all drinking water standards. Additional parameters may be required by the Director for this submittal or additional tests required upon his or her review of the information submitted.

- All sources of public water system sources must undergo a source water assessment which will delineate a source water protection area. This process is preliminary to the creation of a source water protection plan for that source and activities which will take place to protect the source of drinking water.

- All projects which propose the establishment of a potentially contaminating activity (as identified in the Hawai`i Source Water Assessment Plan) within the source water protection area of an existing source of water for a public water supply should address this potential and activities that will be implemented to prevent or reduce the potential for contamination of the drinking water source.

For further information concerning the application of new source approval, source water assessment, or public water system programs, please contact Alain Carey of the Safe Drinking Water Branch at 586-4258.

Sincerely,

STUART YAMADA, P.E., CHIEF
Safe Drinking Water Branch
Environmental Management Division

AC:slm

c: Environmental Planning Office

Kauai District Health Office
3040 Umi Street
Lihue, HI 96766

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 15, 2010

Belt Collins Hawaii Ltd.
2153 North King Street Suite 200
Honolulu, Hawaii 96819-4554

Attention: Mr. Glen T. Koyama

Ladies and Gentlemen:

Subject: Environmental Assessment for Proposed Reservoir Addition and Exploratory Well Ornellas Tank Site

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Commission on Water Resource Management, Historic Preservation, Engineering Division, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

for Morris M. Atta
Administrator

2010.0531

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

1003NM03

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 26, 2010

RECEIVED
HISTORIC PRES. DIV.
DEPT. OF LAND &
NATURAL RESOURCES
2010 MAR -2 P 12: 16

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
~~x Land Division – Kauai~~ District
x Historic Preservation

FROM: Morris M. Atta
SUBJECT: Pre-Consultation for Environmental Assessment for Proposed Reservoir Addition and Exploratory Well Ornellas Tank Site
LOCATION: Island of Kauai
APPLICANT: Belt Collins

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 15, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

In the unlikely event that historic sites, including human burials, are uncovered during routine construction activities, all work in the vicinity must stop and the State Historic Preservation Division must be contacted at 692-8015.

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

Signed:
Date: 3/3/2010

DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

RECEIVED
LAND DIVISION
2010 MAR -4 P 2: 57

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 26, 2010

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
~~Div. of Boating & Ocean Recreation~~
x Engineering Division
~~Div. of Forestry & Wildlife~~
Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Kauai District
x Historic Preservation

FROM: Morris M. Atta
SUBJECT: Pre-Consultation for Environmental Assessment for Proposed Reservoir Addition and Exploratory Well Ornellas Tank Site
LOCATION: Island of Kauai
APPLICANT: Belt Collins

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 15, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed:
Date: 3/9/10

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LDMorrisAtta
RE: EAReservoirExploratoryWell
Kaua.501

COMMENTS

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ___.

(X) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone X. The Flood Insurance Program does not have any regulations for developments within Flood Zone X.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

( ) Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.

( ) Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.

( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.

( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: _____

( ) Other: _____

Should you have any questions, please call Ms. Suzie S. Agraan of the Planning Branch at 587-0258.

Signed: _____
CARTY S. CHANG, ACTING CHIEF ENGINEER

Date: 3/9/10

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
SUMNER ERDMAN
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIIKE, M.D., J.D.

KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

March 9, 2010

TO: Morris Atta, Administrator
Land Division

FROM: Ken C. Kawahara, P.E., Deputy Director
Commission on Water Resource Management

SUBJECT: Ornellas Tank Site Reservoir Addition and Exploratory Well Construction Pre-Consultation

FILE NO.: N/A
TMK NO.: (4) 4-6-011:003

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://www.hawaii.gov/dlnr/cwrm.

Our comments related to water resources are checked off below.

☒ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☐ 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.

☐ 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EPA as having high water efficiency can be found at http://www.epa.gov/watersense/pp/index.htm.

☐ 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.

☒ 6. We recommend the use of alternative water sources, wherever practicable.

☐ 7. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM:
Additional information and forms are available at http://hawaii.gov/dlnr/cwrm/resources_permits.htm.

☐ 8. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water.

☒ 9. A Well Construction Permit(s) is (are) required before any well construction work begins.

☐ 10. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 11. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 12. Ground water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 13. A Stream Channel Alteration Permit(s) is (are) required before any alteration(s) can be made to the bed and/or banks of a stream channel.

☐ 14. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is (are) constructed or altered.

☐ 15. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 16. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☐ OTHER:

If there are any questions, please contact Charley Ice at 587-0218.

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
2010 MAR 25 PM 2:34
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 23, 2010

Belt Collins Hawaii Ltd.
2153 North King Street Suite 200
Honolulu, Hawaii 96819-4554

Attention: Mr. Glen t. Koyama

Ladies and Gentlemen:

Subject: Environmental Assessment for Proposed Reservoir Addition and Exploratory Well Ornellas Tank Site

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to Land Division-Kauai District for their review and comment.

The Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene E Unoki
for Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION
2010 MAR 15 A 10: 18
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

February 26, 2010

MEMORANDUM

~~TO:~~ **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Kauai District
x Historic Preservation

From

TO ~~FROM:~~ Morris M. Atta Marlene
SUBJECT: Pre-Consultation for Environmental Assessment for Proposed Reservoir Addition and Exploratory Well Ornellas Tank Site
LOCATION: Island of Kauai
APPLICANT: Belt Collins

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 15, 2010.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

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

Signed: _____
Date: 3/08/10

2010 MAR 15

MAR 8 '10

DLNR KOLO POLO

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

February 25, 2010

Glen Koyama
Belt Collins Hawaii Ltd
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

LOG NO: 2010.0546
DOC NO: 1001NM57
Archaeology

Dear Mr. Koyama

SUBJECT: Chapter 6E-8 - Historic Preservation Review – County of Kauai
Pre-Consultation on DEA Proposed Reservoir Addition and Exploratory Well
Ornellas Tank Site:
Kapaa Ahupua'a, Kapaa District, Kaua'i, Hawai'i
TMK: (4) 4-6-011: 003

Thank you for the opportunity to review this application for new well, additional reservoir in an existing tank area. No known historic properties are on this parcel. We have determined that this project will have "**no effect on historic properties**".

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager

BERNARD P. CARVALHO, JR.
MAYOR

GARY K. HEU
ADMINISTRATIVE ASSISTANT

DONALD M. FUJIMOTO
COUNTY ENGINEER
TELEPHONE 241-4992

EDMOND P.K. RENAUD
DEPUTY COUNTY ENGINEER
TELEPHONE 241-4992

AN EQUAL OPPORTUNITY EMPLOYER
COUNTY OF KAUA'I
DEPARTMENT OF PUBLIC WORKS
4444 RICE STREET
MO'IKEHA BUILDING, SUITE 275
LĪHU'E, KAUA'I, HAWAI'I 96766-1340

March 2, 2010

PW 02.10.110

Belt Collins Hawai'i Ltd.
2153 North King Street Suite 200
Honolulu, HI 96819-4554
Attention: Mr. Glenn Koyama

SUBJECT: ENVIRONMENTAL ASSESSMENT PROPOSED RESERVOIR ADDITIONS AND EXPLORATORY WELL, ORNELLAS TANK SITE, TMK: 4-6-011-003

Gentlemen,

We reviewed the subject DOW project to upgrade its water system in upland Kapa`a by constructing a new 1.0 MG reservoir adjacent to its existing 0.2 MG Ornellas Tank at TMK: 4-6-011-003. We offer the following comments:

1. A grading permit for the site can be exempted from the Sediment and Erosion Control Ordinance No. 808. Section 22-7-6 Exemption, states "The permit requirements of Section 22-7.8 of this article shall not apply to the following: (a) states "work in a public street, sidewalk, alley, right-of-way or <u>in an isolated, self - contained government controlled area.</u>" Although the site can be exempted from the Sediment and Erosion Control Ordinance, we expect the Department of Water to monitor its own grading activities. We **recommend** that a Geotechnical Engineer provide construction oversights during the construction of the 1.0 MG reservoir.

2. Best Management Practices (BMP's) **shall** be provided at all times to the maximum extent to practicable to prevent the damage by sedimentation, erosion or dust to streams, water courses, natural areas and the property of others.

3. A separate grading permit **may** be required for the borrow site or site receiving the excess excavated material. The borrow site and disposal site will need to be identified.

We wish to remain on your mailing list in obtaining a copy of the draft EA. Should you have any questions, please contact us.

Very truly yours,

Wallace Kudo, P.E.
Chief, Engineering Division

CONCUR:

DONALD M. FUJIMOTO, P.E.
County Engineer

WK

cc: Design and Permitting
Construction Inspection
Department of Water, County of Kaua'i

Appendix B

Phase 1 Site Selection Report for Kapa‘a Homesteads Well No. 4

Phase 1 Site Selection Report for Kapaa Homesteads Well No. 4 as an Addition to the Kauai Department of Water's Kapaa System

Prepared by:

Tom Nance Water Resource Engineering
680 Ala Moana Boulevard - Suite 406
Honolulu, Hawaii 96813

Prepared for:

Hawaii Pacific Engineers, Inc.
1132 Bishop Street - Suite 1003
Honolulu, Hawaii 96813

July 2008

Table of Contents

List of Figures

Introduction

The Kauai Department of Water (DOW) would like to develop a new well source, to be known as Kapaa Homesteads Well No. 4, at a suitable location within the service area of is 313- or 214-foot service zones of its Kapaa System. This report presents the basis for the selected site which is next to DOW's 313-foot Ornellas Tank.

Hydro-Geologic Circumstances

Except near to and along the shoreline where alluvium and marine sediments are found, the entire area of DOW's 313- and 214-foot service zones of its Kapaa System are blanketed by Koloa series volcanics. This name is applied to the island's later stage volcanics that were laid down long after the original volcanism that built the main mass of Kauai had ceased and a long period of erosion and sedimentation had followed. The original, island-building volcanics, referred to as the Waimea series volcanics, is generally very permeable and yields water readily to wells. In comparison, the Koloa series volcanics are generally moderately to poorly permeable. With a few notable exceptions, wells drawing water from the Koloa volcanics have relatively modest yields.

The thickness of the Koloa series volcanics in the Kapaa area is not known but can reasonably assumed to be substantial. For the purposes of this report, a well started in the Koloa volcanics with the intent of fully penetrating the Koloa series and the unconformity below these volcanics to tap the Waimea series would require drilling to an impractically expensive depth. As such, a well of this depth is not considered further. The selection of a suitable site for the Kapaa Homesteads Well No. 4 has focused exclusively on the Koloa volcanics.

Assessment of Existing Wells in the Kapaa Area

Figure 1 identifies all the wells that have been drilled within and near to DOW's 313- and 214-foot service zones of its Kapaa System. As far as is known, all of the wells end in and draw water from the Koloa volcanics. The yields of these wells vary widely, from as low as 10 GPM to as much as 700 GPM. In the Kapaa area, the highest producing wells have been relatively near to the shore, have been at relatively low elevation, and have been drilled 200 or more feet below sea level. All of these tap groundwater confined by overlying strata. These highest producing wells, from south to north in the Kapaa area, are identified and described below.

- Well 0419-05 in Kapaa Highlands. This 6-inch test hole is at 25-foot elevation and was drilled 260 feet deep (to 235 feet below sea level). The yielding strata are between 190 to 235 feet below sea level. The piezometric head is approximately 13 feet (MSL). A short term pump test indicated that a production well at this site could probably accommodate a 450 GPM pump and would produce water with chlorides of less than 60 MG/L.

- Wells 0519-01 and 04 Inland of Kapaa New Park. Well 0519-01 was drilled in 1986 as a possible wastewater disposal well, but it was never used as such. In 2004, it was sealed with cement and Well 0519-04 was drilled next to it. This well, known as Kapaa Homesteads Well No. 3, is to be a new source of supply for DOW's system. Ground elevation at these wells is on the order of 10 feet (MSL) and the well depths are 221 and 263 feet, respectively. Both wells draw from groundwater in the Koloa volcanics which is confined by overlying alluvium. The piezometric head of the confined groundwater is about 12 feet (MSL). During a 500 GPM constant rate pump test of Well 0591-04, chlorides appeared to stabilize at about 90 MG/L.

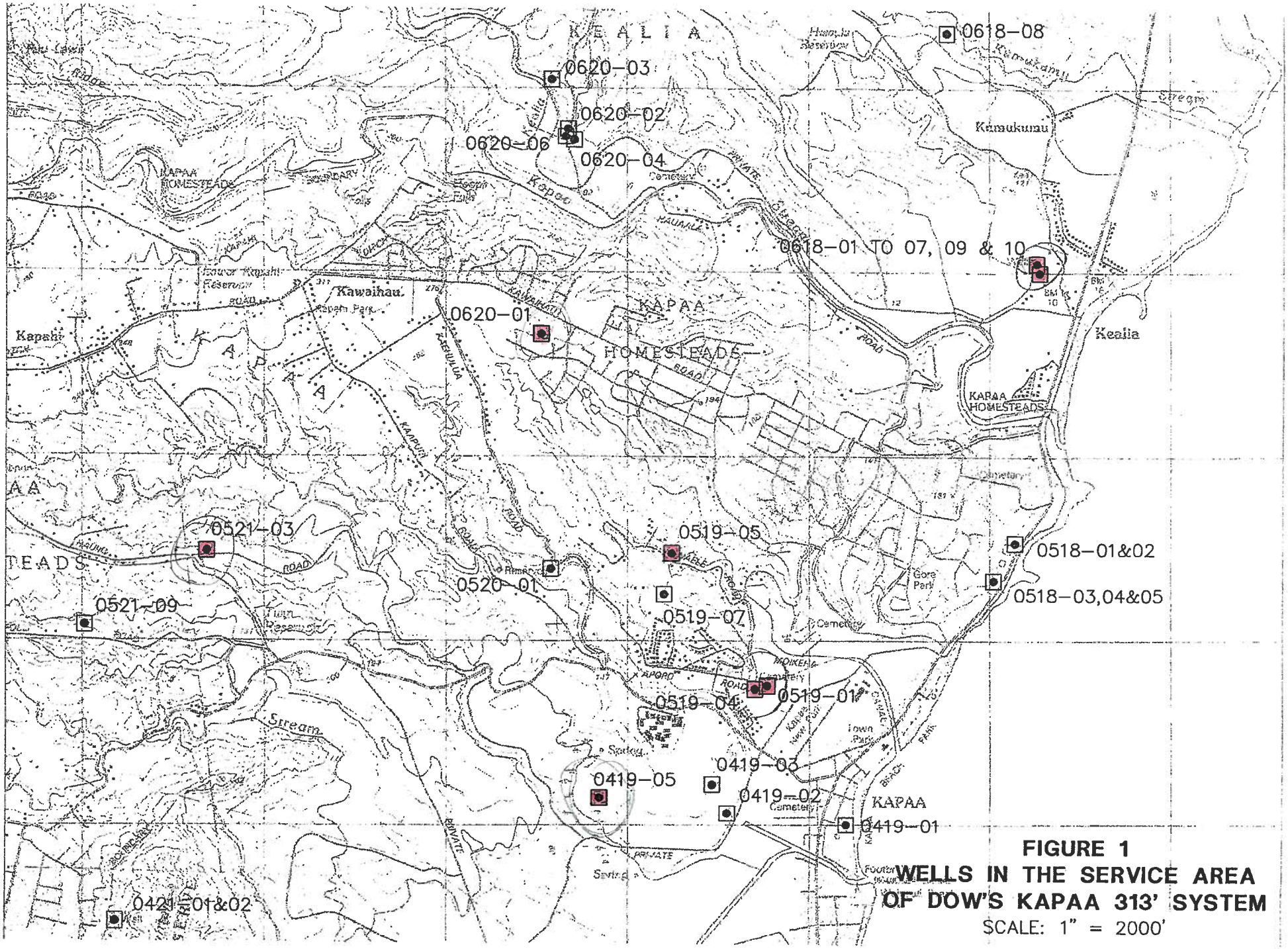


FIGURE 1
WELLS IN THE SERVICE AREA OF DOW'S KAPAA 313' SYSTEM
SCALE: 1" = 2000'

- Wells 0618-01 to 07 and 09 and 10. This battery of former plantation wells is on the north side of Kapaa Stream, so they are beyond the extent of DOW's Kapaa service area. However, groundwater occurrence at this location is similar to Wells 0519-01 and 04, chlorides are lower (40 to 50 MG/L), and the wells are even more productive (in the range of 500 to 700 GPM per well).

Most of the wells drilled further inland than those discussed above are relatively shallow (ie. they do not go to 200 feet below sea level), are of modest capacity (typically less than 50 GPM), and tap groundwater at widely varying water levels substantially higher than 10 feet. However, there are three wells, the results of which are of particular relevance to possible locations for Kapaa Homesteads Well No. 4. These are identified and described below.

- Well 0521-03 at Kulana. This well is located at 282-foot elevation off Hauiki Road. It was drilled and pump tested in 2001 and has never been used. The well was drilled to a depth of 495 feet (213 feet below sea level) and taps groundwater with a piezometric head of 13 feet (MSL). Its 6-inch casing limited the capacity of the test pump, but an extrapolation of the step test data suggests that a 12-inch well at this site, if drilled to the same depth and properly developed, could produce 450 GPM of low salinity water (chlorides of 20 MG/L) with an acceptable drawdown.

- Well 0620-01 Along Kawaihau Road. This "Cannery Well" was completed in 1960 with 8-inch casing. It was reportedly drilled to 463-foot depth (214 feet below sea level) and finished with 403 feet of solid casing and 60 feet of open hole. The piezometric head of the groundwater it taps was reported to be 11.6 feet (MSL). It was outfitted with a 300 GPM line shaft turbine pump and produced water of 30 MG/L chlorides. Data on the well's hydraulic performance could not be found in the Commission on Water Resource Management (CWRM) files.

  A private party interested in using this well recently had the line shaft turbine pump removed and a video log of the entire depth made. Although video log depths are typically about 1 foot per 100 feet different than actual, the log showed conditions somewhat different than reported in the CWRM files:

  - The casing depth is 255 feet, not the reported 403 feet.
  - The total depth is 449 feet, not the reported 463 feet.
  - It is open hole from the bottom of the casing at 255 feet to the bottom of the well.
  - There are two holes in the casing, through which perched water is coming into the well at obviously high pressure. The first and smaller of the two holes is at 194-foot depth. The second and larger hole is at 219 feet (about 16 feet above the water table).

  It is clear from the video that the annular space between the casing and borehole, at least for a substantial distance, is not filled with cement grout. Relining the well with a seal between the new liner and original casing would not leave a practical space to accommodate a pump of any significant capacity. This well is simply not useable in its present condition nor is it even salvageable. Further, the well in its present condition provides a conduit for the top or perched water to potentially contaminate the aquifer at depth. This well should be backfilled with cement in accordance with CWRM standards.

- Well 0519-05 Along Kanaele Road. This well is about midway between the lower elevation wells and the two inland wells described above. As such, its results provide a promising link between the productive lower elevation wells and the two successful inland wells. Well 0519-05 was only drilled to 186 feet below sea level, but its 12.2-foot static water level is consistent with the area's other relatively productive wells. It produced 250 GPM with a drawdown of 8.3 feet. It appears that its production (both drawdown and yield) could probably be improved by drilling deeper followed by development by surging.

With the consistency of piezometric heads and well depths of the area's most productive wells, it is tempting to conclude that there is a regional aquifer that can be tapped at almost any location simply by drilling to the appropriate depth. However, there is too much heterogeneity (ie. unpredictability) in the Koloa volcanics to draw that conclusion. Any selected drill site should be viewed as having an inherent risk of not producing the desired yield regardless of the depth drilled.

Possible Sites for Kapaa Homesteads Well No. 4

Inland Locations. DOW has three tank sites, each of which provides a possible location for a new well (Figure 2). The tank sites provide obvious advantages over sites remote from a tank: there would be no land acquisition cost; start and stop of the well pump could be controlled by the water level in the adjacent tank; and contact time for chlorine would be provided by storage in the tank. The prospects for a well at each tank site are discussed below.

- 0.25 MG, 313-Foot Kulana Tank. The property to be dedicated to DOW for the Kulana Tank has sufficient room for a well, although a well at this location would eliminate the possibility of developing a second tank at this site at a future date. The near proximity of the successfully developed Kulana well provides some confidence for a well at this tank site.

- 1.0 MG, 214-Foot Stable Tank. The Stable Tank site is on a rise along Kaapuni Road. Plans have been prepared to demolish the abandoned 0.20 MG tank and replace it with a 1.0 MG tank with a 214-foot spillway. There is sufficient room to install a well on the right side of tank's access driveway to accommodate a well and control building. Well 0519-05 along Kanaele Road is about 3200 feet east of Stable Tank. It was drilled to 186 feet below sea level, had a static water level of 12.2 feet, and produced 250 GPM with a drawdown of 8.3 feet, a relatively encouraging result for the Stable Tank as a site for the new well.

- 0.2 MG, 313-Foot Ornellas Tank. The Ornellas Tank is at the Kawaihau-Kaapuni Road intersection. There appears to be sufficient room to install a well and related facilities in the southeast corner of the existing lot or in the larger area between the Ornellas Tank and the planned 1.0 MG Kapahi Tank. The Cannery Well (0620-01), which is about 4000 feet down Kawaihau Road from the Ornellas Tank, is the nearest drilled well. Although that 8-inch well's hydraulic capacity is not documented, its static water level and 300 GPM installed pump capacity are generally encouraging.

Lower Elevation Locations. The most productive wells in the area of DOW's 313- and 214-foot service zone have been drilled at lower elevations. The disadvantage of these sites is that, as a practical matter, they would pump directly into the distribution system rather than into a nearby tank. Possible locations for a lower elevation well are described below.

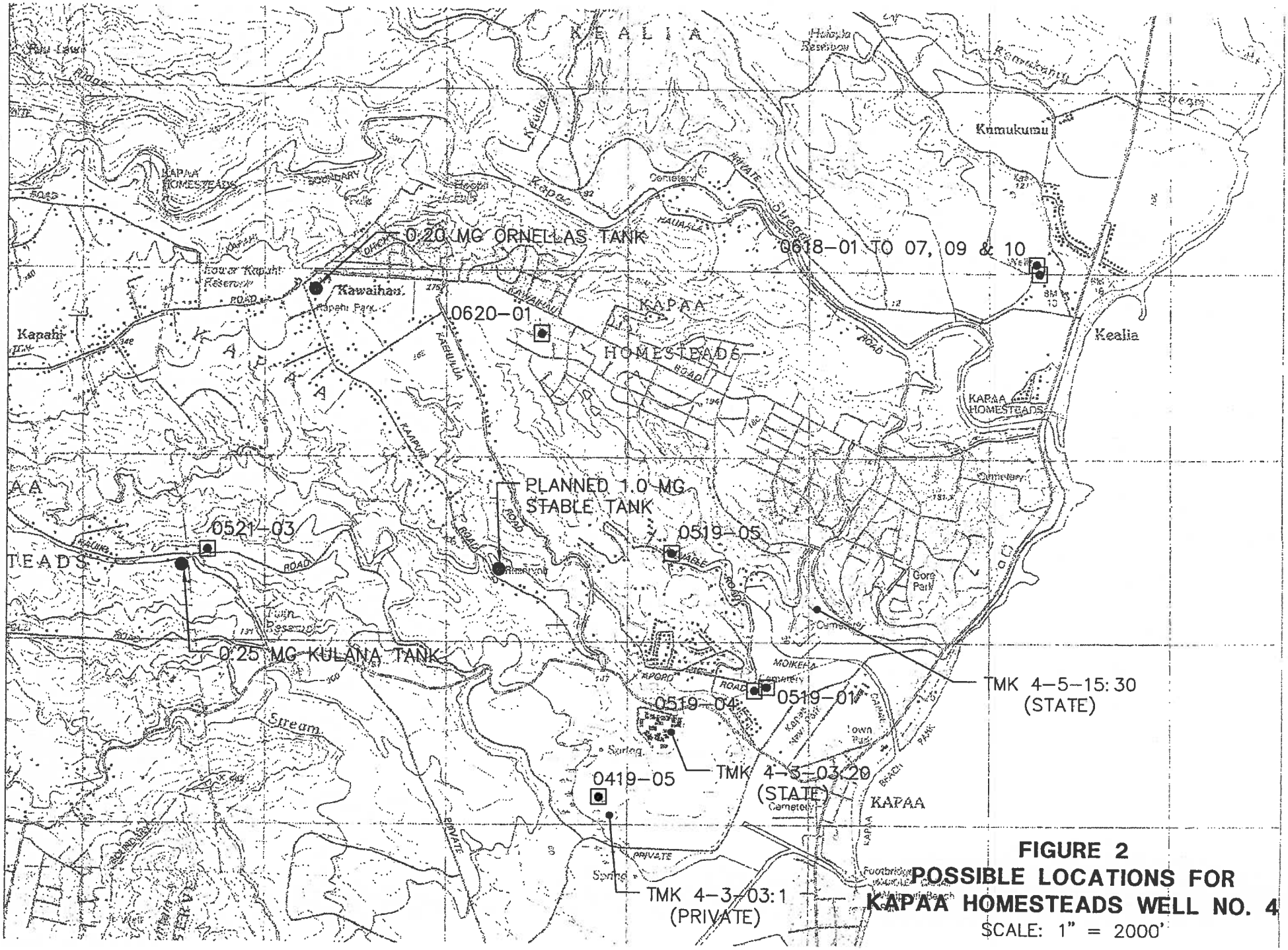


FIGURE 2
POSSIBLE LOCATIONS FOR
KAPAA HOMESTEADS WELL NO. 4
SCALE: 1" = 2000'

- TMK 4-3-03:1 (Kapaa Highlands Site). The success of test hole 0419-05 has identified substantial potential yield in confined strata at depth. The logical point of connection would be DOW's 16-inch main in Olohena Road. In a brief discussion, the landowner has indicated an interest in participating in such a project.

- TMK 4-3-03:20 (State of Hawaii). A well on this 16-acre State parcel along Olohena Road would hopefully tap into the same water bearing strata identified by nearby test hole 0419-05.

- TMK 4-5-15:30 (State of Hawaii). A well in this 35-acre State parcel off Kanaele Road would presumably tap into the same strata as Wells 0519-01 and 0519-04. As nearby DOW distribution lines are small in size, connection costs may be greater at this site than at other locations.

Recommended Site and Approach to the Well's Construction and Pump Testing

The potential well sites identified above were provided to DOW with a preliminary recommendation to select one of the three inland sites in an existing DOW tank lot. The Ornellas Tank site would provide the greatest flexibility for distributing the well's water within the 313- and 214-foot service zones in Kapaa. As the well will draw water from the Koloa volcanics, the yield is not assured and the recommended approach to the well's construction and testing listed below reflects this.

- Available space within the Ornellas Tank lot is quite limited, but it does appear that a well and a control building could be fit on the site on opposite sides of the tank itself (Figure 3).

- A pilot borehole of 12-inch diameter should be drilled to at least a depth of 550 feet (ie. to about 240 feet below sea level).

- A pump test should be run in the pilot borehole to establish the well's potential yield and to sample the pumped water for selected potential contaminants. At a minimum, these constituents would include NO_3-N and EDB, DBCP, and TCP.

- There is a significant possibility of encountering higher elevation, perched water which would be undesirable as a source of supply due to its susceptibility to contamination. Contract documents should anticipate this possibility and require an inflatable packer or other means to seal off this "top" water during the pilot borehole pump test.

- 12-inch (ID) casing would be adequate. The expectable piezometric head of the aquifer to be tapped is 10 to 15 feet above sea level, but the aquifer itself will be substantially below sea level. This will enable the solid casing to be extended below sea level and function as a shroud if a submersible pump and motor is used.

- Data compiled at the completion of the pilot borehole pump test will provide a decision point. If the site at the Ornellas Tank will not provide sufficient yield or has organic contamination that may require treatment, the contract documents should provide for the Contractor to move to the Stable Tank site and proceed with drilling there.

Appendix C

Avifaunal and Feral Mammal Survey

AVIFAUNAL AND FERAL MAMMAL SURVEY OF LANDS INVOLVED IN THE KAPAA HOMESTEAD/KAPAHI STORAGE TANK WATER SYSTEMS IMPROVEMENT PROJECT IN WAILUA/KAPAA, KAUAI

Prepared for:

Belt Collins Hawaii Ltd.

Prepared by:

Phillip L. Bruner
Environmental Consultant
Faunal (Bird & Mammal) Surveys
Box 1775
BYUH
55-220 Kulanui St.
Laie, HI 96762

19 July 2004

INTRODUCTION

This report provides the findings of a two day (15, 16 July 2004) faunal (bird and mammal) field survey of three sites involved in the Kapaa Homestead/Kapahi Storage Tank Water Systems Project in Wailua-Kapaa, Kauai. References to pertinent published and unpublished sources are also included in this report to provide a broader perspective of birds and mammals known from similar habitats in this region of Kauai. The goals of the field survey were to:

1- Document the species of birds and mammals presently in the area of these sites.

2- Conduct an evening search for the endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*).

HABITAT DESCRIPTIONS OF THE THREE SITES

Site 1: Makai Site 1

This site is located at the junction of Kaapuni and Kawaihau Roads. The site is covered in dense tall grass along with a few scattered trees. Residential properties surround the site.

Site 2: Makai Site 2

This site is located mauka of Lower Kapahi Reservoir off Kahuna Road. The property contains a mix of pasture lands and second growth forest composed primarily

of alien (introduced) trees and brush. Similar habitat surrounds the site. A few residential properties are nearby.

Site 3: Mauka Site

This site is located at an existing water tank at the end of Kahuna Road. The area is presently in pasture with a patch of large Mollucan albizia (*Paraserianthes falcataria*) trees. These trees are not native. Residential lands are nearby.

SURVEY PROTOCOL

The faunal survey was conducted on foot. All habitats at each of the three sites were examined. Each site was surveyed four times (early morning on 15, 16 July and late afternoon on 15, 16 July). In addition, the evening (1900-2300 hours) of 15 July was devoted to searching for the presence of the endangered Hawaiian Hoary Bat at each of these sites. A Pettersson Elektronik AB Ultrasound Detector D 100 was used to listen for echolocating bats. Daylight surveys were conducted early and late when birds were most active and detectable. No trapping of mammals was attempted. Such an effort was beyond the scope and time available for this survey. The majority of the mammal observations came from the presence of tracks and visual sightings.

Weather during the course of the survey varied from clear to periods of light rain showers. The conditions were actually ideal since the birds were active and vocal and thus easily detected.

Scientific names used in this report follow Pyle (2002) and Honacki et al. (1982). These sources use the names found in the current scientific literature.

RESULTS OF THE FIELD SURVEY

Makai Site 1:

No native or migratory birds were recorded on this site. Given the habitat present none would be expected. Table One lists the 12 species of alien (non-active) birds recorded over the course of the survey. The only mammal observed was a Mule (*Equus caballus* x *Equus asinus*). This animal was tied up and allowed to graze a portion of the site fronting Kawaihau Road. The night observations did not detect the presence of the Hawaiian Hoary Bat. Cats (*Felis catus*) were seen near the property but were likely pets from adjoining residential lands.

Makai Site 2:

No native or migratory birds were found at this location. The habitat in this area is not suitable for these species. The nearby Lower Kapahi Reservoir and small streams may provide some limited habitat for endangered Koloa or Hawaiian Duck (*Anas wyvilliana*). This species is common on Kauai (Hawaii Audubon Society 1997). A total of ten species of alien (non-native) birds were tallied on the survey of this site. Table One lists the names of these species. The only mammal observations were the tracks of

feral pigs (*Sus scrofa*). The endangered Hawaiian Hoary Bat was not found on the survey at this location.

Mauka Site 2:

No native or migratory birds were recorded at this site. The only species that might be expected is the migratory Pacific Golden-Plover (*Pluvialis fulva*). This species winters in Hawaii from August to late April. During July migratory shorebirds are on their breeding grounds in the arctic. The Pacific Golden-Plover, known as Kolea in Hawaiian, has been extensively studied (Johnson et al. 1981, 1989, 1993, 2001a, 2001b, 2004). The migratory Kolea is not listed as threatened or endangered. The pasture lands around the Mauka Site likely have foraging, territorial Kolea during August through April. Table One notes the 13 species of alien (non-native) birds recorded at the Mauka Site. Tracks and skeletal remains of feral pigs (*Sus scrofa*) were found in this area.. Domestic cats and horses were also present. This species is fairly common on Kauai (Tomich 1986, Kepler and Scott 1990). Jacobs (1991, 1993) and Reynolds et al. (1998) provide further information on the life history and distribution of the Hawaiian Hoary Bat.

SUMMARY AND CONCLUSIONS

All three sites were thoroughly surveyed for birds and mammals. All habitats were investigated at appropriate times when birds and mammals were active and most

easily detected. No unexpected birds or mammals were discovered on the survey. A similar list of birds and mammals were found on other studies in similar habitat in this area of Kauai (Bruner 1986, 1990, 1993). No migratory birds were recorded but likely occur in the pastures during the months of August through April. The native Hawaiian Hoary Bat was not detected at any of the sites. This species is known to forage not only in native forest but also in developed areas. Thus it is possible that one might on occasion see bats foraging over any of these sites. They roost solitarily in trees. The proposed developments at these three sites should not have any measurable impact in the populations of birds and mammals in this region of Kauai.

TABLE ONE

Alien (introduced) birds found on a survey of three sites involved in the Kapaa Homestead/Kapahi Storage tank Water Systems Project in Wailua-Kapaa, Kauai. A (+) indicates the presence and a (-)an absence of that particular species.

Common Name	Scientific Name	Makai Site 1	Makai Site 2	Mauka Site
Cattle Egret	*Bubulcus ibis*	+	-	+
Red Junglefowl	*Gallus gallus*	+	+	+
Spotted Dove	*Streptopelia chinensis*	+	+	+
Zebra Dove	*Geopelia striata*	+	+	+
Japanese Bush-Warbler	*Cettia diphone*	-	-	+
White-rumped Shama	*Copsychus malabaricus*	-	-	+
Hwamei	*Garrulax canorus*	-	+	+
Japanese White-eye	*Zosterops japonicus*	+	+	+
Common Myna	*Acridotheres tristis*	+	+	+
Red-crested Cardinal	*Paroaria coronata*	+	+	-
Northern Cardinal	*Cardinalis cardinalis*	+	+	+
Western Meadowlark	*Sturnella neglecta*	-	+	+
House Finch	*Carpodacus mexicanus*	+	+	+
House Sparrow	*Passer domesticus*	+	-	-
Nutmeg Mannikin	*Lonchura punctulata*	+	-	-
Chestnut Munia	*Lonchura atricapilla*	+	-	-
Java Sparrow	*Padda oryzivora*	+	-	+

SOURCES CITED

Bruner, P.L. 1986. Faunal survey of Makaleha Valley, Kapaa, Kauai. Unpubl. ms. Prep. for Portugal and Associates, Inc.

_____ 1990. Field survey of the avifauna and feral mammals at Hanamaulu, Kauai. Unpubl. ms. Prep. for Helber Hastert & Kimura.

_____ 1993. Avifaunal and feral mammal surveys of lands involved in the Kuhio Highway Bypass Project – Hanamaulu to Kapaa, Kauai. Unpubl. ms. Prep. for Pacific Planning and Engineering.

Hawaii Audubon Society. 1993. Hawaii's Birds. Fourth Edition. Hawaii Audubon Society. Honolulu. 112pp.

Honacki, J.H., K.E. Kinman and J.W. Koeppl eds. 1982. Mammal species of the World: A taxonomic and geographic reference. Allen Press, Inc. and the Association of Systematic Collections. Lawrence, Kansas. 694pp.

Jacobs, D.S. 1991. The Distribution and Abundance of the endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*), on the island of Hawaii. Unpubl. Report submitted to University of Hawaii, Department of Zoology.

_____ 1993. Foraging behavior of the endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*). Final report to U.S. Fish and Wildlife Service. Grant No. 14-48-0001-92570. Unpubl.

Johnson, O.W., P.M. Johnson and P.L. Bruner. 1981. Wintering behavior and site faithfulness of Golden-Plovers on Oahu. 'Elepaio 41(12): 123-130.

Johnson, O.W., M.L. Morton, P.L. Bruner and P.M. Johnson. 1989. Fat cyclicity, flight ranges, and features of wintering behavior in Pacific Golden-Plovers. Condor 91: 156-177.

Johnson, O.W., P.G. Connors, P.L. Bruner, and J.L. Maron. 1993. Breeding ground fidelity and mate retention in the Pacific Golden-Plover. Wilson Bull. 105: 60-67.

Johnson, O.W., P.L. Bruner, J.J. Rotella, P.M. Johnson, and A.E. Bruner. 2001a. Long term study of apparent survival in Pacific Golden-Plovers at a wintering ground on Oahu, Hawaiian Islands. The Auk 118(2): 342-351.

Johnson, O.W., P.L. Bruner, A.E. Bruner, P.M. Johnson, R.J. Kienholz, and P.A. Brusseau. 2001b. Features of breeding biology in Pacific Golden-Plovers nesting on the Seward Peninsula, Alaska. Wader Study Group Bulletin 25: 59-65.

Johnson. O.W., P.L. Bruner, P.M. Johnson, and A.E. Bruner. 2004. A new longevity record for the Pacific Golden-Plover. J. Field Ornithol. 75(2): 134-135.

Pyle, R.L. 2002. Checklist of the birds of Hawaii – 2002. 'Elepaio 62(6): 137-148.

Reynolds, M.H., B.M.B. Nielsen, and D.J. Jacobi. 1998. Surveys on the Hawaiian Hoary Bat in the district of Puna, Hawaii Island. 'Elepaio 57(9): 153-157.

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press. Honolulu. 375pp.

Appendix D

Archaeological Assessment

An Archaeological Assessment For The Proposed Water Reservoir, Kapa'a Ahupua'a, Kaua'i

TMK 4-6-03:10

by

Karl Van Ryzin, B.A.

and

Hallett H. Hammatt, PhD

Prepared for:

Belt Collins Hawaii, Ltd.

2153 N. King Street, Suite 200

Honolulu, Hi 96819

by

Cultural Surveys Hawai'i, Inc.

SEPTEMBER 2004

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. INTRODUCTION

A. Project Background

At the request of Belt Collins Hawai'i Ltd., Cultural Surveys Hawai'i, Inc. (CSH) conducted an archaeological assessment of a parcel of land (referred to hereafter as "Mauka Locale") in Kapa'a (in TMK 4-6-3:10) (Figures 1 & 2). In addition, CSH surveyed and assessed two additional parcels as alternative sites (referred to hereafter as "Makai Locale 1" and "Makai Locale 2") in (TMKs 4-6-11:3, 4-6-8:23). The survey was accomplished to address any historic preservation or cultural impact issues that might be raised by the proposed development of a water reservoir within one of the three parcels. The county of Kaua'i owns the three parcels.

B. Scope of Work

Archaeological and Historical Concerns

The purpose of this archaeological assessment is to address any archaeological and/or historical concerns. The assessment included a surface survey and a report detailing methods and any finds. The archaeological assessment does not meet the requirements of an inventory-level survey per the rules and regulations of SHPD/DLNR. However, the level of work is sufficient enough to address site types, locations, and allow for future work recommendations.

The scope of work includes:

1. Historical research included study of archival sources, historic maps, Land Commission Awards and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near this property.
2. Field inspection of the project area identified any surface archaeological features and investigated and assessed the potential for impact to such sites. The assessment identified any sensitive areas that may require further investigation or mitigation before the project proceeds.
3. Preparation of a report included the results of the historical research and the fieldwork with an assessment of archaeological potential based on that research with recommendations for further archaeological work, if appropriate. It also provided mitigation recommendations if there were archaeologically sensitive areas that need to be taken into consideration.

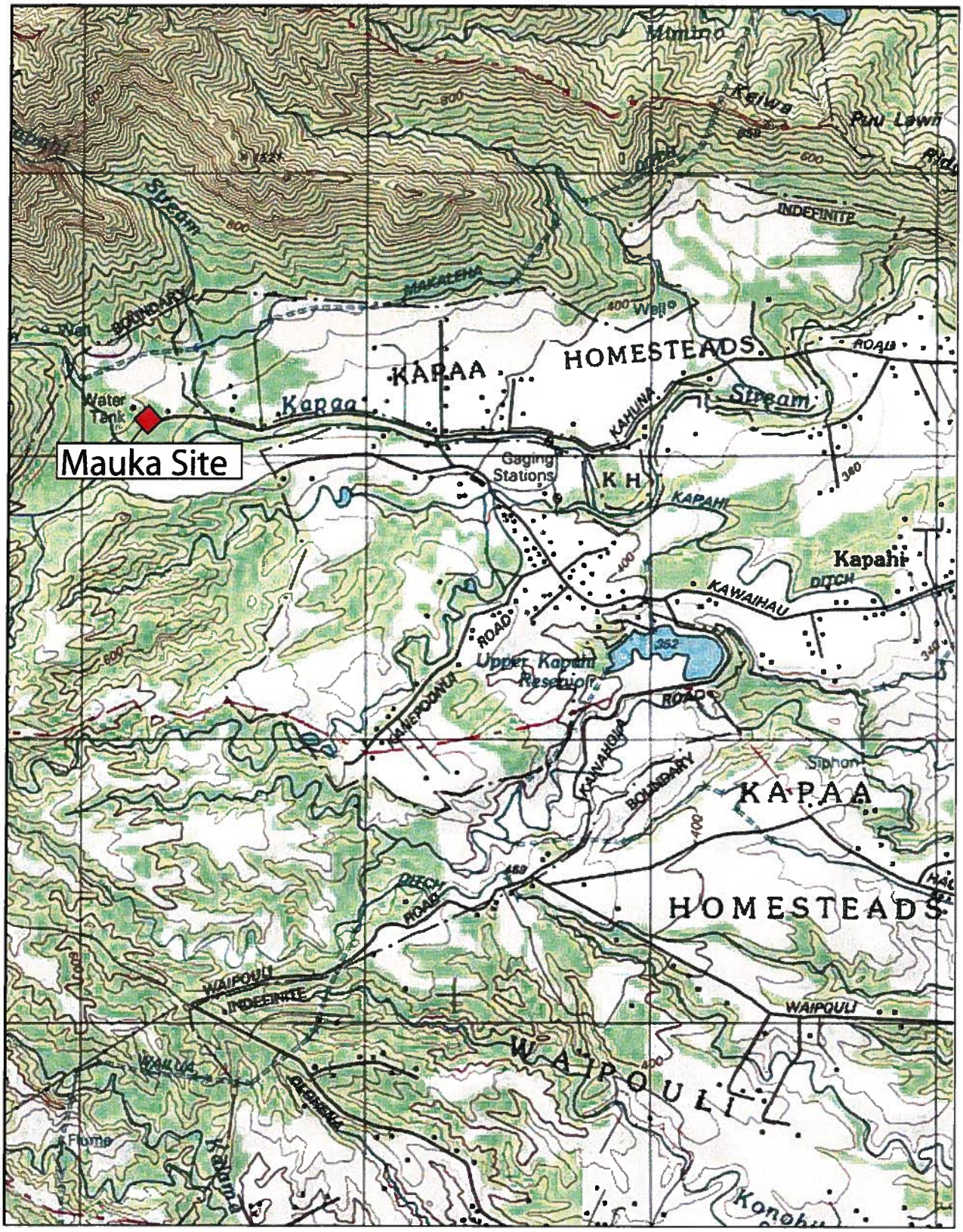


Figure 1. Portion of USGS map showing project location.

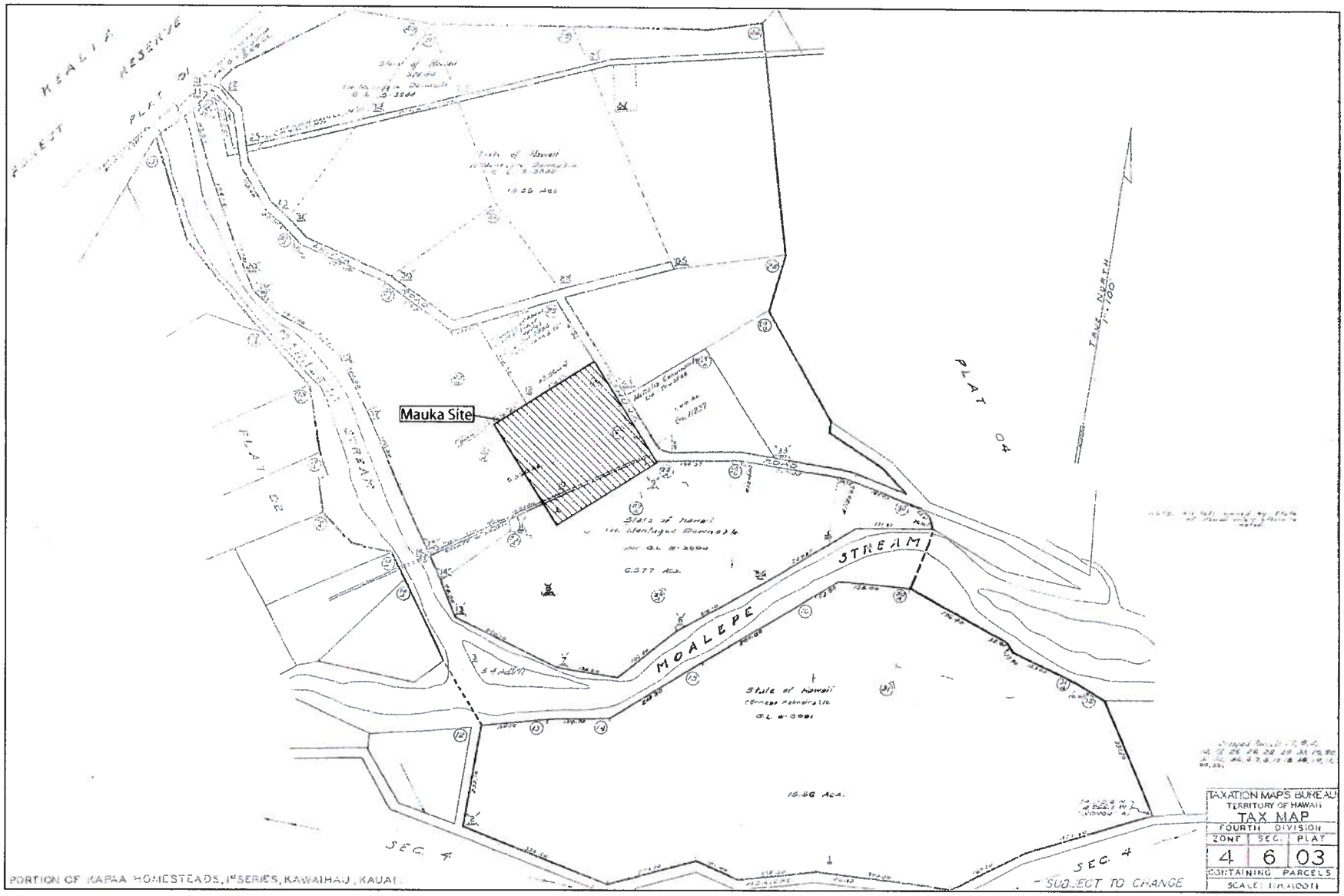


Figure 2 TMK 4-6-03 showing project area location

C. Methods

On June 10th, 2004 a field inspection of the Mauka Locale proposed water tank installation project area was conducted by Cultural Surveys Hawai'i Inc. archaeologist Karl Van Ryzin, B.A., and supervising archaeologist David Perzinski, B.A. Survey transects oriented north-south were conducted with archaeologists spaced apart 10 m. Field observations were recorded and photographs were taken of the project area. The work was conducted under the overall supervision of principal archaeologist Hallett H. Hammatt, Ph.D.

Historical research included a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; studies of documents at Hamilton Library of the University of Hawai'i, and study of maps at the Survey Office of the Department of Land and Natural Resources. Nineteenth-century Land Commission Award claim records were accessed via the Internet from the Mahele Database prepared by Waihona 'Aina Corp.

D. Natural Setting

1. Mauka Locale Project Area

The Mauka Locale project area is located immediately south of where Kahuna Road terminates, just northeast of Makaleha Stream. The project areas elevation is 150 m (500 ft) and is approximately 7.56 km (4.7 mi) to the coast. A significant landmark is an existing water tank that lies just west of the project area (Figure 7). Foote et al (1972) described the soil in this area as being Kapa'a Silty clay. Kapa'a Silty clay consists of "well-drained soils on the uplands on the islands of Kaua'i and Oahu. These soils developed in material weathered from basic igneous rock. They are gently sloping to extremely steep. Elevations range from 200 to 800 feet." (Foote et al.1972). Mauka Locale receives an average an annual rainfall of approximately 2000 mm (79 inches) (Giambelluca 1986:47). A brief summary of observations on the natural setting is presented in the results of field check section of this study.

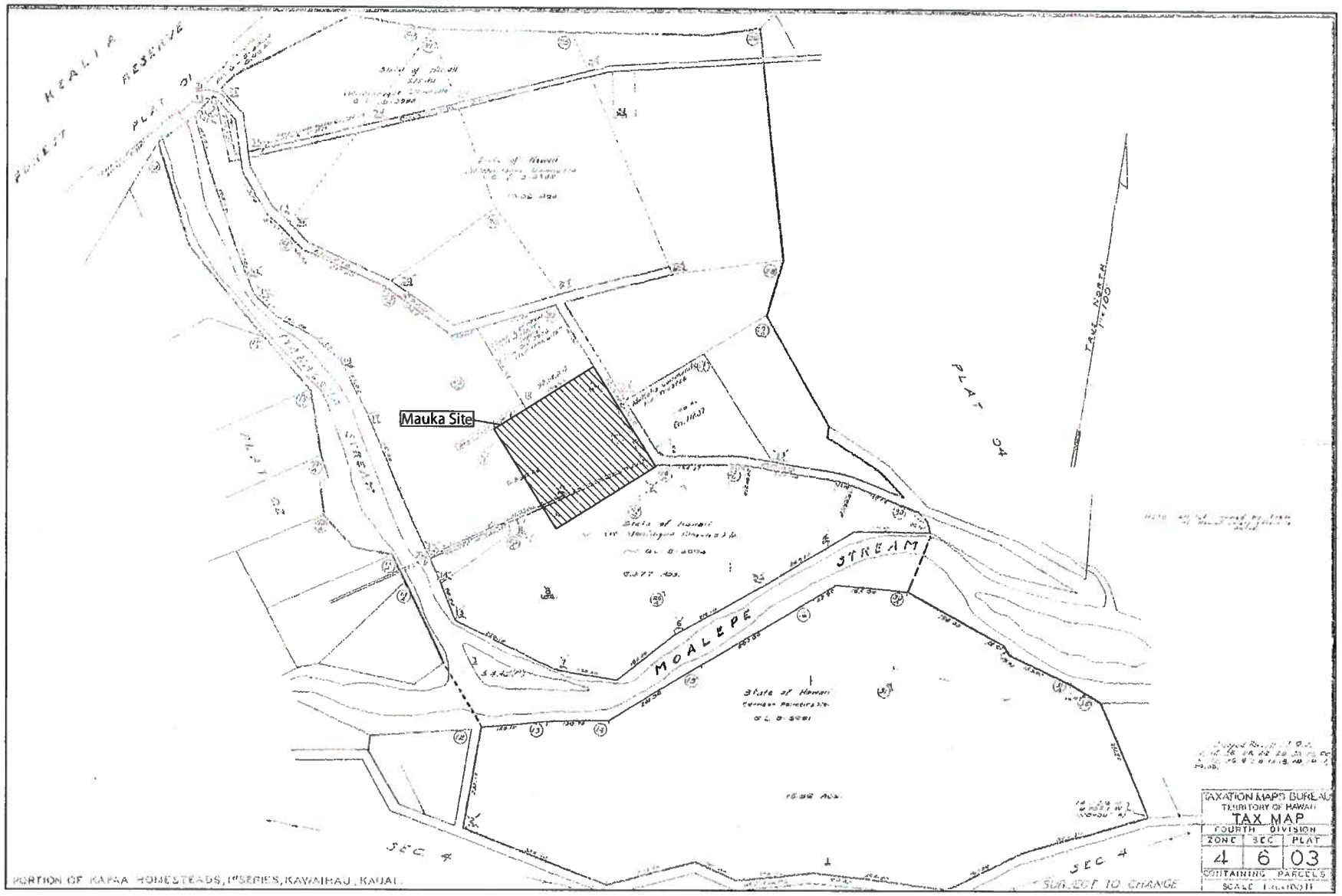


Figure 3. TMK 4-6-03 showing Mauka Locale project area

II. HISTORICAL BACKGROUND

A. From Puna District to Kawaihau District

The *ahupua'a* of Kapa'a belongs in the ancient district of Puna, one of five ancient districts on Kaua'i (King 1935: 228). Puna was the second largest district on Kaua'i, behind Kona, and extended from Kīpū, south of Līhue to Kamalomalo'o, just north of Keālia. For taxation, educational and judicial reasons, new districts were created in the 1840's. The Puna District, with the same boundaries became the Līhue District, named for an important town in that district. In 1878, by act of King Kalākaua in securing a future and name for the new Hui Kawaihau, created the new district of Kawaihau. This new district encompassed the *ahupua'a* ranging from Olohena on the south to Kīlauea on the north. Subsequent alterations to district boundaries in the 1920's left Kawaihau with Olohena as its southernmost boundary and Moloa'a as its northernmost boundary (King 1935:222).

B. Traditional and Legendary Accounts of Kapa'a

1. Palila and Ka'ea

High in the *mauka* region of Kapa'a in the Makaleha mountains at a place called Ka'ea, is reported to be the supernatural banana grove of the Kaua'i *kupua* or demigod Palila, grandson of Hina (Handy and Handy 1972:424). Joseph Akina for *Kū'oko'a* Newspaper in 1913 describes Palila's banana grove:

> The stalk could hardly be surrounded by two men, and was about 35 feet high from the soil to the lowest petiole. The length of the cluster from stem to lowest end of the bunch of bananas was about 1 ¾ fathoms long (one *anana* and one *muku*). There were only two bananas on each about 4 ½ inches around the middle. There were just two bananas, one on the east side and one on the west, each about a foot or more in length. The one on the east side was tartish, like a *waiawi* (Spanish guava) in taste and the one on the west was practically tasteless. The diameter of the end of the fruit stem of this banana seemed to be about 1½ feet. This kind of banana plant and its fruit seemed almost supernatural… (Akina, 1913:5).

2. Ka Lulu o Mō'īkeha

Kapa'a was the home of the legendary *ali'i*, Mō'īkeha. Born at Waipi'o on the island of Hawai'i, Mō'īkeha sailed to Kahiki (Tahiti), the home of his grandfather Maweke, after a disastrous flood. On his return to Hawai'i, he settled at Kapa'a, Kaua'i. Kila, Mō'īkeha's favorite of three sons by the Kaua'i chiefess Ho'oipoikamalani, was born at Kapa'a and was said to be the most handsome man on the island. It was Kila who was sent by his father back to Kahiki to slay his old enemies and retrieve a foster son, the high chief La'amaikahiki (Handy and Handy 1972:424; Beckwith 1970:352-358; Kalākaua 1888:130-135; Fornander 1916, vol.4 pt.1:160). Mō'īkeha's love for Kapa'a is recalled in the *'ōlelo no'eau*: *Ka lulu o Mō'īkeha i ka laulā o Kapa'a.* "The calm of Mō'īkeha in the breadth of Kapa'a" (Pukui, 1983: 157).

"Lulu-o-Moikeha" is described as being situated "near the landing and the school of Waimahanalua" (Akina, 1913: 5). The landing in Kapa'a was known as the Makee Landing and was probably constructed in the late 1870s, along with the Makee sugar mill. Today, in place of the old Makee Landing is part of a breakwater located on the north side of Mō'īkeha Canal near the present day Coral Reef Hotel, and approximately half-a-mile north of Waikaea Bridge.

Akina (1913) tells the story of how Mō'īkeha's son, Kila stocks the islands with the fish *akule*, *kawakawa* and *'ōpelu*. When Kila travels to Kahiki, he seeks out his grandfather Maweke and explains that he is the child of Mō'īkeha. When Maweke asks Kila if Mō'īkeha is enjoying himself, Kila answers with the following chant:

My father enjoys the billowing clouds over Pohaku-pili,

The sticky and delicious poi,

With the fish brought from Puna,

The broad-backed shrimp of Kapalua,

The dark-backed shrimp of Pōhakuhapai,

The potent *awa* root of Maiaki'i,

The breadfruit laid in the embers at Makialo,

The large heavy taros of Keahapana

The crooked surf of Makaīwa too

The bending hither and thither of the reed and rush blossoms,

The swaying of the *kalukalu* grasses of Puna

The large, plump, private parts of my mothers,

Of Ho'oipoikamalanai and Hinau-u,

The sun that rises and sets,

He enjoys himself on Kaua'i,

All of Kaua'i is Mō'īkeha's. (Akina, 1913: 6)

Maweke was delighted and when the boy is questioned as to his purpose, Kila tells his grandfather he is seeking fish for his family. Maweke tells Kila to lead the fish back to his homeland. This is how Kila led the *akule*, *kawakawa* and *'ōpelu* to Hawai'i.

3. Paka'a and the wind gourd of La'amaomao (Keahiahi)

Kapa'a also figures prominently in the famous story of Pāka'a, and the wind gourd of La'amaomao. Pāka'a was the son of Kūanu'uanu, a high-ranking retainer of the Big Island ruling chief Keawenuia'umi (the son and heir to the legendary chief 'Umi), and La'amaomao, the most beautiful girl of Kapa'a and member of a family of high status kahuna. Kūanu'uanu left the island of Hawai'i, traveled throughout the other islands and finally settled on Kaua'i, at Kapa'a. It was there that he met and married La'amaomao, although he never revealed his background or high rank to her until the day a messenger arrived, calling Kūanu'uanu back to the court of Keawenuia'umi.

By that time, La'amaomao was with her child but Kūanu'uanu could not take her with him. He instructed her to name the child, if it turned out to be a boy, Pāka'a. Pāka'a was raised on the beach at Kapa'a by La'amaomao and her brother Ma'ilou, a bird snarer. He grew to be an intelligent young man and it is said he was the first to adapt the use of a sail to small fishing canoes. Although Pāka'a was told by his mother from a very young age that his father was Ma'ilou, he suspected otherwise and after constant questioning La'amaomao told her son the truth about Kūanu'uanu.

Intent on seeking out his real father and making himself known to him, Pāka'a prepared for the journey to the Big Island. His mother presented to him a tightly covered gourd containing the bones of her grandmother, also named La'amaomao, the goddess of the winds. With the gourd and chants taught to him by his mother, Pāka'a could command the forces of all the winds in Hawai'i. While this story continues on at length about Pāka'a and his exploits on the Big Island and later on Moloka'i, it will not be dwelt upon further here. It is important to note that several versions of this story do include the chants which give the traditional names of all of the winds at all the districts on all the islands, preserving them for this and future generations (Nakuina 1990; Rice 1923:69-89; Beckwith 1970:86-87; Thrum 1923:53-67; Fornander 1918-19 vol. 5 pt.1:78-128).

Frederick Wichman (1998:84) writes that Pāka'a grew up on a headland named Keahiahi. Here, Pāka'a learned to catch *mālolo*, his favorite fish. After studying the ocean and devising his plan to fabricate a sail, Pāka'a wove a sail in the shape of a crab claw and tried it out on his uncle's canoe. One day, after going out to catch *mālolo*, he challenged the other fishermen to race to shore. He convinced them to fill his canoe with fish suggesting it was the only way he could truly claim the prize if he won:

> The fishermen began paddling toward shore. They watched as Pāka'a paddled farther out to sea and began to fumble with a pole that had a mat tied to it. It looked so funny that they began to laugh, and soon they lost the rhythm of their own paddling. Suddenly Pāka'a's mast was up and the sail filled with wind. Pāka'a turned toward shore and shot past the astonished fishermen, landing on the beach far ahead of them. That night, Pāka'a, his mother, and his uncle had all the *mālolo* they could eat (Wichman 1998:85).

4. Kaweloleimākua

Kapa'a is also mentioned in traditions concerning Kawelo (Kaweloleimākua), Ka'ililauokekoa (Mō'īkeha's daughter, or granddaughter, dependent on differing versions of the tale), the *mo'o* Kalamainu`u and the origins of the *hīna'i hīnālea* or the fish trap used to catch the

hīnālea fish, and the story of Lonoikamakahiki (Fornander 1917, vol.4 pt.2:318, vol.4 pt.3:704-705; Rice 1923:106-108; Thrum 1923:123-135; Kamakau 1976:80).

5. *Kalukalu* grass of Kapa'a

"*Kūmoena kalukalu Kapa'a*" or "Kapa'a is like the *kalukalu* mats" is a line from a chant recited by Lonoikamakahiki. Kalukalu is a sedge grass, apparently used for weaving mats (Fornander 1917, Vol. IV, Pt. 2, pp. 318-19). Pukui (1983: 187) associates the *kalukalu* with lovers in "*ke kalukalu moe ipo o Kapa'a*; the *kalukalu* of Kapa'a that sleeps with the lover". According to Wichman (1998:84), "a *kalukalu* mat was laid on the ground under a tree, covered with a thick pile of grass, and a second mat was thrown over that for a comfortable bed", thus the association with lovers. Kaua'i was famous for this peculiar grass, and it probably grew around the marshlands of Kapa'a. It is thought to be extinct now, but an old-time resident of the area recalled that it had edible roots, "somewhat like peanuts." Perhaps it was a famine food source (Kapa'a Elementary School 1933:VI).

C. Heiau of Kapa'a

During their expeditions around Hawai'i in the 1880's, collecting stories from *ka pō'e kahiko*, Lahainaluna students stopped in Kapa'a and Keālia and gathered information regarding heiau of the region. All together, fourteen *heiau* were named in Kapa'a and Keālia, suggesting the two *ahupua'a* were probably more politically significant in ancient times. Table 1 lists the names of the ten heiau identified in the *ahupua'a* of Kapa`a, their location if known, their type, and associated chief and priest.

Table 1. *Heiau* of Kapa'a

Name	Location	Type	Associated
Mailehuna	Kapa'a (Mailehuna is the area of the present day Kapa'a School)	unknown	Kiha, Kaumuali'i/ Lukahakona
Pueo	Kapa'a	unknown	Kiha, Kaumuali'i/ Lukahakona
Pahua	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Kumalae	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Waiehumalama	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Napuupaakai	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Noeamakalii	Kapa'a/Keālia	"*heiau* for birth of Kaua'i Chiefs, like Holoholoku"	Unknown
Puukoa	Kapa'a/Keālia	"*unu* type heiau"	Unknown
Piouka	Kapa'a/Keālia	"*unu* type heiau"	Unknown
Una	Kapa'a/Keālia	Unknown	Kiha/ Lukahakona
Mano	Kapa'a/Keālia	Unknown	Kiha/ Lukahakona

Name	Location	Type	Associated
Kuahiahi	Kapa'a (govn't school stands on site now)	Unknown	Kaumuali`i/ Lukahakona
Makanalimu	Upland of Kawaihau	Unknown	Kaumuali'i
Kaluluomō'īkeha	Kapa'a	Unknown	Mō'īkeha

The exact locations of these heiau are unknown. The locations of two of the *heiau* correlate with the locations of *wahi pana* which are known to be in close to Kuahiahi and Kaluluomō'īkeha. Kuahiahi (also spelled Kaahiahi and Keahiahi) is the rocky headland at the north end of Kapa'a where the first Kapa'a School was once located. Kaluluomō'īkeha is thought to be the general area near the Mō'īkeha Canal and the present day Coral Reef Hotel

D. The Mahele: Kapa'a Land Commission Awards

The Organic Acts of 1845 and 1846 initiated the process of the Mahele, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848 the crown and the ali`i received their lands. The common people received their *kuleana* in 1850. It is through records for Land Commission Awards (LCAs) generated during the Mahele that specific documentation of traditional life in Kapa'a Ahupua'a comes to light.

During the Mahele, Kapa'a was taken as Crown Lands (Office of the Commissioner of Public Lands of the Territory of Hawaii, 1929). The *'Ili* of Paikahawai and Ulakiu in Kapa'a Ahupua'a were retained as Government Lands.

Table 2. Mahele Land Claims in Kapa'a Ahupua'a

LCA	CLAIMANT	`ILI	LAND USE	AWARD
08843	Kiau and son, Apahu	Apopo, Kalolo Village	6 *lo'i,* small *kula* and house lot	2 *'āpana*; 2,75 acres
10564	Oleloa, Daniela	Kapa'a, Puna;	with one fish pond; 10 *lo'i* and a fish pond	No award in Kapa'a, Puna; award in Waioli, Halelea
08247	Ehu	Moalepe	approx. 20 *lo'i* lying waste, some orange trees	1 *'āpana*, Kapa'a
08837	Kamapaa	Awawaloa, Ulukiu Village	9 *lo'i*, and adjoining *kula*; house lot	Awawaloa: 1 *'āpana*; Wakiu 3 *'āpana*

LCA	CLAIMANT	`ILI	LAND USE	AWARD
03638	Huluili, Kahoiu (Kadaio)	Maeleele, Kaloko Village	15 *lo'i* in Maeleele and adjoining *kula*; house lot in village of Kaloko (Kalolo)	Maeleele: 2 apana, 5 acs.
03971 and 03243	Honolii, Ioane	Kahana, Kupanihi	6 uncultivated *lo'i*, house lot in Kupanihi Village	Kupanihi: 2 *'āpana*, 1 ac
03554 and 03599	Keo	Hahanui,	Entire *'ili* of Kahanui, 15 *lo'i*, house lot in Puhi Village	No Award in Kapa`a, Puna; Award in Waila`au, Kona.

The land claims during this period show that only five individuals were awarded land parcels in the relatively large *ahupua'a* of Kapa'a. The five awardees include Kiau (#08843), Kamapaa (#08837), Ioane Honolii (#03971) Huluili (#03638) and Ehu (#08247). In addition, two land claims (#10564 and #03554, 3559) were not awarded in Kapa'a. Four of the five awardees received multiple parcels which show similarities. All four had *lo'i* or irrigated *kalo* fields on the mauka side of the lowland swampy area, sometimes extending a short distance up into small, shallow gulches and valleys. Many of these *lo'i* parcels name pali or hills/cliffs as boundaries. Each LCA also had a separate house lot located on the *makai* side of the swamp, near the beach. Three of the land claims name ponds on their lands, including Puhi Pond (LCA #03554), Fishponds in Kupanihi 'Ili (LCA #03971) and Hahanui 'Ili (LCA #10564). Loko Kihapai may be the same as the Fishpond in Hahanui as it was named in the same land claim. The other two *loko* are associated with house lots, situated on the *makai* edge of the Kapa'a swamplands suggesting modification of the natural swamplands. Other natural and cultural resources mentioned in the LCAs include freshwater springs, pig pens, *hau* bushes, *hala* clumps, streams, *'auwai*, and *kula* or pasturelands.

Interestingly, the residential "village" of Kapa'a did not exist as a single entity, but was a series of probably small settlements or compounds, perhaps even individual house lots which stretched along the shoreline of the *ahupua'a* and included (south to north) Kupanihi (Makahaikupanihi), Kalolo (Kaulolo), Puhi, and Uluki.

The fifth individual, Ehu (LCA #08247), was the only person to be awarded a single parcel in the upland area of Kapa'a, Moalepe Valley, approximately five miles *mauka* of the coast and one mile southwest of the Mauka Locale project area. In 1848, when Ehu made his claim, he was the only one living there. A few years later, according to Honolii's testimony to support Ehu's claim, "There are no houses and no people now living on the land. Ehu found himself lonely there, all his neighbors having either died or left the land. Ehu now lives in Wailua." Evidently Ehu may have been the last person to live at and cultivate in the traditional way, the far *mauka* region of Kapa'a.

E. Early Historic Accounts of Kapa'a (1830's-1900's)

Although most of the historic record documents for Kaua'i in this period revolve around missionary activities and the missions themselves, there was indication that the Kapa'a area was being considered for new sugar cane experiments, similar to those occurring in Kōloa. In a historic move, Ladd and Company received a 50 year lease on land in Kōloa from Kamehameha III and Kaua'i Governor Kaikio'ewa of Kaua'i. The terms of the lease allowed the new sugar company "the right of someone other than a chief to control land" and had profound effects on "traditional notions of land tenure dominated by the chiefly hierarchy" (Donohugh, 2001: 88). In 1837, a very similar lease with similar terms was granted to Wilama Ferani, a merchant and U.S. citizen based in Honolulu (Hawai'i State Archives, Interior Dept., Letters, Aug. 1837). The lease was granted by Kauikeaouli for the lands of Kapa'a, Keālia and Waipouli for twenty years for the following purpose:

> ...for the cultivation of sugar cane and anything else that may grow on said land, with all of the right for some place to graze animals, and the forest land above to the top of the mountains and the people who are living on said lands, it is to them whether they stay or not, and if they stay, it shall be as follows: They may cultivate the land according to the instructions of Wilama Ferani and his heirs and those he may designate under him... (Hawai'i State Archives, Interior Dept., Letters, Aug. 1837).

Unlike Ladd & Company which eventually became the Kōloa Sugar Company, there is no further reference to Wilama Ferani and his lease for lands in Kapa'a, Keālia and Waipouli. In a brief search for information on Honolulu merchant, Wilama Ferani, nothing was found. It is thought that perhaps Wilama Ferani may be another name for William French, a well known Honolulu merchant who is documented as having experimented with grinding sugar cane in Waimea, Kaua'i at about the same time the 1837 lease for lands in Kapa'a, Keālia and Waipouli was signed (Joesting, 1984: 152).

In 1849, son of Wai'oli missionary, William P. Alexander, recorded a trip he took around Kaua'i. Although, he focuses on the larger mission settlements like Kōloa and Hanalei, he does mention Kapa'a.

> A few miles from Wailua, near Kapa'a we passed the wreck of a schooner on the beach, which once belonged to Capt. Bernard. It was driven in a gale over the reef, and up on the beach, where it now lies. A few miles further we arrived at Keālia. We had some difficulty crossing the river at this place, owing to the restiveness of our horses. The country here near the shore was rather uninviting, except the valley which always contained streams of water (Alexander, 1991: 123).

In later years, the notorious Kapa'a reef was to become the location of many shipwrecks once a landing was built there in the 1880s.

The first large scale agricultural enterprise in Kapa'a began in 1877 by the Makee Sugar Plantation and the *Hui* Kawaihau (Dole, 1916: 8). The *Hui* Kawaihau was originally a choral society begun in Honolulu whose membership consisted of many prominent names, both Hawaiian and *haole*. It was Kalākaua's thought that the *Hui* members could join forces with

Makee, who had previous sugar plantation experience on Maui, to establish a successful sugar corporation on the east side of Kaua'i. Captain Makee was given land in Kapa'a to build a mill and he agreed to grind cane grown by Hui members. Kalākaua declared the land between Wailua and Moloa'a, the Kawaihau District, a fifth district and for four years the *Hui* attempted to grow sugar cane at Kapahi, on the plateau lands above Kapa'a. After a fire destroyed almost one half of the *Hui's* second crop of cane and the untimely death of one of their principal advocates, Captain James Makee, the Hui began to disperse and property and leasehold rights passed on to Makee's son-in-law and new Makee Plantation owner, Colonel Z.S. Spalding (Dole, 1916: 14).

As part of the infrastructure of the new plantation, a sugar mill was erected and the Makee Landing was built in Kapa'a during the early years of the Makee Sugar Plantation. Following Captain Makee's death, Colonel Spalding took control of the Plantation and in 1885 moved the mill to Keālia (Cook, 1999: 51). The deteriorating stone smokestack and landing were still there well into the 1900s (Damon, 1931:359). Condè and Best (1973:180) suggest that railroad construction for the Makee Plantation started just prior to the mid 1890's. There is one reference to a railroad line leading from the Kapa'a landing to Keālia in 1891. During Queen Lili'uokalani's visit to Kaua'i in the summer of 1891, the royal party was treated to music by a band, probably shipped in from O'ahu. "The band came by ship to Kapa'a and then by train to Keālia" (Joesting, 1984:252). This line is depicted on a 1910 USGS map which shows the line heading south from Keālia Mill and splitting near the present Coral Reef Hotel, one finger going to the old Kapa'a Landing (Makee Landing) and another line heading *mauka*, crossing the present Mō'īkeha Canal, traveling southwest up Lehua Street and through what is now goat pasture, along a plateau and into the *mauka* area behind Kapa'a swamplands. This railroad line was part of a twenty mile network of plantation railroad with some portable track and included a portion of Keālia Valley and in the *mauka* regions of the plateau lands north of Keālia (Condé and Best, 1973:180).

By the late 1800's, Makee Plantation was a thriving business with more than one thousand workers employed (Cook, 1999:51). Hundreds of Portuguese and Japanese immigrants found work on Makee Plantation and the new influx of immigrants required more infrastructure. In 1883, a lease for a school lot was signed between Makee Sugar Company and the Board of Education (Kapa'a School, 1983: 9). Stipulations found in the Portuguese immigrant contracts with Makee Sugar Company stated that "children shall be properly instructed in the public schools" (Garden Island, April 1, 1983). The original Kapa'a School was constructed in 1883 on a rocky point adjacent to the Makee Sugar Company railroad. Traditionally, this point was known as Kaahiahi (Kapa'a School, 1983: 10). In 1908, Kapa'a School was moved to its present site directly *mauka* and up the hill at Mailehune.

A 1905 map of Kapa'a by Fred E. Harvey shows sugarcane cultivation (field 25) where the present day Makai Locale 1 project area is located. Also shown are railroad tracks running just northeast of the Makai Locale 1.

As in much of the rest of Hawai'i, the Chinese rice farmers began cultivating the lowlands of Kapa'a with increasing success in the latter half of the 1800s. Several Hawaiian *kuleana* owners leased or sold their parcels *mauka* of the swamp land to Chinese rice cultivators. Other Chinese rice cultivators appeased to the government for swamplands first leasing and later buying. As a result of the growing rice and sugar industries, the economic activity displaced the house lot *kuleana* on the *makai* side of the marsh for increasing commercial and residential development (Lai, 1985:148-161).

Narrow wagon roads gave way to macadamized roads in the early part of the 20th century. This new road was called the Kaua'i Belt Road and parts of it are thought to have followed the "Old Government Road" (Cook, 1999). In Kapa'a, the present day Kūhiō Highway probably follows the same route as the original Government Road and subsequent Kaua'i Belt Road. The location of the *kuleana* awards in Kapa'a indicates that the majority of the house lots were situated along the Government Road. LCA 3243 names a "road" as one of its boundaries.

F. 20th Century History of Kapa'a (1900-Present)

In the early 1900's, government lands were auctioned off as town lots in Kapa'a to help with the burgeoning plantation population. One *kama'āina* mentioned that in the 1930's and 1940's, the area north of Mō'īkeha Canal in Kapa'a was mostly settled by Portuguese families (Bushnell et al. 2002). The Japanese were also very prominent in the 1920s and 1930s largely replacing the Chinese merchants of the turn of the century in the Kapa'a business sector (Bushnell et al. 2002). The Board of Health, Territory of Hawaii ran a dispensary in Kapa'a at the *makai* edge of Niu Street near the Kapa'a Beach Park parking lot, adjacent to the bike path starting 1926. The lot is presently vacant. A Fire Station was once located in the area now occupied by the Coral Reef Hotel and a Courthouse and jail cell once stood at the location of the present Kapa'a Neighborhood Center. It is not known when these structures were removed or abandoned.

In 1913, Hawaiian Canneries opened in Kapaa at the site now occupied by Pono Kai Resort (Cook, 1999: 56). Through the Hawaiian Organic Act, Hawaiian Canneries Company, Limited purchased the land they were leasing, approximately 8.75 acres, in 1923 (Bureau of Land Conveyances, Grant 8248). A 1923 sketch of the cannery shows only four structures, one very large structure assumed to be the actual cannery and three small structures *makai* of the cannery. A 1933 historic photograph of Kapa'a Town shows an ironwood windbreak on the *makai* side of the cannery adjacent to the railroad. By 1956, 1.5 million cases of pineapple were being packed. By 1960, 3400 acres were in pineapple and there were 250 full time employees and 1000 seasonal employees for the Kapa'a Cannery (Honolulu Advertiser, March 20, 1960). In 1962, Hawaiian Canneries went out of business due to competition from third world countries.

The Ahukini Terminal & Railway Company was formed in 1920 to establish a railroad to connect Anahola, Keālia, Kapa'a to Ahukini Landing and "provide relatively cheap freight rates for the carriage of plantation sugar to a terminal outlet" (Condé and Best, 1973: 185). This company was responsible for extending the railroad line from the Makee Landing, which was no longer in use, to Ahukini Landing, and for constructing the original Waika'ea Railroad Bridge and the Mō'īkeha Makai Railroad Bridge.

In 1934, the Lihue Plantation Company absorbed the Ahukini Terminal & Railway Company and Makee Sugar Company (Condé and Best, 1973: 167). The railway and rolling stock formerly owned by Makee Sugar Company became the Makee Division of the Lihue Plantation. At this time, besides hauling sugar cane, the railroad was also used to haul plantation freight including "fertilizer, etc...canned pineapple from Hawaiian Canneries to Ahukini and Nawiliwili, pineapple refuse from Hawaiian Canneries to a dump near Anahola and fuel oil from Ahukini to Hawaiian Canneries Co., Ltd." (Hawaiian Territorial Planning Board, 1940: 11). Former plantation workers and *kama'āina* growing up in Kapa'a remember when the cannery would send their waste to the pineapple dump, a concrete pier just north of Kumukumu Stream (State Site No. 50-30-08-789:H) by railroad. The structure is built over the water where the rail cars would dump

the pineapple waste. The current would carry the waste to Kapa'a which would attract fish and sharks (Bushnell et al. 2002).

Lihue Plantation was the last plantation in Hawai'i to convert from railroad transport to trucking (Condé and Best, 1973: 167). "By 1957 the company was salvaging a part of their plantation railroad, which was being supplanted by roads laid out for the most part on or close to the old rail bed" (Ibid: 167). By 1959, the plantation had completely converted over to trucking. The Cane Haul Road which begins near the intersection of Haua'ala Road and Kūhiō Highway is thought to date to the late 1950s and follows the alignment of the old railroad until just before or near 'Āhihi Point.

Severe floods in Kapa'a in 1940 led to the dredging and construction of the Waika'ea and Mō'īkeha Canals sometime in the 1940s (Hawaii Territorial Planning Board, 1940: 7). Although the Waika'ea Canal, bordering the Kapa'a Pineapple Cannery, had been proposed as early as 1923, nothing was constructed until after the floods (Bureau of Land Conveyances, Grant 8248). A Master Plan for Kapa'a, published in 1940, asks the Territorial Legislature for funds to be set aside for the completion of a drainage canal and for filling *makai* and *mauka* of the canal (Hawaii Territorial Planning Board, 1940:7). In 1955, reports came out on the dredging for coral proposed for the reef fronting Kapa'a Beach Park (*Garden Island Newspaper*, September 21, 1955). The coral was to be used for building plantation roads. This dredging was later blamed for accelerated erosion along Kapa'a Beach (Garden Island Newspaper, October 30, 1963).

Today, there are several sea walls along the Kapa'a Beach Park to check erosion. Old time residents claim the sandy beach in Kapa'a was once much more extensive than it is now (Bushnell et al. 2002).

Keālia Town slowly dispersed after the incorporation of Makee Sugar Company into Lihue Plantation in the 1930s. Many of the plantation workers bought property of their own and moved out of plantation camps. The plantation camps which bordered Kūhiō Highway were disbanded in the 1980s. The Lihue Plantation began to phase out in the last part of the 20th century. Kapa'a Town suffered after the closing of the Kapa'a Cannery, however the growing tourist industry helped to ease the economic affects of the Cannery's closing.

III. PREVIOUS ARCHAEOLOGICAL RESEARCH

A. Archaeological Studies and Sites in Kapa'a Ahupua'a

The following table outlines the archaeological research (Table 3) and historic properties (Table 4) identified in Kapa'a Ahupua'a. These tables are followed by discussion of the research and historic properties. Table 3 provides a list of archaeological research conducted within Kapa'a Ahupua'a, including columns for source, location, nature of study, and findings. The locations of these archaeological studies are shown in Figure 4. Table 4 is a list of known historic properties within the ahupua'a and includes columns for state site numbers, site type, location and reference. The locations of identified sites within Kapa'a Ahupua'a are shown in Figure 5.

Table 3. Previous Archaeological Studies in coastal Kapa'a

Source	Location	Nature of Study	Findings
Bennett 1931	Island wideIdentifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch	Archaeological Reconnaissance	Identifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch
Handy and Handy 1972	Archipelago-wide	Native Planter study	Discusses "highly developed irrigation system"
Ching 1976	Just south of the Waikaea Drainage Canal	Archaeological Reconnaissance	No significant findings
Hammatt 1981	Upland Kapa'a	Archaeological Reconnaissance	No significant findings
Hammatt 1986	Upper reaches of the Makaleha stream valley.	Archaeological Reconnaissance	No significant findings
Hammatt 1991	Along Kūhiō Highway	Subsurface Testing	Identifies two sub-surface cultural layer sites
Kikuchi and Remoaldo 1992	Around Kapa'a Town	Cemeteries of Kaua'i	Identifies six cemeteries
Spear 1992	South side Waikaea Canal, *mauka* of Kūhiō Highway. (TMK: 4-5-05:04, 09)	Monitoring Report	Designated subsurface site 50-30-08-547

Source	Location	Nature of Study	Findings
Chaffee, Burgett & Spear 1994a	A house lot near the corner of Kukui and Ulu Streets in *mauka* Kapa'a Town. (TMK: 4-5-09:10)	Archaeological Inventory Survey	No significant findings
Chaffee, Burgett & Spear 1994b	Māmane Street Kapa'a Town. (TMK: 4-5-09:51	Archaeological Inventory Survey	No significant findings
Hammatt, Ida & Chiogioji 1994	Proposed bypass routes *mauka* of Kapa'a Town	Archaeological Assessment	No new field work, reviews literature
Hammatt, Ida & Folk 1994	South side Waikaea Canal, *mauka* of Kūhiō Highway (TMK: 4-5-05:06)	Archaeological Inventory Survey	Weak cultural layer designated site 50-30-08-748
Kawachi 1994	Inia Street (Jasper) TMK 4-5-08:33	Burial Report	Designates Site 50-30-08-871
McMahon 1994	"behind the armory in Kapa'a near the god stones" The location is uncertain & "Buzz's near the Coconut Marketplace"	Documents second hand report of burials in two locations	Bones in 3 places reported from behind the armory, 16 bodies reported from the Buzz' s restaurant. No site numbers assigned
Creed, Hammatt, Ida, Masterson & Winieski 1995	Kapa'a Sewer line project, Kūhiō Highway, south and central Kapa'a Town	Archaeological Monitoring Report	Documents cultural layer of site -1848 and (an enlarged) site -1849 & recovery of thirty burials at sites –867, -868, -871, & -1894
Jourdane 1995	1382-A 'Inia Street, *makai* of Kūhiō Highway, central Kapa'a Town	Burial Report	Site 626
McMahon 1996	South side Waikaea Canal, *mauka* of Kūhiō Highway (TMK: 4-5-05:08)	Archaeological Inventory Survey	No significant cultural material
Hammatt, Chiogioji, Ida & Creed 1997	Test excavations focused inland of Kapa'a Town	Archaeological Inventory Survey	Four test trenches were excavated inland of Kapa'a Town
Borthwick and Hammatt 1999	Kapa'a Seventh-Day Adventist Church at 1132 Kūhiō Highway	Archaeological Monitoring and Burial Treatment Plan	Monitoring was indicated as this parcel lay within the designated Site 50-30-08-1848.

Source	Location	Nature of Study	Findings
Bushnell and Hammatt 2000	Seventh-Day Adventist Church, *makai* of Kūhiō Highway, south of the Waikaea Canal	Archaeological Monitoring Report	Minimal findings (one piece of worked bone)
Callis 2000	Kapa'a Beach Park	Burial Removal and Archaeological Monitoring Report	Human Burial
Perzinski and Hammatt 2001	Kūhiō Highway on the margins of the Waikaea Canal	Archaeological Monitoring Report	No significant cultural material
Elmore and Kennedy 2003	Kūhiō Highway	Archaeological Monitoring Report	No significant cultural material
Dega, Michael F. and James Powell 2003	Kūhiō Highway	Archaeological Monitoring Report	Human Burials

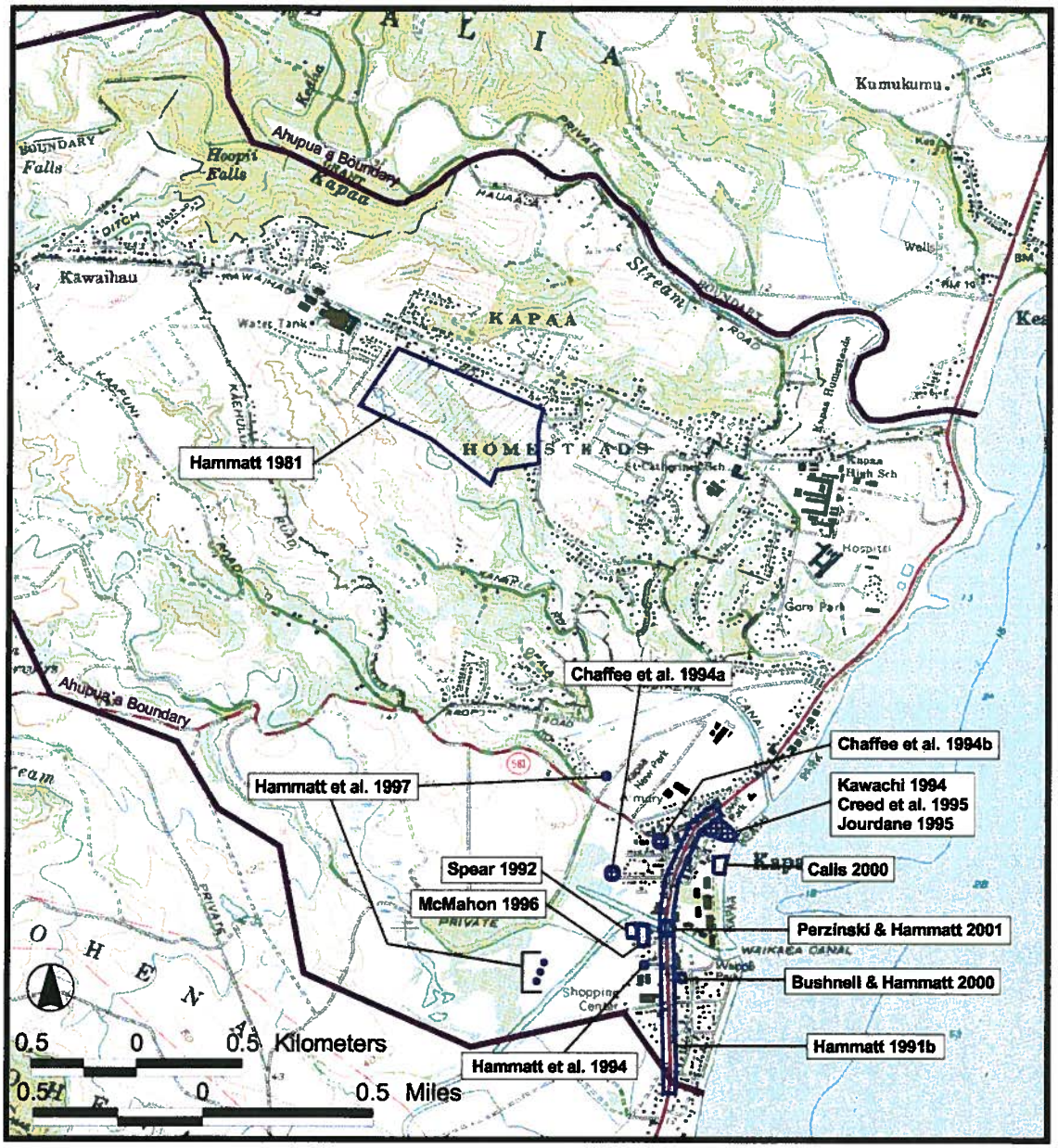


Figure 4. Map showing previous archaeological sites in Kapa'a. The majority of study areas are located within urban Kapa'a away from the shore and mountain areas.

Table 4. Historic Properties in Coastal Kapa'a Ahupua'a

Site # 50-30-08-	Site Type/ Name (if any)	Location	Site Constraints	Reference
B001	Historic Cemetery	South of bend of Kapa'a Stream, a kilometer *mauka* from Kūhiō Highway	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B002	Historic Cemetery	Just *mauka* from Kūhiō Highway, south of Kapa'a Stream	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B003	Kapa'a Public Cemetery	South of Kanaele Road, approximately one kilometer inland of Kūhiō Highway	Appears to be a discrete historic cemetery	Kanaele Road; Kikuchi and Remoaldo 1992
B004	Historic Cemetery	North of Apopo Road, approximately one kilometer inland of Kūhiō Highway	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B013	Historic Cemetery	Just *mauka* from Kūhiō Highway, north of the Waikaea Canal	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B014	All Saints Episcopal Church Cemetery	Just *mauka* from Kūhiō Highway, south of the Waikaea Canal	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992:62-65
-547	sub-surface features including a fire pit and a possible house foundation	South of bend of Waikaea Canal, *mauka* of Kūhiō Highway	Archaeological monitoring in the vicinity is recommended	Spear 1992:3

Site # 50-30-08-	Site Type/ Name (if any)	Location	Site Constraints	Reference
-626	Burial	Inia Street, *makai* of Kūhiō Highway, central Kapa`a	Consultation and monitoring in vicinity indicated	Jourdane 1995
-748	Minimal findings, a weak cultural layer (buried A-horizon)	South of the bend of the Waikaea Canal, *mauka* of Kūhiō Highway	Considered no longer significant within project area	Hammatt, Ida & Folk 1994
-867	1 set of human remains	Kukui Street, just *mauka* of Kūhiō Highway, Kapa`a Town	Consultation and monitoring in vicinity indicated	Creed et al. 1995:50
-868	1 set of human remains	Lehua Street *mauka* of Kūhiō Highway, Kapa'a Town	Consultation and monitoring in vicinity indicated	Creed et al. 1995:50
-871	13 sets of human remains (Creed et al. 1995:50)	Inia Street, *makai* of Kūhiō Highway	Consultation and monitoring in vicinity indicated	Kawachi 1994, Creed et al. 1995:50
1848	Cultural layer & sub	Along Kūhiō Highway between Wana Road and the Waikaea Drainage Canal	Archaeological monitoring in the vicinity is recommended	Hammatt 1991; Creed et al. 1995
-1849	Cultural layer & sub-surface features; Creed et al. 1995:53 expands boundaries to incl. burial sites, -626, -867, -868 - 871, and -1894	Along Kūhiō Highway between Inia Street and Kauwila Street extending to the coast	Consultation and monitoring in vicinity indicated	Hammatt 1991; Creed et al. 1995
-1894	11sets of human remains	Ulu Street, just N of Kūhiō Highway, Kapa'a Town	Consultation and monitoring in vicinity indicated	Creed et al. 1995:50

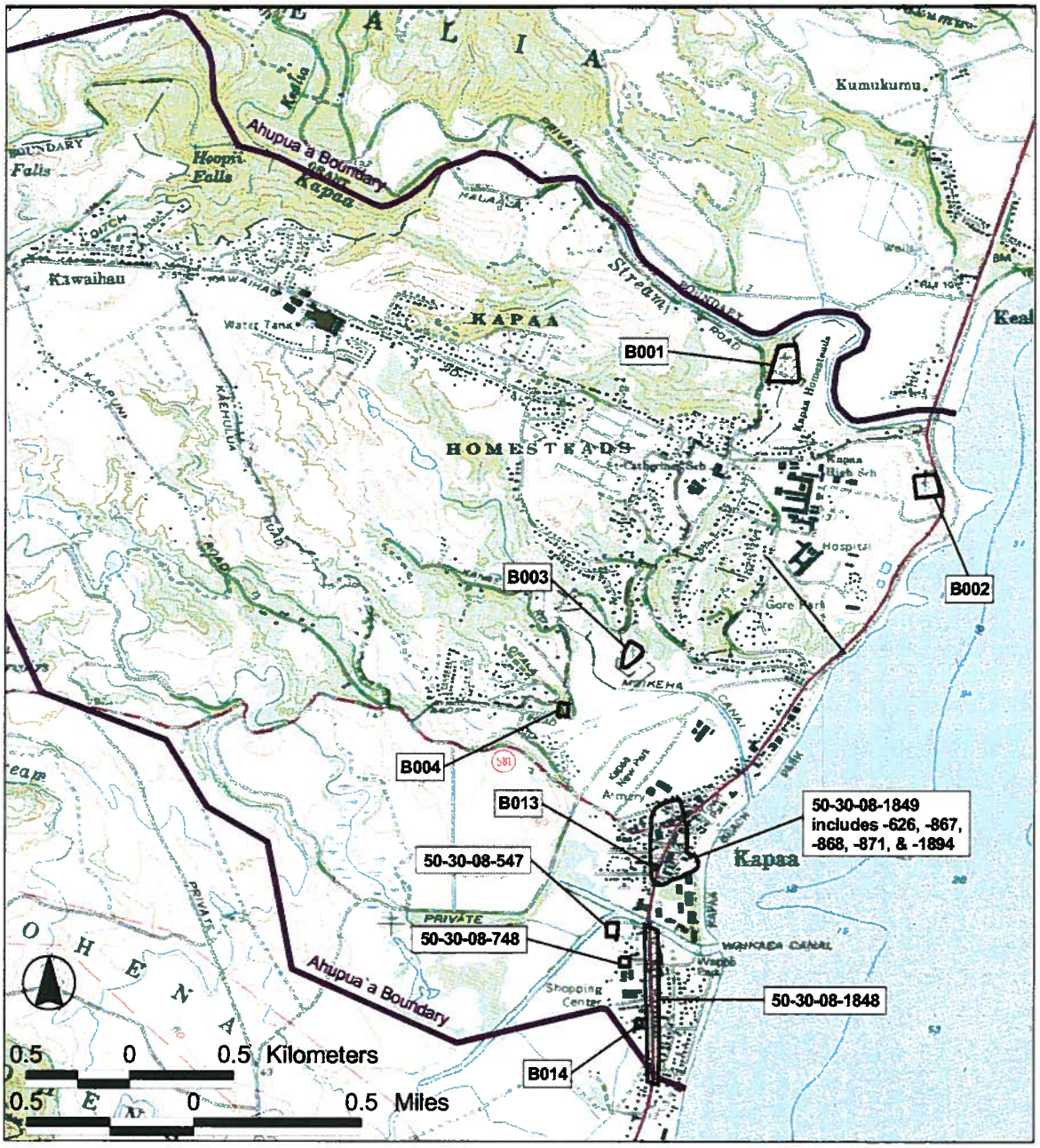


Figure 5. Map showing previously documented archaeological sites in Kapa'a.

B. Pattern of Archaeological Sites in Kapa'a

The pattern of archaeological studies in Kapa'a Ahupua'a is somewhat skewed with a dozen projects in urban Kapa'a Town and very little work along the coast (Figure 4). Major archaeological sites have been found in the Kapa'a Town area including extensive cultural layers with burials and other cultural features underlying Kūhiō Highway near All Saints Gym and near the older part of Kapa'a Town between Waika'ea Canal and Kapa'a Beach Park, *makai* of Kūhiō Highway (Hammatt 1991; Kawachi 1994; Creed et al. 1995; Jourdane 1995; Callis 2000). The *mauka-makai* extent of these cultural layers has not been clearly defined. These extensive cultural deposits associated with pre-historic and early historic habitation are known to exist in a relatively narrow sand berm that makes up the physiogeography of Kapa'a. The areas *mauka* of Kapa'a Town are marshy although much of it has been filled in recent decades. The five *kuleana* awarded during the Mahele are located adjacent to the present highway. The more *mauka* studies (Spear 1992,Chaffee et al. 1994a & 1994b, Hammatt et al. 1994, 1997, McMahon 1996) are thought to be located towards the *mauka* fringe of the sand berm, approaching more marshy conditions and have generally reported no significant or minimal findings. Less than 1.5 km to the south of Waika'ea Canal is another extensive subsurface, cultural deposit which is associated with a pre-contact fishing encampment located at the southern boundary of Waipouli adjacent to Uhalekawa'a Stream (Waipouli Stream) and the ocean (Hammatt et al. 2000).

Anticipated Sites based on historic and archaeological studies in *mauka* Kapa'a would be evidence of cane cultivation and historic railroad tracks for alternative Sites Makai Locale 1 and 2, and possible terracing for lo'i cultivation within the Mauka Locale.

IV. RESULTS OF FIELD CHECK

A. Mauka Locale

On June 10th, 2004, Cultural Surveys Hawai'i Inc. archaeologist Karl Van Ryzin, B.A., and supervising archaeologist David Perzinski, B.A., made a field inspection on the Mauka Locale proposed water tank installation project area. Access was made via Kahuna Road.

Survey transects oriented north-south were conducted within the project area. The Mauka Locale is relatively level with vegetation in the project area dominated by albezia, ginger, bamboo, papaya, *ti*, ferns, banana, California grass, and various weeds and vines (Figures 6 and 8). Modern-day trash was scattered along the northeast boundary near Kahuna Road (Figure 9). No archaeological sites were observed.

Figure 6. Mauka Locale project area, view to the south.

Figure 7. Existing water tank northwest of *mauka* project area, view to the northwest

Figure 8. Mauka Locale project area, view to the south.

Figure 9. Mauka Locale project area showing modern day trash along northeast boundary, view to the north.

V. RECOMMENDATIONS

The field checks examined the areas of proposed impact and found no archaeological sites or historic preservation concerns in the vicinity of any of the parcel. We recommend no further historic preservation work. As always, if in the unlikely event that any human remains or other significant subsurface deposits are encountered during the course of development activities all work in the immediate area should stop and the State Historic Preservation Division should be promptly notified.

VI. REFERENCES

Akina, Joseph
1913 "*I Ke hou i Ka Lulu-o-Moikeha i ka laula o Kapa'a*", *Kuokoa.* May 2-9, 1913. Bishop Museum Archives HEN Place Names, Kaua'i.

Alexander, William Patterson
1991 "A Tour of Kaua'i in 1849: Private Journal of William DeWitt Alexander," *The Kaua'i Papers*, Kaua'i Historical Society, A Kaua'i Historical Society Publication, Lihue, Kaua'i, HI.

Bass, William M.
1995 Human Osteology: A Laboratory and Field Manual of the Human Skeleton (4th edition), Missouri Archaeological Society, Columbia, MO.

Beckwith, Martha
1970 Hawaiian Mythology, The University Press of Hawai`i, Honolulu.

Bennett, Wendell C.
1931 The Archaeology of Kaua`i, Bishop Museum Bulletin 80, Honolulu, HI.

Bishop Museum Archives
HEN I: 214 "Heiaus of Kealia and Kapa'a" and "Well Known Things [or Places]".

HEN I: 215 "Famous Things mentioned by Two Men".

HEN I: 216 "Heiaus from Kapa'a to Kealia" and "Things for which Kapa'a was Known".

Bureau of Land Conveyances
Grant 8248

Bushnell, K.W., Melanie Mann, Douglas Borthwick, Tony Bush, Todd Tulchin, David Shideler and Hallett H. Hammatt
2002 Archaeological Inventory Survey for the Proposed Kapa`a/Keālia Bike and Pedestrian Path, Kapa`a and Keālia, Kawaihau District, Kaua`i Island, Hawaii (TMK 4-5, 4-6-14, 4-7-03 & 04). Cultural Surveys Hawai`i, Inc. Kailua, HI.

Chafee, David B. , Berdena Burgett and Robert L. Spear
1994a An Inventory Survey of a Kukui Street Houselot, Kapa`a Ahupua`a, Kawaihau District, Puna, Island of Kaua`i (TMK: 4-5-09:10), SCS Inc., Kāne`ohe, HI.

1994b An Inventory Survey of a Māmane Street Houselot, Kapa`a Ahupua`a, Kawaihau District, Puna, Island of Kaua`i (TMK: 4-5-09:51), SCS Inc., Kāne`ohe, HI.

Ching, Francis K. W.
1968 Archaeological Surface Survey; Wailua State Park, Kaua`i, State of Hawaii, Dept. of Land and Natural Resources, Honolulu, HI.

1976 Letter Report: Archaeological Reconnaissance - Report, Kapa'a "Wastewater Treatment and Disposal System, ARCH 14-96, Letter to R. M Towill Corporation, ARCH, Lawai, Kaua'i, HI.

Condé, Jesse C. and Gerald M. Best
1973 Sugar Trains, Narrow Gauge Rails of Hawaii, Glenwood Publishers, Felton, CA.

Cook, Chris
1999 "Kaua`i, the Garden Island: A Pictorial History of the Commerce and Work of the People", Donning Co., Virginia Beach, VA.

Creed, Victoria, Hallett H. Hammatt, Gerald K. Ida, Ian Masterson and John Winieski
1995 A Summary of the Archaeological Monitoring for the Kapa'a Sewerline Project Waipouli and Kapa'a Ahupua'a, Puna Disctric, Kaua'I (TMK:4-3-09 and 4-5-03 to 11), Cultural Surveys Hawaii, Kailua, HI.

Damon, Ethel M.
1934 The Heiau at Wailua, The Kaua'i Historical Society by the Garden Island Press, Līhu`e, Kaua`i, HI.

1931 Koamalu, two vols. Privately printed at the Honolulu Star-Bulletin Press, Honolulu.

Dega, Michael F. and James Powell
2003 Archaeological Monitoring During Phase I of the Kaua'i Rural Fiber Optic Duct Lines Project, Kaua'i Island, Hawai'i. Scientific Consultant Services

Dole, Charles S.
1916 "The Hui Kawaihau" pp.8-15. A Paper read at the November meeting of the Kaua'i Historical Society on November 16, 1916. In Lihue, Kaua`i.

Donohugh, Donald
2001 The Story of Kōloa, A Kaua'i Plantation Town, Mutual Publishing, Honolulu, HI.

Foote, Donald E. E. L. Hill, S. Nakamura and F. Stevens
1972 Soil Survey of the Islands of Kaua'I, O'ahu, Maui, Molokai and Lanai, State of Hawai'i U.S. Department of Agriculture, U.S. Government Printing Office, Washington D.C.

Fornander, Abraham
1916-19 Fornander Collection of Hawaiian Antiquities and Folk-Lore, with translations edited and illustrated with notes by Thomas G. Thrum, Volume 4, First series, 1916 - l917 notes by Thomas G. Thrum, Memoirs of the Bernice P. Bishop Museum, Vols. 4, 5, 6, Honolulu, HI.

Garden Island Newspaper
1955 "Geologists Says Kapa'a Coral Removal No Threat to Town". September 21, 1955.

1963 "Kapa'a Blames Federal Role As Erosion Continues. Says Barrier on Reef is Required". October 30, 1963.

1983 "Centennial Year, Kapa`a School Wants Pix of its 100 Years". April 1, 1983.

Giambelluca, Thomas W., Michael A. Nullet and Thomas A. Schroeder
1986 Rainfall Atlas of Hawai'i, Department of Land and Natural Resources, Honolulu, HI.

Hammatt, Hallett H.

1981 Archaeological Reconnaissance of 52.56 Acres for a Proposed subdivision, TMK:4-6-13-1, Kapa`a, Puna, Kaua`i Island, ARCH Report 14-236, Prepared for Waialeale Partners.

1986 Archaeological Reconnaissance of the Makaleha Springs Water Source Development, Kapa`a, Kaua`i TMK: 4-6-01:1, Cultural Surveys Hawaii, Kailua, HI.

1991 Archaeological Subsurface Testing for the Proposed Kapa'a Sewer line, Wailua, Olohena, Waipouli and Kapa'a, Kaua'i, Cultural Surveys Hawaii, Kailua, HI.

Hammatt, Hallett H., Rodney Chiogioji, Gerald K. Ida and Victoria S. Creed

1996 An Archaeological Inventory Survey for the Kūhiō Highway Widening and Bypass Options Within the Ahupua'a of Wailua, South Olohena, North Olohena, Waipouli & Kapa`a, Island of Kaua'i, Cultural Surveys Hawai'i, Inc., Kailua, HI.

Hammatt, Hallett H., Gerald K. Ida and William H. Folk

1994 Archaeological Inventory of a 1.87-Acre Parcel, Kapa'a, Kaua'I (TMK 4-5-05:6), Rev. August 1994, Cultural Surveys Hawai'i, Kailua, HI.

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

1972 Native Planters in Old Hawaii: Their Life, Lore, and Environment, B.P. Bishop Museum Bulletin 233, B.P. Bishop Museum, Honolulu, HI.

Hawaii State Archives

1837 Interior Department, Land, Incoming Letter. August 1837.

1882 Interior Department, Letter book, Vol. 20, p. 426, Letter from Spalding to the Honorable Jacob Hardy, Circuit Judge–Fourth Circuit Kaua'i.

Hawaiian Territorial Planning Board

1940 Master Plan of the Town of Kapa'a, In collaboration with the Kaua'i County Board of Supervisors, Publication No. 8. Advertiser Publishing Co., Honolulu, HI.

Honolulu Advertiser

1997 "Amfac to put more land up for sale: Tracts on Kaua'i, Big Island" by Mike Gordon. July 7, 1997. Section B1.

1960 "Kaua'i Tries to See into Future. March 20, 1960.

Joesting, Edward

1984 Kaua'i, The Separate Kingdom, University of Hawaii Press and Kaua'i Museum Association, Ltd., Honolulu.

Jourdane, Elaine

1995 Inadvertent Discovery of Human Remains at 1382-A Inia Street, Kapa'a, Kaua'i (Kapa'a Sewerline Project Laterals) Site 626, SHPD, Honolulu, HI.

Kalakaua, David

1888 The Legends and Myths of Hawaii, Edited by R.M. Dagget, Charles L. Webster and Co., New York.

Kamakau, Samuel Manaiakalani
1976 The Works of the People of Old, Na Hana a ka Po`e Kahiko, Bishop Museum Special Publication, No. 61, Honolulu, HI.

Kapa'a Elementary School
1982 Kapa`a School 1883-1983: A "Century of Knowledge". Kapa'a Elementary, Kapa`a, Kaua`i.

Kawachi, Carol T.
1994 Inadvertent Burial at 1316 Inia Street (Jasper) TMK 4-5-08:33, Kapa'a, Kawaihau, Kaua'I 50-30-08-871, State Historic Preservation Division, Honolulu, HI.

Kikuchi, William K. and Susan Remoaldo
1992 Cemeteries of Kaua`i, Volume 1, Kaua`i Community College and University of Hawai`i, Puhi, Kaua`i, HI.

King, Robert D.
1935 "Districts in the Hawaiian Islands" In Coulter, John Wesley (compiler)

A Gazetteer of the Territory of Hawaii, University of Hawaii Research Publications, No. 11, University of Hawaii, Honolulu, Hi.

Krogman, W.M. and M.Y. Isçan
1986 The Human Skeleton in Forensic Medicine (2nd Edition), Springfield, IL.

Lai, Violet L. assisted by Kum Pui Lai
1985 He Was a Ram, Wong Aloiau of Hawaii, Published for the Hawaii Chinese History Center and the Wong Aloiau Association by University Press of Hawaii, Honolulu.

Martini, Frederic H. and Michael J. Timmons
1995 Human Anatomy. Prentic Hall, Inc., Englewood Cliffs, NJ.

Mc Kern, T.W. and T.D. Stewart
1957 Skeletal Age Changes in young American Males. Quartermaster Research and Development Command Technical Report EP-45, Natick, MA.

McMahon, Nancy A.
1994 Inadvertent Burial Find, Kapa`a, Kawaihau, Kaua'i, SHPD, Honolulu, HI.

1996 Archaeological Inventory Survey for 5 Unit Apartment, TMK: 4-5-05:8, Kapa'a, Kawaihau, Kaua'i, Exploration Associates, LTD., Koloa, Kaua'i, HI.

Meindl, R.S. and C.O. Lovejoy
1985 Ectocranial Suture Closure: A Revised Method for the Determination of Skeletal Age at Death Based on the Lateral-Anterior Sutures. American Journal of Physical Anthropology 68: 57-66.

Nakuina, Moses K.
1990 The wind Gourd of La`amaoma, Translated by Esther T. Mookini and Sarah Nakoa, Kalamaku Press, Honolulu.

Office of the Commissioner of Public Lands
1929 Indices of Awards, Made by the Board of Commissioners to Quiet Land Title in the Hawaiian Islands.

Pukui, Mary Kawena

1983 `Ōlelo No`eau: Hawaiian Proverbs and Poetical Sayings, Bishop Museum Special Publication No.71, Bishop Museum Press, Honolulu, HI.

1986 Hawaiian Dictionary, 2nd Edition, University of Hawaii Press, Honolulu, HI.

1974 Place Names of Hawaii, University of HawaiiPress, Honolulu, HI.

Rice, William Hyde

1974 Hawaiian Legends, Bernice P. Bishop Museum Bulletin 3, Honolulu, HI; originally published 1923, Kraus Reprint, Millwood, New York, N.Y.

1923 Hawaiian Legends, Bernice P. Bishop Museum Bulletin 3, Honolulu.

Snow, Charles E.

1974 Early Hawaiians: An Initial Study of Skeletal Remains from Mokapu, O`ahu. The University Press of Kentucky, Lexington, KY.

Spear, Robert L.

1992 Letter Report Concerning Monitoring for the Cost-U-Less Project Kapa`a, Kaua'i, HI.(TMK: 4-5-5:4&9), Scientific Consultant Services Inc., Honolulu, HI.

Thrum, Thomas G.

1906 "Heiaus and Heiau Sites Throughout the Hawaiian Islands, Kaua'i, in: Hawaiian Almanac and Annual 1907, pp. 36-48, Honolulu, HI.

1923 More Hawaiian Folk Tales, A.C. McClurg & Co., Chicago, IL.

Ubelaker, D.H.

1989 Human Skeletal Remains: Excavation, Analysis, Interpretation (2nd Edition). Washington D.C.: Taraxacum.

White, Tim D. and Pieter A. Folkens

1991 Human Osteology. Academic Press, Inc., San Diego, CA.

Wichman, Frederick B.

1998 Kaua`i Ancient Place Names and Their Stories. University of Hawaii Press: Honolulu

VII. APPENDIX

A. Methods

On June 10th, 2004 a field inspection of alternative sites (Makai Locale 1 and Makai Locale 2) for the proposed water tank installation project area was conducted by Cultural Surveys Hawai'i Inc. archaeologist Karl Van Ryzin, B.A., and supervising archaeologist David Perzinski, B.A. Survey transects oriented north-south were conducted in both parcels with archaeologists spaced apart 10 m. Field observations were recorded and photographs were taken of the project areas. The work was conducted under the overall supervision of principal archaeologist Hallett H. Hammatt, Ph.D.

Historical research included a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; studies of documents at Hamilton Library of the University of Hawai'i, and study of maps at the Survey Office of the Department of Land and Natural Resources. Nineteenth-century Land Commission Award claim records were accessed via the Internet from the Mahele Database prepared by Waihona 'Aina Corp.

B. Natural Setting

1. Makai Locale 1 Project Area

The Makai Locale 1 project area is located at the corner of Kawaihau Road and Ka'apuni Road (Figures 10 and 11) at an elevation of 91m (300ft) and approximately 4.18 km (2.6 mi) from the coast. Foote et al (1972) describes the soil in this area as being "Puhi Silty clay loam" (PnB) which is defined as being "well-drained soils on uplands on the island of Kaua'i. These soils developed in material derived from basic igneous rock. They are nearly level to steep. Elevations range from 175 to 500 feet." (Foote et al.1972). Makai Locale 1 receives an average annual rainfall of approximately 2000 mm (79 inches) (Giambelluca 1986:47). A brief summary of observations on the natural setting is presented in the results of field check section of this study.

2. Makai Locale 2 Project Area

The Makai Locale 2 project area is located approximately 400 m north of Lower Kapahi Reservoir and immediately south of Kapa'a Stream (Figures 10 and 12). The elevation runs from 60 m to 91 m (200-300 ft) and is approximately 4.59 km (2.85 mi) to the coast. Foote et al (1972) described three types of soils within this project area – rough broken land (rRR), rock outcrop (rRO), and Hanalei silty clay (HrB). Rough broken land consists of "very steep land broken by numerous intermittent drainage channels. In most places it is not stony. It occurs in gulches and on mountainsides on all the islands except Oahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active." (Foote et al.1972). Rock outcrop consists of "areas where exposed bedrock covers more than 90 percent of the surface. It occurs on all five islands. The rock outcrops are mainly basalt and andesite. This land type is gently sloping to precipitous. Elevations range from nearly seal level to 10,000 feet. … This land

type is not suited to farming. It is used for water supply, wildlife habitat, and recreation" (Foote et al.1972). Hanalei silty clay consists of "somewhat poorly drained to poorly drained soils on bottom lands of the islands of Kaua'i and O'ahu. These soils developed in alluvium derived from basic igneous rock. They are level to gently sloping." (Foote et al.1972). Makai Locale 2 receives an average an annual rainfall of approximately 2000 mm (79 inches) (Giambelluca 1986:47). A brief summary of observations on the natural setting is presented in the results of field check section of this study.

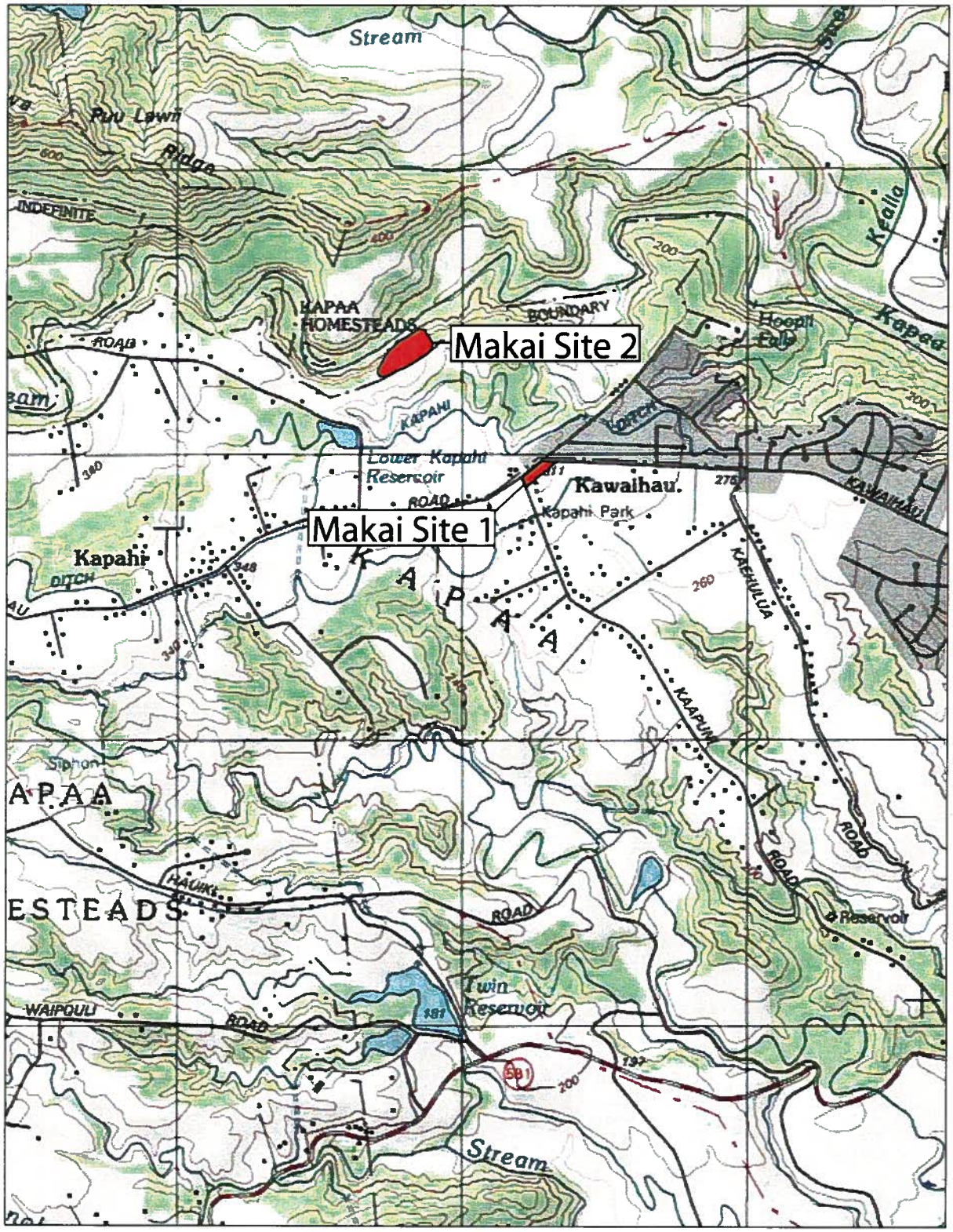


Figure 10 Portion of USGS map showing location of alternative sites Makai Site 1 and Makai Site 2

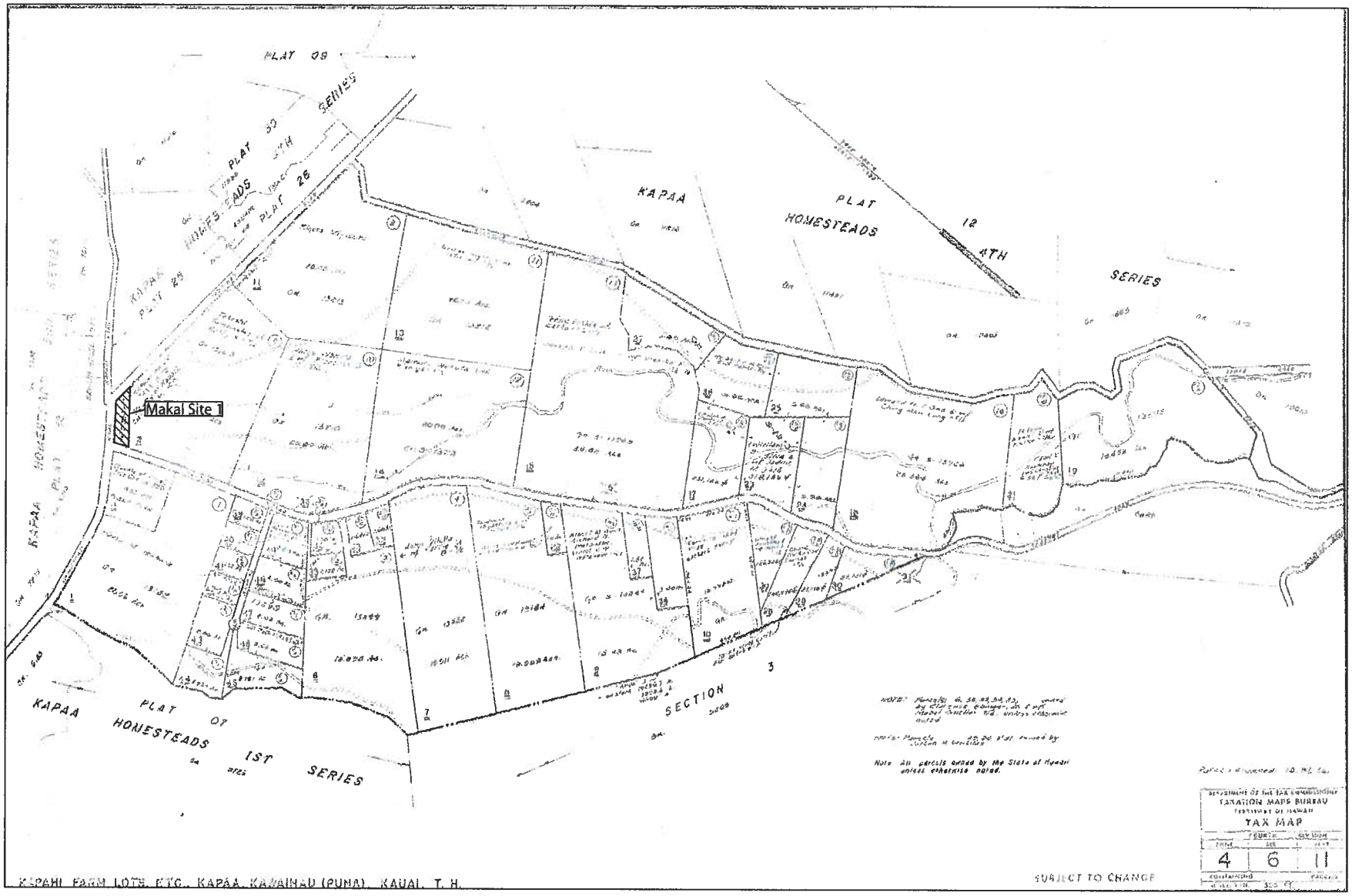


Figure 11 TMK 4-6-11 showing Makai Locale 1 project area

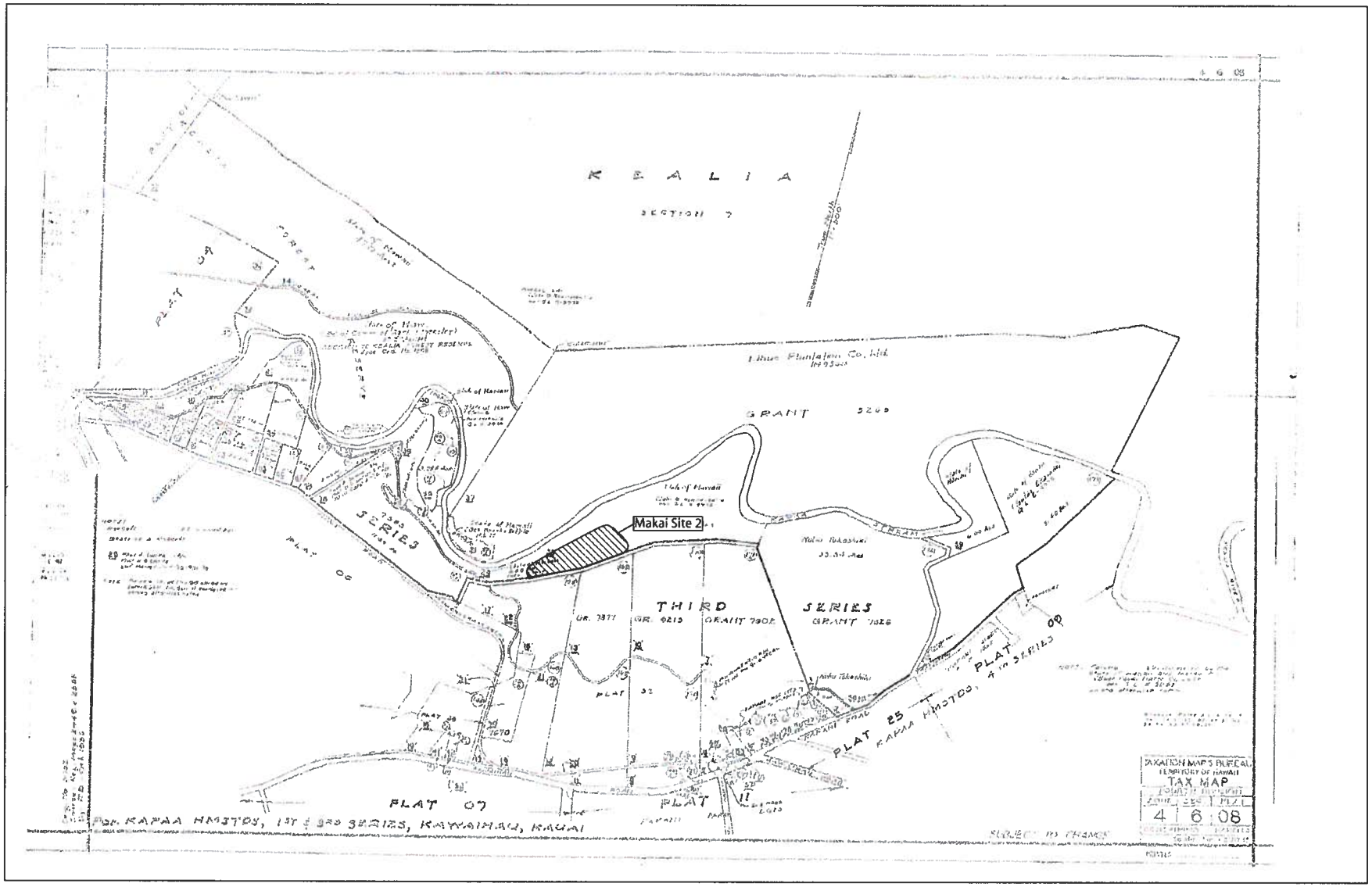


Figure 12. TMK 4-6-08 showing Makai Locale 2 project area.

C. Results of fieldwork

I. Makai Locale 1

On June 10th, 2004, Cultural Surveys Hawai'i Inc. archaeologist Karl Van Ryzin, B.A., and supervising archaeologist David Perzinski, B.A., made a field inspection of the Makai Locale 1 alternative water tank installation project area. Access was via Highway 56, turning off to the west on Highway 581, then turning off to the northwest on Kaehulua Road.

Makai Locale 1 is comprised of a 0.84-acre State property of which a portion is fenced and contains an existing 0.2 MG wooden reservoir (Figure 13). Survey transects oriented north-south were conducted through the project area. Based on observations the entire existing and proposed tank locale had previously been bulldozed and graded. The existing tank area consists of mowed grass lawn. The remainder of the property is an open, level pasture containing large patches of California grass, bananas, and various weeds and vines (Figures 14 and 15). No archaeological sites were observed. Based on background research Makai Locale 1 was, during the early 20th century, under sugar cane cultivation.

Figure 13. Fenced section of Makai Locale 1 project area, view to the southwest.

Figure 14. Makai Locale 1 project area, view to the east

Figure 15. Makai Locale 1 project area, view to the southeast.

A. Makai Locale 2

On June 10th, 2004, Cultural Surveys Hawai'i Inc. archaeologist Karl Van Ryzin, B.A., and supervising archaeologist David Perzinski, B.A., made a field inspection on the Makai Locale 2 alternative water tank installation project area. Access was via an unmarked privately owned dirt road that runs northeast from Kahuna Road.

The Makai Locale 2 is comprised of an unmarked, approximately 3.7 acre site off a dirt access road and is located immediately south of Kapa'a Stream (Figure 12). The majority of the project area lies on a 45 to 90 degree angle slope that descends down into Kapa'a Stream (Figures 16 and 17). Survey transects oriented north-south were conducted throughout the relatively level upper portion of the project area. For the lower portion of the project area transects were done along the contour of the slope. Vegetation is dense with the project area dominated by ginger, ferns, *ti*, palms, albezia, and exotic grasses. No archaeological sites were observed.

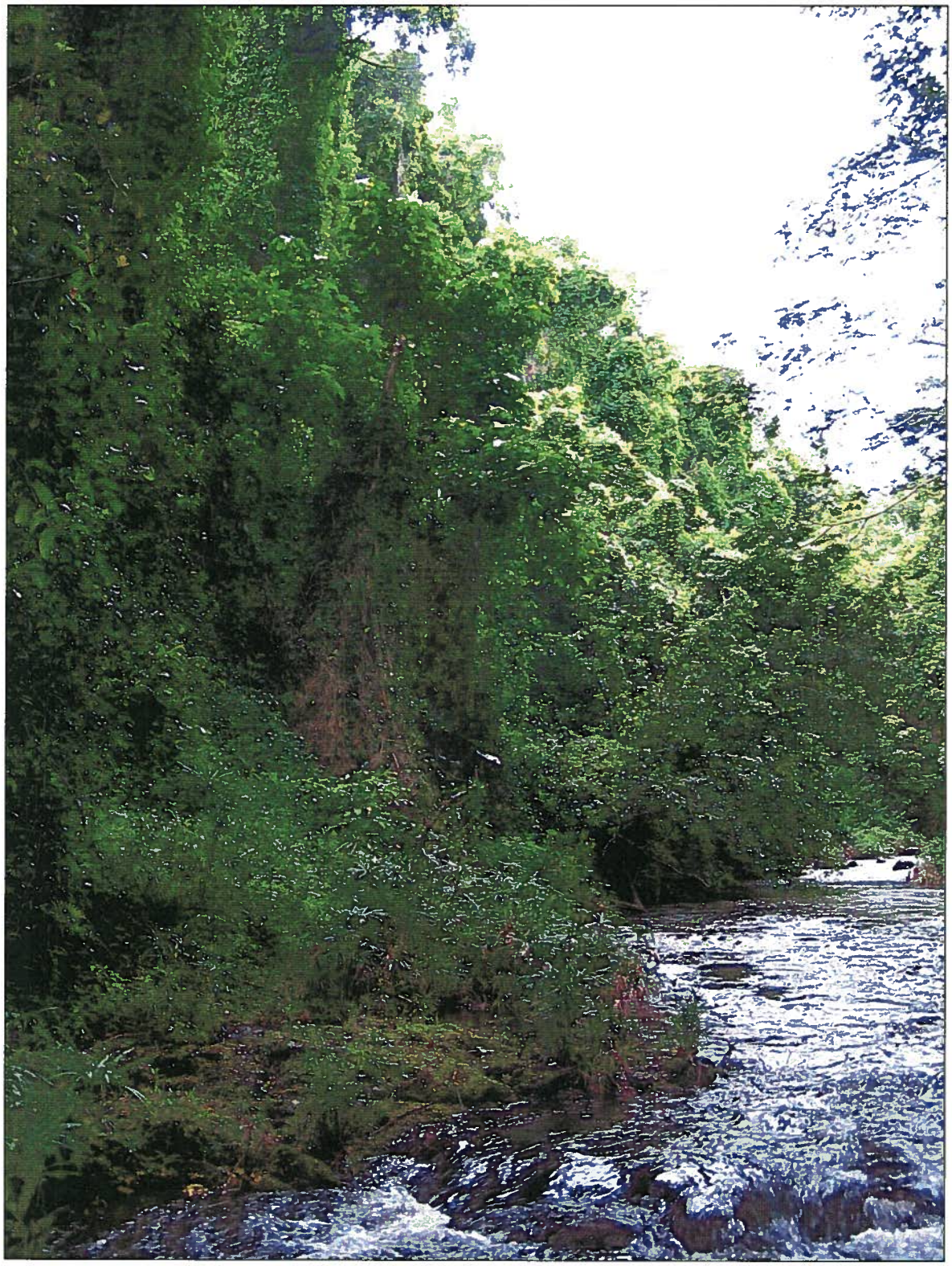


Figure 16. Makai Locale 2 project area south of Kapa'a stream showing steep slope, view to the west.

Figure 17. Makai Locale 2 project area showing dense vegetation and steep slope, view to the east.

B. Recommendations

The field checks examined the areas of proposed impact and found no archaeological sites or historic preservation concerns in the vicinity of any of the two alternative parcels. We recommend no further historic preservation work. As always, if in the unlikely event that any human remains or other significant subsurface deposits are encountered during the course of development activities all work in the immediate area should stop and the State Historic Preservation Division should be promptly notified.

Appendix E

Cultural Impact Assessment

A Cultural Impact Assessment For A Proposed Water Reservoir, Kapa'a Ahupua'a, Kawaihau District, Kaua'i

TMKs 4-6-11:3, 4-6-08:24, 4-6-03:10

by

Auli'i Mitchell B.A.

and

Hallett H. Hammatt Ph.D.

Prepared for

Belt Collins Hawai'i Ltd.

by

Cultural Surveys Hawai'i, Inc.

October 2004

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. INTRODUCTION

A. Project Background

At the request of Belt Collins Hawai'i Ltd., Cultural Surveys Hawai'i, Inc. (CSH) has conducted a cultural impact assessment for a proposed inland (*mauka)* water reservoir locality at Kapa'a, Kaua'i Island (TMK 4-6-3:10) (Figures 1 & 2). Two other alternate seaward (*makai*) possible localities (*Makai* 1 locale and *Makai* 2 locale) in Kapa'a (TMK 4-6-11:3, 4-6-08:24) were also assessed prior to the selection of the *mauka* locality as a preferred alternative for the proposed reservoir (See Appendix for data developed on the *makai* localities). This assessment was accomplished to address any historic preservation or cultural impact issues that might be raised by the proposed development of a water reservoir within one of the three parcels.

B. Scope of Work

Because of previous disturbance associated with the construction of the existing *mauka* and *makai* reservoirs and access roads a relatively modest scope of work was recommended. The agreed upon scope of work includes:

1) Examination of historical documents, Land Commission Awards, and historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record to develop a Cultural landscape background study,

2) A review of the existing archaeological information pertaining to the sites in the vicinity as they may allow us to reconstruct traditional land use activities and identify and describe the cultural resources, practices and beliefs associated with the parcel and identify present uses, if appropriate.

3) Limited consultations with agencies and individuals knowledgeable regarding the project area vicinity.

4) Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report will assess the impact of the proposed action on the cultural practices and features identified.

C. Methods

Historical documents, maps and existing archaeological information pertaining to historical properties in the vicinity of this project were researched at the State Historic Preservation Division Library, Cultural Surveys Hawai'i Library, Asian Pacific Digital Library of Kapi'olani Community College, and the University of Hawai'i's Hamilton Library. The Office of Hawaiian Affairs, O'ahu Island Burial Council, Hui Mālama O Nā Kūpuna, and members of other community organizations were contacted in order to identify potentially knowledgeable individuals with cultural expertise and or knowledge of the study area and the surrounding vicinity. A discussion of the consultation process can be found in the section on "Community Consultations." Please refer to Table 5 for a complete list of individuals and organizations contacted.

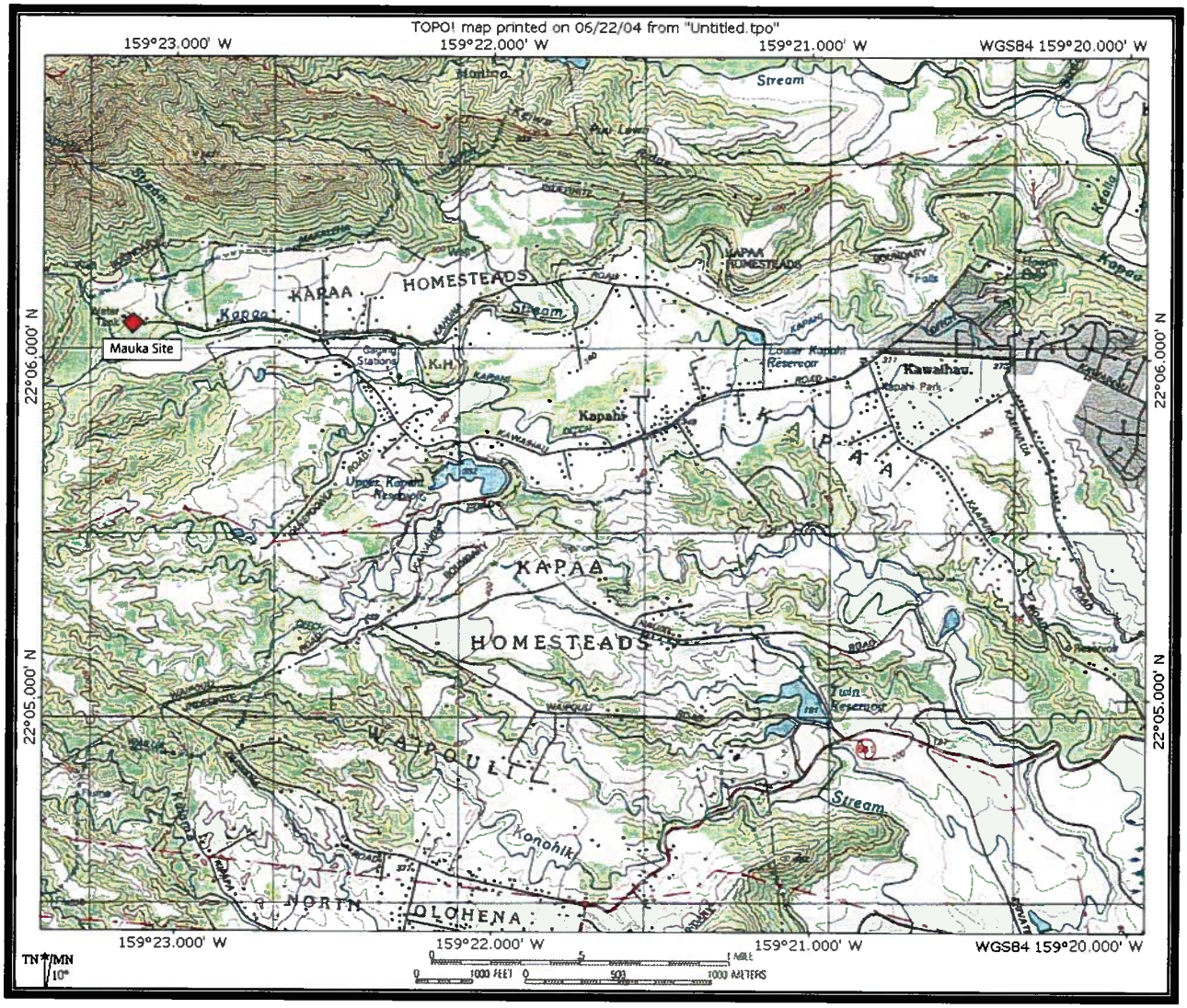


Figure 1. Portion of U.S. Geological Survey map showing, *mauka* project area

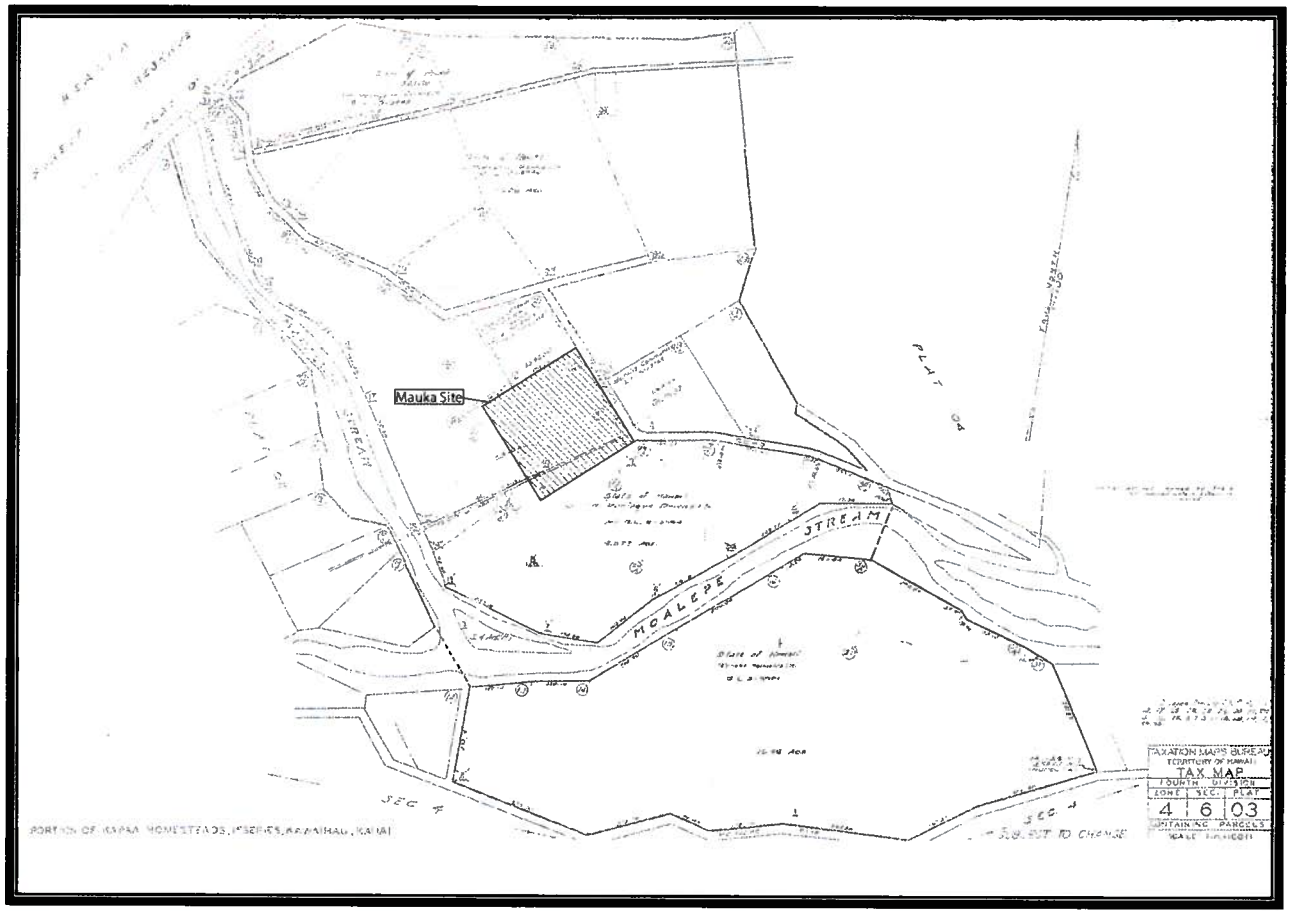


Figure 2. TMK Map 4-6-03 showing *mauka* project area

D. Natural Setting

The *Mauka* Locale project area is located in the uplands of Kapa'a Stream Valley west (*mauka*) of Kapa'a Town at Kapa'a Ahupua'a, Kawaihau District, on the east side of Kaua'i Island. The project area is located immediately south of where Kahuna Road terminates, just northeast of Makaleha Stream. The project area lies at an elevation of 150 m (500 ft) and is approximately 7.56 km (4.7 mi) from the coast. A significant landmark is an existing water tank that lies just west of the project area (see Figure 4). Foote et al (1972) described the soil in this area as being Kapa'a Silty clay. Kapa'a Silty clay consists of "well-drained soils on the uplands on the islands of Kaua'i and Oahu. These soils developed in material weathered from basic igneous rock. They are gently sloping to extremely steep. Elevations range from 200 to 800 feet." (Foote et al. 1972). The Mauka Locale receives an average an annual rainfall of approximately 2000 mm (79 inches) (Giambelluca et al. 1986:47). The area is relatively level with vegetation dominated by albezia, ginger, bamboo, papaya, *ti*, ferns, banana, California grass, and various weeds and vines (Figures 3-6). Modern-day trash was scattered along the northeast boundary near Kahuna Road (Figure 6). No archaeological sites were observed in the course of a companion archaeological assessment study (Van Ryzin and Hammatt 2004).

Figure 3. *Mauka* Locale project area, view to the south

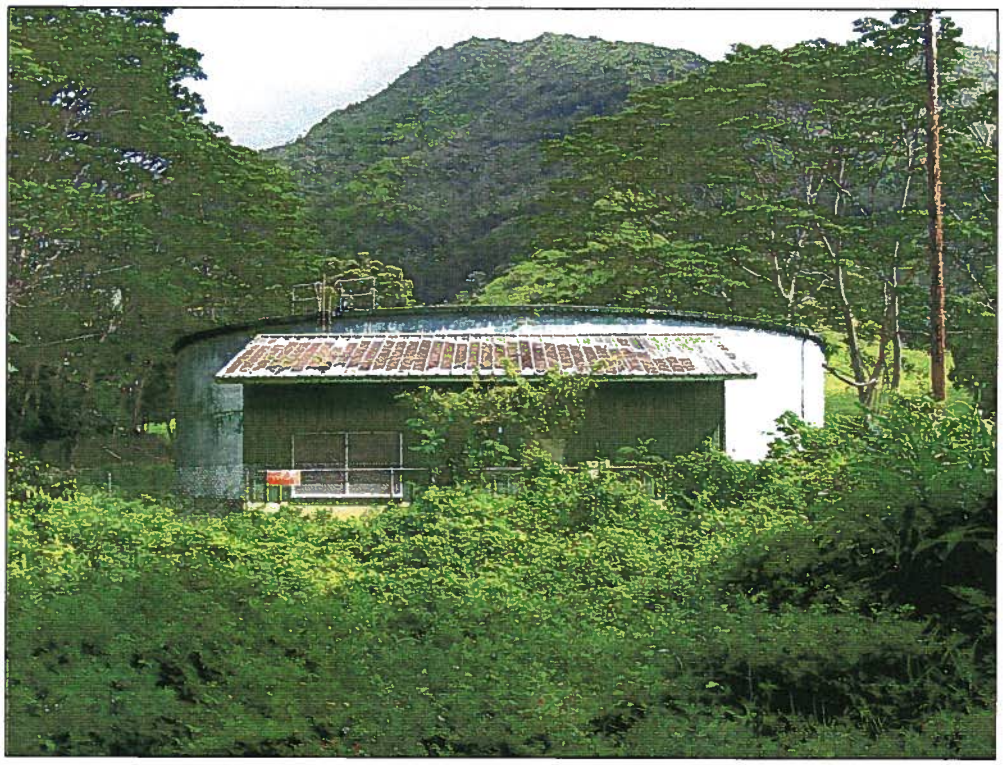


Figure 4. Existing water tank northwest of *Mauka* Locale project area, view to the northwest

Figure 5. *Mauka* Locale project area showing modern day trash along northeast boundary, view to the north.

II. MYTHOLOGICAL AND TRADITIONAL ACCOUNTS OF KAPA'A

A. Introduction to the Mythological and Traditional Accounts of Kapa'a

Wichman (1998:84) notes the paradox that Kapa'a "is one of the largest *ahupua'a* of the Puna District [of Kaua'i] and the most bereft of legends." A brief overview of somer of the better documented mythological and traditional accounts of Kapa'a is presented below and is followed by a brief summation of their import.

B. Mythological and Traditional accounts of Kapa'a

1. Traditional Place Names of Kapa'a

Place Name	Reference	Meaning	Source
Apopo	*'Ili , pali*	"Tomorrow"?	LCA 8343, Soehren (2002:265)
Awawaloa	*'Ili*	long valley, gulch, ravine	LCA 8837, Soehren (2002:265)
Hahanui	*'Ili, pali,* stream	Lobelia plant?	LCA 10564, Soehren (2002:265)
Hoa	*Pali*	"Friend"?	Claim 3638:1, Soehren (2002:265)
Ho'opi'i	*Wailele*	"To cause to rise?"	Soehren (2002:265)
Humu'ula	*Pu'u*	"Jasper stone"?	Claim 8247, Soehren (2002:265)
Kahana	*'Ili*	"Cutting?"	Claim 3971 & 3243 Soehren (2002:265)
Kaloko	*Kauhale, kula*	"The pond"	Claim 3638
Kalolo	*Kauhale, kula*	"Liquor"?	Claim 3638, Soehren (2002:265)
Kamahuna	Pu'u	?	Soehren (2002:265)
Kamali'i	Ridge	"Children"	Soehren (2002:265)
Kapa'a	*Ahupua'a* name	The "solid"or "the closing"	Wichman (1998:84) Soehren (2002:265)
Kapahi	Village, stream	"The knife"	Soehren (2002:266)
Kapeku	*Lo'i*	"The kick"	Claim 8837, Soehren (2002:266)
Kaulolo	*Kauhale*	?	LCA 3638, Soehren (2002:266)
Keahiahi	Headland on the north associated with hero Pāka'a	"twilight"	Wichman (1998:84)

Keiwa	Ridge, boundary point	"The ninth"?	Soehren (2002:266)
Koalua	Surf	"Two coral heads"	Finney 1959, ʻĪʻī 1963, Soehren (2002:266)
Kolehaka	*Pali*	?	Claim 3971 & 3243, Soehren (2002:266)
Kolokolo	Name of a deep fresh water pond	"Soap Plant"	Wichman (1998:84)
Kolouna	*Pali*	*?*	Claim 8247, Soehren (2002:266)
Kupanihi	*ʻIli, kauhale*	*?*	LCA 3971 & 3243, Soehren (2002:266)
Māʻeleele	*ʻIli*	*"Numb"*	LCA 7638, Soehren (2002:266)
Makaleha	*Puʻu,* boundary point	Eyes looking about as in wonder and admiration	Boundary Commission, Soehren (2002:266)
Makanalimu	Place, *heiau*	"Gift of seaweed"	Pukui et al. (1974:141)
Makea	*ʻAuwai*	"Fallow land?	Claim 3599 & 3554, Soehren (2002:267)
Moalepe	*ʻIli*, stream	"Chicken comb"	LCA 8247, Soehren (2002:267)
Naele	*Pali*	"Swamp, bog"	Claim 8837, Soehren (2002:267)
Paikahawai	*ʻIli ku*	*?*	Soehren (2002:267)
Pōhākiʻikiʻi	*Puʻu*	Tilted stone	Soehren (2002:267)
Pōhakupili	*Puʻu,* boundary point	"Joined stone"	Soehren (2002:267)
Poʻo	Surf	"Head"	Finney 1959, Soehren (2002:267)
Pueo	*Pali*	"Owl"	Claim 8843, Soehren (2002:267)
Puhi	*Kauhale*, pond	"Eel?"	Claim 3599 & 3554, Soehren (2002:267)
Puohomaka	*Pali*	?	Claim 8837, Soehren (2002:267)
Pupukai	*Pali*	?	Claim 3638, Soehren (2002:267)

Pu'u Ekeeke	*Pali*	?	Claim 8837, Soehren (2002:267)
Pu'u Lau'i'i	*Pu'u*, boundary point	*Lau'i'i* fern hill	Boundary Commission, Soehren (2002:267)
Ulakiu	*'Ili ku*		LCA 8837, Soehren (2002:267)
Waikaea	Ditch	?	Soehren (2002:268)
Wailē'ia	Rock, boundary point	"Abundant water"	Boundary Commission, Soehren (2002:268)

2. Heiau of Kapa'a

During their expeditions around Hawai'i in the 1880's, collecting stories from *ka pō'e kahiko*, Lahainaluna students stopped in Kapa'a and Keālia and gathered information regarding heiau of the region. All together, fourteen *heiau* were named in Kapa'a and Keālia, suggesting the two *ahupua'a* were probably more politically significant in ancient times. Table 1 lists the names of the ten *heiau* identified in the *ahupua'a* of Kapa'a, their location if known, their type, and associated chief and priest.

Table 1. *Heiau* of Kapa'a

Name	Location	Type	Associated
Mailehuna	Kapa'a (Mailehuna is the area of the present day Kapa'a School)	unknown	Kiha, Kaumuali'i/ Lukahakona
Pueo	Kapa'a	unknown	Kiha, Kaumuali'i/ Lukahakona
Pahua	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Kumalae	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Waiehumalama	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Nāpu'upa'akai	Kapa'a/Keālia	unknown	Kiha/ Lukahakona
Noeamakali'i	Kapa'a/Keālia	"*heiau* for birth of Kaua'i Chiefs, like Holoholoku"	Unknown
Pu'ukoa	Kapa'a/Keālia	"*unu* type heiau"	Unknown
Piouka	Kapa'a/Keālia	"*unu* type heiau"	Unknown
Una	Kapa'a/Keālia	Unknown	Kiha/ Lukahakona
Mano	Kapa'a/Keālia	Unknown	Kiha/ Lukahakona
Kuahiahi	Kapa'a (govn't school stands on site now)	Unknown	Kaumuali`i/ Lukahakona
Makanalimu	Upland of Kawaihau	Unknown	Kaumuali'i
Kaluluomō'īkeha	Kapa'a	Unknown	Mō'īkeha

The exact locations of these *heiau* are unknown. The locations of two of the *heiau* correlate with the locations of *wahi pana* or sacred places which are known to be in close to Kuahiahi and Kaluluomō'īkeha. Kuahiahi (also spelled Kaahiahi and Keahiahi) is the rocky headland at the north end of Kapa'a where the first Kapa'a School was once located. Kaluluomō'īkeha is thought to be the general area near the Mō'īkeha Canal and the present day Coral Reef Hotel

3. Kaililauokekoa the Chiefess of Kapa'a and the Lute Kanikawi

The tradition of Kaililauokekoa ("The leaf-bark of the Koa") tells the story of a daughter of Mō'īkeha who goes of to have adventures in the uplands with a certain youth of Pihanakalani who plays artfully on the musical instrument named Kanikawi. The residence of Mō'īkeha and Kaililauokekoa is said to have been at Kapa'a with a poetic reference to the grass ("the night drooping grass of Kapa'a"; see the discussion of the *Kalukalu* grass below). Mō'īkeha commanded his subjects to search for his errant daughter and "The valleys, pits, cliffs, hills and plains, were crowded with the common people." (Thrum 1923:131). Her lover is captured and is imprisoned down in Kapa'a. A boy surreptitiously brings the prisoner food by sneaking through the *Kalukalu* grass and *Ahuawa* rushes. Kahuna end up giving their blessing to the marriage of the young couple.

4. *Kalukalu* grass of Kapa'a

"*Kūmoena kalukalu Kapa'a*" or "Kapa'a is like the *kalukalu* mats" is a line from a chant recited by Lonoikamakahiki. *Kalukalu* is a sedge grass, apparently used for weaving mats (Fornander 1917, Vol. IV, Pt. 2, pp. 318-19). According to Wichman (1998:84), "a *kalukalu* mat was laid on the ground under a tree, covered with a thick pile of grass, and a second mat was thrown over that for a comfortable bed", thus the association with lovers. Kaua'i was famous for this peculiar grass, and it probably grew around the marshlands of Kapa'a. It is thought to be extinct now, but an old-time resident of the area recalled that it had edible roots, "somewhat like peanuts." Perhaps it was a famine food source (Kapa'a Elementary School 1983: VI).

Hawaiian sayings collected, translated, and annotated by Mary Kawena Pukui offer a unique opportunity to relish the wisdom, poetic beauty, and earthy humor of the Hawaiian Language. They reveal deeper layers of meaning, giving understanding not only of Hawai'i and its people but of all humanity. These sayings are considered to be the highest form of cultural expression in old Hawai'i, they bring one closer to the everyday thoughts and lives of the Hawaiians who created them (Pukui 1983: VII).

The following poetic sayings refer to the place of study, Kapa'a, Kaua'i: Pukui (1983: 187) associates the *kalukalu* with lovers in "*ke kalukalu moe ipo o Kapa'a*; the *kalukalu* of Kapa'a that sleeps with the lover":

> *Ka lulu o Mō'īkeha I ka laulā o Kapa'a.*
>
> *The calm of Mō'īkeha in the breadth of Kapa'a.*
>
> The chief Mō'īkeha enjoyed the peace of Kapa'a, Kaua'i, the place he chose as his permanent home

It is said the *kalukalu* is a fern somewhat like the *palapalai* (*Microlepia setosa*) famous to Kapa'a, Kaua'i. Mō'īkeha's love for Kapa'a is recalled in the *'ōlelo no'eau*, "*Ka lulu o Mō'īkeha i ka laulā o Kapa'a.*" "The calm of Mō'īkeha in the breadth of Kapa'a" (Pukui, 1983: 157):

Ke kalukalu moe ipo o Kapa'a.

The *kalukalu* of Kapa'a that sleeps with the lover.

Lovers were said to like whiling the time in the soft kalukalu plants.

5. Ka Lulu o Mō'īkeha

Kapa'a was the home of the legendary *ali'i*, Mō'īkeha. Born at Waipi'o on the island of Hawai'i, Mō'īkeha sailed to Kahiki (Tahiti), the home of his grandfather Maweke, after a disastrous flood. On his return to Hawai'i, he settled at Kapa'a, Kaua'i. Kila, Mō'īkeha's favorite of three sons by the Kaua'i chiefess Ho'oipoikamalani, was born at Kapa'a and was said to be the most handsome man on the island. It was Kila who was sent by his father back to Kahiki to slay his old enemies and retrieve a foster son, the high chief La'amaikahiki (Handy and Handy 1972:424; Beckwith 1970:352-358; Kalākaua 1888:130-135; Fornander 1916, vol.4 pt.1:160). "Lulu-o-Moikeha" understood as a place of ease of Mō'īkeha, is described as being situated "near the landing and the school of Waimahanalua" (Akina, 1913: 5). The landing in Kapa'a was known as the Makee Landing and was probably constructed in the late 1870s, along with the Makee sugar mill. Today, in place of the old Makee Landing is part of a breakwater located on the north side of Mō'īkeha Canal near the present day Coral Reef Hotel, and approximately half-a-mile north of Waikaea Bridge.

Akina (1913) tells the story of how Mō'īkeha's son, Kila stocks the islands with the fish *akule*, *kawakawa* and *'ōpelu*. When Kila travels to Kahiki, he seeks out his grandfather Māweke and explains that he is the child of Mō'īkeha. When Māweke asks Kila if Mō'īkeha is enjoying himself, Kila answers with the following chant:

My father enjoys the billowing clouds over Pōhaku-pili,

The sticky and delicious poi,

With the fish brought from Puna,

The broad-backed shrimp of Kapalua,

The dark-backed shrimp of Pōhakuhapai,

The potent *'awa* root of Maiaki'i,

The breadfruit laid in the embers at Makialo,

The large heavy taros of Keahapana

The crooked surf of Makaīwa too

The bending hither and thither of the reed and rush blossoms,

The swaying of the *kalukalu* grasses of Puna

The large, plump, private parts of my mothers,

Of Ho'oipoikamalanai and Hinau-u,

The sun that rises and sets,

He enjoys himself on Kaua'i,

All of Kaua'i is Mō'īkeha's. (Akina, 1913: 6)

Māweke was delighted and when the boy is questioned as to his purpose, Kila tells his grandfather he is seeking fish for his family. Māweke tells Kila to lead the fish back to his homeland. This is how Kila led the *akule*, *kawakawa* and *'ōpelu* to Hawai'i. See also accounts of Mō'īkeha at Kapa'a in Kalākaua (1888:124)

6. Kaweloleimākua

Kapa'a is also mentioned in traditions concerning Kawelo (Kaweloleimākua), Ka'ililauokekoa (Mō'īkeha's daughter, or granddaughter, dependent on differing versions of the tale), the *mo'o* or reptile Kalamainu'u and the origins of the *hīna'i hīnālea* or the fish trap used to catch the *hīnālea* fish, and the story of Lonoikamakahiki (Fornander 1917, vol.4 pt.2:318, vol.4 pt.3:704-705; Rice 1923:106-108; Thrum 1923:123-135; Kamakau 1976:80).

7. Kanaka-Nunui-Moe-The Sleeping Giant

Frederick B. Wichman relates an account of Kaua'i's Sleeping Giant:

> A long time ago, there was a giant living in Kawaihau among the low hills behind Kapa'a town. He was so tall he could see above the coconut trees. If he sat very still, it was easy to mistake him for one of the hills. Anyone who did not know him was afraid of his great size, fearing the damage he might cause. However the people of Kawaihau loved him, for he was very friendly and went out of his way to be useful.
>
> This giant was always careful where he stepped so that he would not injure anyone and he never destroyed taro patches or houses with a careless foot. When he wished to rest, he sat on one of the small hills above Kapa'a. The villagers were glad when this happened for his weight flattened the hilltop, making another plot of ground fit for cultivation.
>
> "He is very helpful," the Kapa'a people said to astonished stranger who came to their land. "He does many things for us quickly that otherwise we could not do in many months."
>
> Wherever this giant stepped he left keep footprints and in these deep holes the people planted banana trees. The villagers threw leaves, taro peelings, and other vegetable rubbish into these holes. When a compost had been formed, they planted banana sprouts. In this way, the people of Kapa'a always had ripe bananas to give to the giant, for banana was his favorite food.
>
> The giant yawned very often, for he was always sleepy. The gust of wind from his mouth often knocked down houses and blew the grass thatch into the sea. The giant was always very apologetic whenever this happened and he quickly brought logs from the uplands to rebuild the fallen houses and gathered *pili* for the thatching.
>
> He found it difficult to stay awake more than a hundred years at a time. When he could no longer fight against the drowsiness overpowering him, he would sleep using a small hill for a pillow. Because of this, the people called him Kanaka-nunui-moe, the sleeping giant.

When he slept, Nunui slept for hundreds of years while the winds blew dirt over him and seeds were dropped there by the birds. The gently showers sent by Ka-hale-*lehua*, goddess of the gentle rains, fed these seeds and forest grew up over the giant. When Nunui awoke and stretched, the people of Kapa'a fled in great fear, for what they had thought to be a hill had come alive.

One time, while Nunui was still awake, the high chief of Kawaihau wanted to build a large *heiau* to honor one of his gods. This was to be no ordinary temple. The chief wanted water-polished rocks for the walls and hard *koa* wood from Kōke'e for the framework of the god's house.

So the chief told the Kawaihau people what he wanted them to do. They must gather rocks from the golden brown waters of the Kōke'e streams and cut *koa* trees on the edges of Waimea canyon, and gather *pili* grass that grew at Mānā. "All this must be done in the turn of one moon," he ordered.

The unhappy people left their chief and silently returned to their village. The giant Nunui, stepping carefully among them, saw the long faces of the people.

"What is wrong?" he asked.

The Kapa'a villagers told him what they must do within the impossibly short time. "This cannot be done," the people said in low, sad voices. "How can we go to Kōke'e and bring back stones enough to build the walls in that time? And cut down the *koa* trees and bring the logs here and build the sacred house? And even if we do these things, who will cultivate our fields?"

Nunui smiled gently. "Tend to your fields," he said. "This work is nothing for me, and I'll gladly help you. Besides, it will give me something to do."

The giant went to Kōke'e and scooped up smooth, round boulders from the golden brown waters and brought them to Kapa'a. "Chief," he called to the astonished ruler, "show me where you wish to build this *heiau*."

The amazed chief pointed out the place set aside for the temple. Nunui placed the rocks to form a wall, fitting them so closely together that not even a mouse could squeeze between the cracks. Within a week, he had built a strong, thick, handsome wall around the sacred place.

Nunui returned to the edge of Waimea Canyon and cut down *koa* trees and trimmed them into the shaped he needed. He carried these back and made the framework of the house. He gathered *pili* grass form Mānā and wrapped the stems into bundles, tied these bundles to the framework, and within half the time the chief had set, the *heiau* was finished.

> Everyone was happy. The farmers had been able to keep up with their chores, the chief had his *heiau*, and Nunui had something to do. There was even time enough a celebration. The chief ordered all his people to gather bananas and to pound sweet potatoes and taro into poi. Some people hurried to slaughter pigs and dogs to be cooked in the *imu*, while other paddled out to sea to fill their canoes with fish and sent their wives to gather seaweed and *'opihi* from the reef. At last, enough food for everyone was ready, and the chief, the villagers, and Nunui sat down before the overflowing bowls and platters.
>
> "Eat," said the chief to Nunui. "After the work you have done, you must be hungry."
>
> The giant ate all the food that had been put before him. When he was through, his stomach bulged and he was very sleepy. He chose a comfortable hill just a short distance above Kapa'a town. Nunui stretched a last time, lay down along the top of the hill, and soon was sound asleep.
>
> As he slept through the years, the winds blew dirt over him and the birds brought seeds. Ka-hale-*lehua*, goddess of the gentle rains, sent showers to water the plants that now covered the giant.
>
> So Kanaka-nunui-moe sleeps and sleeps and has come to resemble a long hill with a lump at one end where his nose is and lumps at the other ends where his feet are. He no long looks like a living being, but one day, perhaps soon, his eyes will open, he'll yawn and stretch his arms, and sit up. [Wichman 1985:13-16]

8. Lepeamoa

In the Legend of "Lepeamoa (The Chicken Girl of Pālama)"(Thrum 1923:177) is a reference to a fantastic battle at Kapa'a between Lepeamoa's brother, the hero Kauilani and a supernatural kupua called Akuapehuale ("god of swollen billows"):

> Kauilani struck him a heavy blow and the spear leaped again and again upon him, till he rolled into a mountain stream at a place called Kapa'a, out of which he crawled, almost drowned. Then he was driven along even to the image houses, where a fierce battle took place, in which the wooden images took part, many of them being torn to pieces by the teeth of Akuapehuale.

9. Pāka'a and the Wind Gourd of La'amaomao (Keahiahi)

Kapa'a also figures prominently in the famous story of Pāka'a, and the wind gourd of La'amaomao. Pāka'a was the son of Kūanu'uanu, a high-ranking retainer of the Big Island ruling chief Keawenuia'umi (the son and heir to the legendary chief 'Umi), and La'amaomao, the most beautiful girl of Kapa'a and member of a family of high status *kahuna*. Kūanu'uanu left the island of Hawai'i, traveled throughout the other islands and finally settled on Kaua'i, at Kapa'a. It was there that he met and married La'amaomao, although he never revealed his background or high rank to her until the day a messenger arrived, calling Kūanu'uanu back to the court of Keawenuia'umi.

By that time, La'amaomao was with child but Kūanu'uanu could not take her with him. He instructed her to name the child, if it turned out to be a boy, Pāka'a. Pāka'a was raised on the

beach at Kapa'a by La'amaomao and her brother Ma'ilou, a bird snarer. He grew to be an intelligent young man and it is said he was the first to adapt the use of a sail to small fishing canoes. Although Pāka'a was told by his mother from a very young age that his father was Ma'ilou, he suspected otherwise and after constant questioning La'amaomao told her son the truth about Kūanu'uanu.

Intent on seeking out his real father and making himself known to him, Pāka'a prepared for the journey to the Big Island. His mother presented to him a tightly covered gourd containing the bones of her grandmother, also named La'amaomao, the goddess of the winds. With the gourd and chants taught to him by his mother, Pāka'a could command the forces of all the winds in Hawai'i. While this story continues on at length about Pāka'a and his exploits on the Big Island and later on Molokai, it will not be dwelt upon further here. Several versions of this story include chants which give the traditional names of all of the winds at all the districts on all the islands, preserving them for this and future generations (Nakuina 1990; Rice 1923:69-89; Beckwith 1970:86-87; Thrum 1923:53-67; Fornander 1918-19 vol. 5 pt.1:78-128). The wind of Kapa'a is the Kēhau wind.

Frederick Wichman (1998:84) writes that Pāka'a grew up on the northern headland of Kapa'a named Keahiahi. Here, Pāka'a learned to catch *mālolo or flying fish*, his favorite fish. After studying the ocean and devising his plan to fabricate a sail, Pāka'a wove a sail in the shape of a crab claw and tried it out on his uncle's canoe. One day, after going out to catch *mālolo*, he challenged the other fishermen to race to shore. He convinced them to fill his canoe with fish suggesting it was the only way he could truly claim the prize if he won:

> The fishermen began paddling toward shore. They watched as Pāka'a paddled farther out to sea and began to fumble with a pole that had a mat tied to it. It looked so funny that they began to laugh, and soon they lost the rhythm of their own paddling. Suddenly Pāka'a's mast was up and the sail filled with wind. Pāka'a turned toward shore and shot past the astonished fishermen, landing on the beach far ahead of them. That night, Pāka'a, his mother, and his uncle had all the *mālolo* they could eat (Wichman 1998:85).

10. Palila and Ka'ea

High in the *mauka* region of Kapa'a in the Makaleha mountains at a place called Ka'ea, is reported to be the supernatural banana grove of the Kaua'i *kupua* or demigod Palila, grandson of Hina (Handy and Handy 1972:424). Joseph Akina for *Kū'oko'a* Newspaper in 1913 describes Palila's banana grove:

> The stalk could hardly be surrounded by two men, and was about 35 feet high from the soil to the lowest petiole. The length of the cluster from stem to lowest end of the bunch of bananas was about 1 ¾ fathoms long (one *anana* and one *muku*). There were only two bananas on each about 4 ½ inches around the middle. There were just two bananas, one on the east side and one on the west, each about a foot or more in length. The one on the east side was tartish, like a *waiawi* (Spanish guava) in taste and the one on the west was practically tasteless. The diameter of the end of the fruit stem of this banana seemed to be about 1½ feet. This kind of banana plant and its fruit seemed almost supernatural… (Akina, 1913:5).

C. Summary of the Mythological and Traditional accounts of Kapa'a

A survey of traditional mythological literature shows Kapa'a prominently associated with some of the most famous legendary and historical figures including Maui, Kawelo, Mō'īkeha, Māweke, Palila, Paka'a and Kanaka Nunui Moe. The fourteen documented *heiau* of Kapa'a is a testament to both the substantial population and the social/political/religious importance of this *ahupua'a*.

What few specific references there are suggest that high status habitation was focused near the coast with less intensive utilization of the uplands which were regarded as wild places. The most notable feature of the traditional accounts are the references to grasses and sedges (*Kalukalu* grass and *Ahuawa* rushes) which undoubtedly reflects in part the natural marsh lands near the coast but may also reflect transformation of the landscape through a denudation of trees by the activities of a relatively dense population harvesting slow growing trees for firewood and construction materials over many centuries.

III. HISTORICAL ACCOUNTS

The project area lies in the traditional *ahupua'a* of Kapa'a belong to the ancient district of Puna (now the district is more commonly called "Kawaihau"), one of five ancient districts on Kaua'i (King 1935: 228). Puna was the second largest district on Kaua'i, behind Kona, and extended from Kīpū, south of Līhu'e to Kamalomalo'o, just north of Keālia. For taxation, educational and judicial reasons, new districts were created in the 1840's. The Puna District, with the same boundaries became the Līhu'e District, named for an important town in that district. In 1878, by act of King Kalākaua in securing a future and name for the new Hui Kawaihau, created the new district of Kawaihau. This new district encompassed the *ahupua'a* ranging from Olohena on the south to Kīlauea on the north. Subsequent alterations to district boundaries in the 1920's left Kawaihau with Olohena as its southernmost boundary and Moloa'a as its northernmost boundary (King 1935:222).

A. Early Historic Period

Although most of the historic record documents for Kaua'i in this period revolve around missionary activities and the missions themselves, there was indication that the Kapa'a area was being considered for new sugar cane experiments, similar to those occurring in Kōloa. In a historic move, Ladd and Company received a 50 year lease on land in Kōloa from Kamehameha III and Kaua'i Governor Kaikio'ewa of Kaua'i. The terms of the lease allowed the new sugar company "the right of someone other than a chief to control land" and had profound effects on "traditional notions of land tenure dominated by the chiefly hierarchy" (Donohugh, 2001: 88). In 1837, a very similar lease with similar terms was granted to Wilama Ferani, a merchant and U.S. citizen based in Honolulu (Hawai'i State Archives, Interior Dept., Letters, Aug. 1837). The lease was granted by Kauikeaouli or Kamehameha III for the lands of Kapa'a, Keālia and Waipouli for twenty years for the following purpose:

> ...for the cultivation of sugar cane and anything else that may grow on said land, with all of the right for some place to graze animals, and the forest land above to the top of the mountains and the people who are living on said lands, it is to them whether they stay or not, and if they stay, it shall be as follows: They may cultivate the land according to the instructions of Wilama Ferani and his heirs and those he may designate under him... (Hawai'i State Archives, Interior Dept., Letters, Aug. 1837).

Unlike Ladd & Company which eventually became the Kōloa Sugar Company, there is no further reference to Wilama Ferani and his lease for lands in Kapa'a, Keālia and Waipouli. In a brief search for information on Honolulu merchant, Wilama Ferani, nothing was found. It is thought that perhaps Wilama Ferani may be another name for William French, a well known Honolulu merchant who is documented as having experimented with grinding sugar cane in Waimea, Kaua'i at about the same time the 1837 lease for lands in Kapa'a, Keālia and Waipouli was signed (Joesting, 1984: 152).

B. The Mahele: Kapa'a Land Commission Awards

The Organic Acts of 1845 and 1846 initiated the process of the *Mahele*, the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848 the crown and the *ali'i* received their lands. The common people received their *kuleana* in 1850. It is through records for Land Commission Awards (LCAs) generated during the *Mahele* that specific documentation of traditional life in Kapa'a Ahupua'a comes to light.

During the *Mahele*, Kapa'a was taken as Crown Lands (Office of the Commissioner of Public Lands of the Territory of Hawaii, 1929). The *'Ili* of Paikahawai and Ulakiu in Kapa'a Ahupua'a were retained as Government Lands.

Table 2. Mahele Land Claims in Kapa'a Ahupua'a

LCA	CLAIMANT	'ILI	LAND USE	AWARD
08843	Kiau and son, Apahu	Apopo, Kalolo Village	6 *lo'i*, small *kula* and house lot	2 *'āpana*; 2,75 acres
10564	Oleloa, Daniela	Kapa'a, Puna;	with one fish pond; 10 *lo'i* and a fish pond	No award in Kapa'a, Puna; award in Waioli, Halelea
08247	Ehu	Moalepe	approx. 20 *lo'i* lying waste, some orange trees	1 *'āpana*, Kapa'a
08837	Kamapa'a	Awawaloa, Ulukiu Village	9 *lo'i*, and adjoining *kula*; house lot	Awawaloa: 1 *'āpana*; Wakiu 3 *'āpana*
03638	Huluili, Kahoiu (Kadaio)	Maeleele, Kaloko Village	15 lo'i in Maeleele and adjoining *kula*; house lot in village of Kaloko (Kalolo)Maeleele: 2 *'āpana*, 5 acs.	Maeleele: 2 *'āpana*, 5 acs.
03971 and 03243	Honoli'i, Ioane	Kahana, Kupanihi	6 uncultivated *lo'i*, house lot in Kupanihi Village	Kupanihi: 2 *'āpana*, 1 ac
03554 and 03599	Keo	Hahanui,	Entire 'ili of Kahanui, 15 *lo'i*, house lot in Puhi Village	No Award in Kapa'a, Puna; Award in Waila'au, Kona.

The land claims during this period show that only five individuals were awarded land parcels in the relatively large *ahupua'a* of Kapa'a. The five awardees include Kiau (#08843), Kamapa'a (#08837), Ioane Honoli'i (#03971) Huluili (#03638) and Ehu (#08247). In addition, two land claims (#10564 and #03554, 3559) were not awarded in Kapa'a. Four of the five awardees received multiple parcels which show similarities. All four had *lo'i* or irrigated *kalo* fields on the *mauka* side of the lowland swampy area, sometimes extending a short distance up into small,

shallow gulches and valleys. Many of these *lo'i* parcels name *pali* or hills/cliffs as boundaries. Each LCA also had a separate house lot located on the *makai* side of the swamp, near the beach. Three of the land claims name ponds on their lands, including Puhi Pond (LCA #03554), Fishponds in Kupanihi 'Ili (LCA #03971) and Hahanui 'Ili (LCA #10564). Loko Kihapai may be the same as the Fishpond in Hahanui as it was named in the same land claim. The other two *loko* are associated with house lots, situated on the *makai* edge of the Kapa'a swamplands suggesting modification of the natural swamplands. Other natural and cultural resources mentioned in the LCAs include freshwater springs, pig pens, *hau* bushes, *hala* clumps, streams, *'auwai*, and *kula* or pasturelands.

Interestingly, the residential "village" of Kapa'a did not exist as a single entity, but was a series of probably small settlements or compounds, perhaps even individual house lots which stretched along the shoreline of the *ahupua'a* and included (south to north) Kupanihi (Makahaikupanihi), Kalolo (Kaulolo), Puhi, and Uluki.

The fifth individual, Ehu (LCA #08247), was the only person to be awarded a single parcel in the upland area of Kapa'a, Moalepe Valley, approximately five miles *mauka* of the coast and one mile southwest of the *Mauka* Locale project area. In 1848, when Ehu made his claim, he was the only one living there. A few years later, according to Honoli'i's testimony to support Ehu's claim, "There are no houses and no people now living on the land. Ehu found himself lonely there, all his neighbors having either died or left the land. Ehu now lives in Wailua." Evidently Ehu may have been the last person to live at and cultivate in the traditional way, the far *mauka* region of Kapa'a.

There were no *kuleana* claims found within the project area north of the Kapa'a Homesteads.

C. Post Mahele

In 1849, a son of Wai'oli missionaries, William P. Alexander, recorded a trip he took around Kaua'i. Although, he focuses on the larger mission settlements like Kōloa and Hanalei, he does mention Kapa'a:

> A few miles from Wailua, near Kapa'a we passed the wreck of a schooner on the beach, which once belonged to Capt. Bernard. It was driven in a gale over the reef, and up on the beach, where it now lies. A few miles further we arrived at Keālia. We had some difficulty crossing the river at this place, owing to the restiveness of our horses. The country here near the shore was rather uninviting, except the valley which always contained streams of water (Alexander, 1991: 123).

In later years, the notorious Kapa'a reef was to become the location of many shipwrecks particularly once a landing was built there in the 1880s.

The first large scale agricultural enterprise in Kapa'a began in 1877 by the Makee Sugar Plantation and the *Hui* Kawaihau (Dole, 1916: 8). The *Hui* Kawaihau was originally a choral society begun in Honolulu whose membership consisted of many prominent names, both Hawaiian and *haole*. It was Kalākaua's thought that the *Hui* members could join forces with Makee, who had previous sugar plantation experience on Maui, to establish a successful sugar corporation on the east side of Kaua'i. Captain Makee was given land in Kapa'a to build a mill and he agreed to grind cane grown by *Hui* members. Kalākaua declared the land between Wailua and Moloa'a, the Kawaihau District, a fifth district and for four years the *Hui* attempted to grow sugar cane at Kapahi, on the plateau lands above Kapa'a. After a fire destroyed almost one half

of the *Hui's* second crop of cane and the untimely death of one of their principal advocates, Captain James Makee, the *Hui* began to disperse and property and leasehold rights passed on to Makee's son-in-law and new Makee Plantation owner, Colonel Z. S. Spalding (Dole, 1916: 14).

As part of the infrastructure of the new plantation, a sugar mill was erected and the Makee Landing was built in Kapa'a during the early years of the Makee Sugar Plantation. Following Captain Makee's death, Colonel Spalding took control of the Plantation and in 1885 moved the mill to Keālia (Cook, 1999: 51). The deteriorating stone smokestack and landing were still there well into the 1900s (Damon, 1931:359). Condè and Best (1973:180) suggest that railroad construction for the Makee Plantation started just prior to the mid 1890's. There is one reference to a railroad line leading from the Kapa'a landing to Keālia in 1891. During Queen Lili'uokalani's visit to Kaua'i in the summer of 1891, the royal party was treated to music by a band, probably shipped in from O'ahu. "The band came by ship to Kapa'a and then by train to Keālia" (Joesting, 1984:252). This line is depicted on a 1910 USGS map which shows the line heading south from Keālia Mill and splitting near the present Coral Reef Hotel, one finger going to the old Kapa'a Landing (Makee Landing) and another line heading *mauka*, crossing the present Mō'īkeha Canal, traveling southwest up Lehua Street and through what is now goat pasture, along a plateau and into the *mauka* area behind Kapa'a swamplands. This railroad line was part of a twenty mile network of plantation railroad with some portable track and included a portion of Keālia Valley and in the *mauka* regions of the plateau lands north of Keālia (Condé and Best, 1973:180).

By the late 1800's, Makee Plantation was a thriving business with more than one thousand workers employed (Cook, 1999:51). Hundreds of Portuguese and Japanese immigrants found work on Makee Plantation and the new influx of immigrants required more infrastructure. In 1883, a lease for a school lot was signed between Makee Sugar Company and the Board of Education (Kapa'a School, 1983: 9). Stipulations found in the Portuguese immigrant contracts with Makee Sugar Company stated that "children shall be properly instructed in the public schools" (*Garden Island*, April 1, 1983). The original Kapa'a School was constructed in 1883 on a rocky point adjacent to the Makee Sugar Company railroad. Traditionally, this point was known as Kaahiahi (Kapa'a School, 1983: 10). In 1908, Kapa'a School was moved to its present site directly *mauka* and up the hill at Mailehune.

As in much of the rest of Hawai'i, the Chinese rice farmers began cultivating the lowlands of Kapa'a with increasing success in the latter half of the 1800s. Several Hawaiian *kuleana* owners leased or sold their parcels *mauka* of the swamp land to Chinese rice cultivators. Other Chinese rice cultivators appeased to the government for swamplands first leasing and later buying. As a result of the growing rice and sugar industries, the economic activity displaced the house lot *kuleana* on the *makai* side of the marsh for increasing commercial and residential development (Lai, 1985:148-161).

Narrow wagon roads gave way to macadamized roads in the early part of the 20th century. This new road was called the Kaua'i Belt Road and parts of it are thought to have followed the "Old Government Road" (Cook, 1999). In Kapa'a, the present day Kūhiō Highway probably follows the same route as the original Government Road and subsequent Kaua'i Belt Road. The location of the *kuleana* awards in Kapa'a indicates that the majority of the house lots were situated along the Government Road. LCA 3243 names a "road" as one of its boundaries.

D. 20th Century History of Kapa'a (1900-Present)

In the early 1900's, government lands were auctioned off as town lots in Kapa'a to help with the burgeoning plantation population. One *kama'āina* mentioned that in the 1930's and 1940's, the area north of Mō'īkeha Canal in Kapa'a was mostly settled by Portuguese families (Bushnell et al. 2002). The Japanese were also very prominent in the 1920s and 1930s largely replacing the Chinese merchants of the turn of the century in the Kapa'a business sector (Bushnell et al. 2002). The Board of Health, Territory of Hawaii ran a dispensary in Kapa'a at the *makai* edge of Niu Street near the Kapa'a Beach Park parking lot, adjacent to the bike path starting 1926. The lot is presently vacant. A Fire Station was once located in the area now occupied by the Coral Reef Hotel and a Courthouse and jail cell once stood at the location of the present Kapa'a Neighborhood Center. It is not known when these structures were removed or abandoned.

In 1913, Hawaiian Canneries opened in Kapa'a at the site now occupied by Pono Kai Resort (Cook, 1999: 56). Through the Hawaiian Organic Act, Hawaiian Canneries Company, Limited purchased the land they were leasing, approximately 8.75 acres, in 1923 (Bureau of Land Conveyances, Grant 8248). A 1923 sketch of the cannery shows only four structures, one very large structure assumed to be the actual cannery and three small structures *makai* of the cannery. A 1933 historic photograph of Kapa'a Town shows an ironwood windbreak on the *makai* side of the cannery adjacent to the railroad. By 1956, 1.5 million cases of pineapple were being packed. By 1960, 3400 acres were in pineapple and there were 250 full time employees and 1000 seasonal employees for the Kapa'a Cannery (*Honolulu Advertiser*, March 20, 1960). In 1962, Hawaiian Canneries went out of business due to competition from third world countries.

The Ahukini Terminal & Railway Company was formed in 1920 to establish a railroad to connect Anahola, Keālia, Kapa'a to Ahukini Landing and "provide relatively cheap freight rates for the carriage of plantation sugar to a terminal outlet" (Condé and Best, 1973: 185). This company was responsible for extending the railroad line from the Makee Landing, which was no longer in use, to Ahukini Landing, and for constructing the original Waika'ea Railroad Bridge and the Mō'īkeha Makai Railroad Bridge.

In 1934, the Lihue Plantation Company absorbed the Ahukini Terminal & Railway Company and Makee Sugar Company (Condé and Best, 1973: 167). The railway and rolling stock formerly owned by Makee Sugar Company became the Makee Division of the Lihue Plantation. At this time, besides hauling sugar cane, the railroad was also used to haul plantation freight including "fertilizer, etc...Canned pineapple from Hawaiian Canneries to Ahukini and Nāwiliwili, pineapple refuse from Hawaiian Canneries to a dump near Anahola and fuel oil from Ahukini to Hawaiian Canneries Co., Ltd." (Hawaii Territorial Planning Board, 1940: 11). Former plantation workers and *kama'āina* growing up in Kapa'a remember when the cannery would send their waste to the pineapple dump, a concrete pier just north of Kumukumu Stream (State Site No. 50-30-08-789: H) by railroad. The structure is built over the water where the rail cars would dump the pineapple waste. The current would carry the waste to Kapa'a which would attract fish and sharks (Bushnell et al. 2002).

Lihue Plantation was the last plantation in Hawai'i to convert from railroad transport to trucking (Condé and Best, 1973: 167). "By 1957 the company was salvaging a part of their plantation railroad, which was being supplanted by roads laid out for the most part on or close to the old rail bed" (Ibid: 167). By 1959, the plantation had completely converted over to trucking. The Cane Haul Road which begins near the intersection of Haua'ala Road and Kūhiō Highway is

thought to date to the late 1950s and follows the alignment of the old railroad until just before or near ʻĀhihi Point.

Severe floods in Kapaʻa in 1940 led to the dredging and construction of the Waikaʻea and Mōʻīkeha Canals sometime in the 1940s (Hawaii Territorial Planning Board, 1940: 7). Although the Waikaʻea Canal, bordering the Kapaʻa Pineapple Cannery, had been proposed as early as 1923, nothing was constructed until after the floods (Bureau of Land Conveyances, Grant 8248). A Master Plan for Kapaʻa, published in 1940, asks the Territorial Legislature for funds to be set aside for the completion of a drainage canal and for filling *makai* and *mauka* of the canal (Hawaii Territorial Planning Board, 1940:7). In 1955, reports came out on the dredging for coral proposed for the reef fronting Kapaʻa Beach Park (*Garden Island Newspaper*, September 21, 1955). The coral was to be used for building plantation roads. This dredging was later blamed for accelerated erosion along Kapaʻa Beach (Garden Island Newspaper, October 30, 1963).

Today, there are several sea walls along the Kapaʻa Beach Park to check erosion. Old time residents claim the sandy beach in Kapaʻa was once much more extensive than it is now (Bushnell et al. 2002).

Keālia Town slowly dispersed after the incorporation of Makee Sugar Company into Lihue Plantation in the 1930s. Many of the plantation workers bought property of their own and moved out of plantation camps. The plantation camps which bordered Kūhiō Highway were disbanded in the 1980s. The Lihue Plantation began to phase out in the last part of the 20th century. Kapaʻa Town suffered after the closing of the Kapaʻa Cannery, however the growing tourist industry helped to ease the economic affects of the Cannery's closing.

IV. PREVIOUS ARCHAEOLOGICAL RESEARCH

A. Archaeological Studies and Sites in Kapa'a Ahupua'a

The following table outlines the archaeological research (Table 3) and historic properties (Table 4) identified in Kapa'a Ahupua'a. These tables are followed by discussion of the research and historic properties. Table 3 provides a list of archaeological research conducted within Kapa'a Ahupua'a, including columns for source, location, nature of study, and findings. The locations of these archaeological studies are shown in Figure 6. Table 4 is a list of known historic properties within the ahupua'a and includes columns for state site numbers, site type, location and reference. The locations of identified sites within Kapa'a Ahupua'a are shown in Figure 7.

Table 3. Previous Archaeological Studies in Kapa'a

Source	Location	Nature of Study	Findings
Bennett 1931	Island wide Identifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch	Archaeological Reconnaissance	Identifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch
Handy and Handy 1972	Archipelago-wide	Native Planter study	Discusses "highly developed irrigation system"
Ching 1976	Just south of the Waikaea Drainage Canal	Archaeological Reconnaissance	No significant findings
Hammatt 1981	Upland Kapa'a	Archaeological Reconnaissance	No significant findings
Hammatt 1986	Upper reaches of the Makaleha stream valley.	Archaeological Reconnaissance	No significant findings
Hammatt 1991	Along Kūhiō Highway	Subsurface Testing	Identifies two sub-surface cultural layer sites
Kikuchi and Remoaldo 1992	Around Kapa'a Town	Cemeteries of Kaua'i	Identifies six cemeteries
Spear 1992	South side Waikaea Canal, mauka of Kūhiō Highway. (TMK: 4-5-05:04, 09)	Monitoring Report	Designated subsurface site 50-30-08-547
Chaffee, Burgett & Spear 1994a	A house lot near the corner of Kukui and Ulu Streets in mauka Kapa'a Town. (TMK: 4-5-09:10)	Archaeological Inventory Survey	No significant findings

Source	Location	Nature of Study	Findings
Chaffee, Burgett & Spear 1994b	Māmane Street Kapa'a Town. (TMK: 4-5-09:51	Archaeological Inventory Survey	No significant findings
Hammatt, Ida & Chiogioji 1994	Proposed bypass routes mauka of Kapa'a Town	Archaeological Assessment	No new field work, reviews literature
Hammatt, Ida & Folk 1994	South side Waikaea Canal, mauka of Kūhiō Highway (TMK: 4-5-05:06)	Archaeological Inventory Survey	Weak cultural layer designated site 50-30-08-748
Kawachi 1994	Inia Street (Jasper) TMK 4-5-08:33	Burial Report	Designates Site 50-30-08-871
McMahon 1994	"behind the armory in Kapa'a near the god stones" The location is uncertain & "Buzz's near the Coconut Marketplace"	Documents second hand report of burials in two locations	Bones in 3 places reported from behind the armory, 16 bodies reported from the Buzz' s restaurant. No site numbers assigned
Creed, Hammatt, Ida, Masterson & Winieski 1995	Kapa'a Sewer line project, Kūhiō Highway, south and central Kapa'a Town	Archaeological Monitoring Report	Documents cultural layer of site -1848 and (an enlarged) site -1849 & recovery of thirty burials at sites –867, -868, -871, & -1894
Jourdane 1995	1382-A 'Inia Street, makai of Kūhiō Highway, central Kapa'a Town	Burial Report	Site 626
McMahon 1996	South side Waikaea Canal, *mauka* of Kūhiō Highway (TMK: 4-5-05:08)	Archaeological Inventory Survey	No significant cultural material
Hammatt, Chiogioji, Ida & Creed 1997	Test excavations focused inland of Kapa'a Town	Archaeological Inventory Survey	Four test trenches were excavated inland of Kapa'a Town
Borthwick and Hammatt 1999	Kapa'a Seventh-Day Adventist Church at 1132 Kūhiō Highway	Archaeological Monitoring and Burial Treatment Plan	Monitoring was indicated as this parcel lay within the designated Site 50-30-08-1848.
Bushnell and Hammatt 2000	Seventh-Day Adventist Church, makai of Kūhiō Highway, south of the Waikaea Canal	Archaeological Monitoring Report	Minimal findings (one piece of worked bone)

Source	Location	Nature of Study	Findings
Callis 2000	Kapa'a Beach Park	Burial Removal and Archaeological Monitoring Report	Human Burial
Perzinski and Hammatt 2001	Kūhiō Highway on the margins of the Waikaea Canal	Archaeological Monitoring Report	No significant cultural material
Hammatt et al. 2003	Kūhiō Highway Bypass Options	Archaeological Assessment	Summarizes work
Bushnell et al. 2003	Kapa'a/Keālia Bike & Pedestrian Path	Archaeological Inventory Survey	Documents 5 new sites & a new feature for another site
Elmore and Kennedy 2003	Kūhiō Highway	Archaeological Monitoring Report	No significant cultural material
Dega, Michael F. and James Powell 2003	Kūhiō Highway	Archaeological Monitoring Report	Human Burials
Hammatt and Shideler 2004	Pedestrian Pathway Options	Archaeological Assessment	Summarizes work

B. Archaeological Studies within the Present Project Area

A companion *Archaeological Assessment For The Proposed Water Reservoir, Kapa'a Ahupua'a, Kaua'i TMK 4-6-03:10* (Van Ryzin, and Hammatt 2004) was recently completed. This study examined the areas of proposed impact and found no archaeological sites or historic preservation concerns in the vicinity.

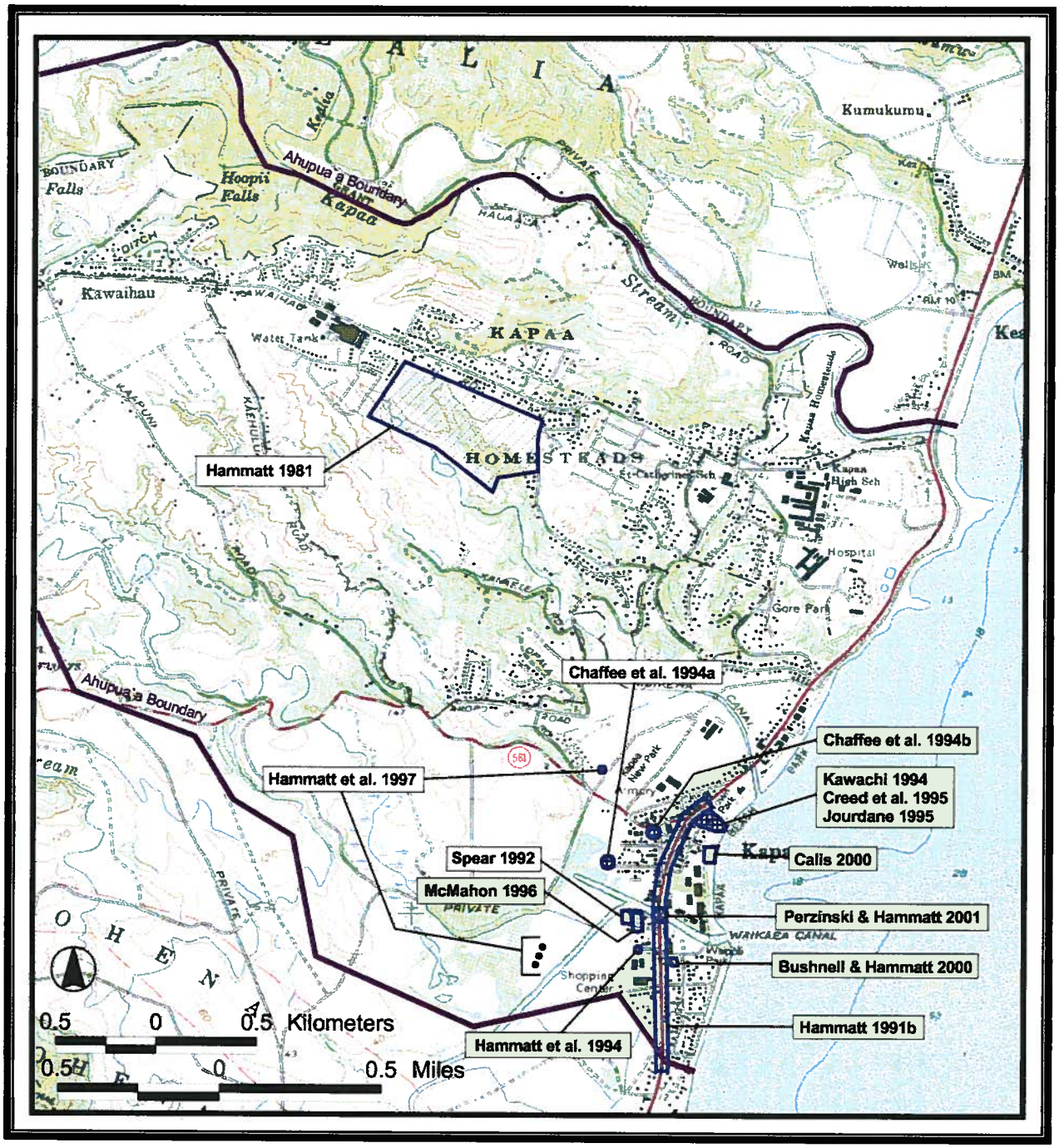


Figure 6. Map showing previous archaeological studies in Kapa'a.

Table 4. Historic Properties in Kapa'a Ahupua'a

Site # 50-30-08-	Site Type/ Name (if any)	Location	Reference
B001	Historic Cemetery	South of bend of Kapa'a Stream, a kilometer *mauka* from Kūhiō Highway	Kikuchi and Remoaldo 1992
B002	Historic Cemetery	Just *mauka* from Kūhiō Highway, south of Kapa'a Stream	Kikuchi and Remoaldo 1992
B003	Kapa'a Public Cemetery	South of Kanaele Road, approximately one kilometer inland of Kūhiō Highway	Kanaele Road; Kikuchi and Remoaldo 1992
B004	Historic Cemetery	North of Apopo Road, approximately one kilometer inland of Kūhiō Highway	Kikuchi and Remoaldo 1992
B013	Historic Cemetery	Just *mauka* from Kūhiō Highway, north of the Waikaea Canal	Kikuchi and Remoaldo 1992
B014	All Saints Episcopal Church Cemetery	Just *mauka* from Kūhiō Highway, south of the Waikaea Canal	Kikuchi and Remoaldo 1992:62-65
-547	sub-surface features including a fire pit and a possible house foundation	South of bend of Waikaea Canal, *mauka* of Kūhiō Highway	Spear 1992:3
-626	Burial	Inia Street, *makai* of Kūhiō Highway, central Kapa'a	Jourdane 1995
-748	Minimal findings, a weak cultural layer (buried A-horizon)	South of the bend of the Waikaea Canal, *mauka* of Kūhiō Highway	Hammatt, Ida & Folk 1994
-789	Historic road	Coastal Kapa'a	Bushnell et al. 2003
-867	1 set of human remains	Kukui Street, just *mauka* of Kūhiō Highway, Kapa`a Town	Creed et al. 1995:50
-868	1 set of human remains	Lehua Street *mauka* of Kūhiō Highway, Kapa'a Town	Creed et al. 1995:50
-871	13 sets of human remains (Creed et al. 1995:50)	Inia Street, *makai* of Kūhiō Highway	Kawachi 1994, Creed et al. 1995:50

Site # 50-30-08-	Site Type/ Name (if any)	Location	Reference
-884	Human burial	N. Coastal Kapa'a	SHPD communication, Bushnell et al. 2003
1848	Cultural layer & sub	Along Kūhiō Highway between Wana Road and the Waikaea Drainage Canal	Hammatt 1991; Creed et al. 1995
-1849	Cultural layer & sub-surface features; Creed et al. 1995:53 expands boundaries to incl. burial sites, -626, -867, -868 -871, and -1894	Along Kūhiō Highway between Inia Street and Kauwila Street extending to the coast	Hammatt 1991; Creed et al. 1995
-1894	11sets of human remains	Ulu Street, just N of Kūhiō Highway, Kapa'a Town	Creed et al. 1995:50
-2075	Hwy bridge	Across Kapa'a Stream	Bushnell et al. 2003
-2076	Petroglyph	Central coastal Kapa'a	Bushnell et al. 2003
-2077	Steps to former pavilion	S. coastal Kapa'a	Bushnell et al. 2003
-2078	Railroad bridges and foundations	Coastal Kapa'a	Bushnell et al. 2003

V. COMMUNITY CONSULTATIONS

Throughout the course of this study, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about traditional cultural practices specifically related to the project area of Kapa'a. This effort was made by letter, e-mail, telephone and in-person contact. In the majority of cases, letters along with a map of the project area were mailed with the following text:

> Cultural Surveys Hawai'i is conducting a Limited Cultural Impact Assessment for the proposed Water Reservoir *Mauka* Locale in Kapa'a, Kaua'i Island. The purpose of the cultural study is to assess potential impacts to traditional cultural practices. This study is meant to satisfy requirements related to Chapter 343 HRS Articles IX and XII and Act 50 and t heir applicability to the project area.
>
> We are seeking your input regarding the following issues:
>
> General history and present and past land use of the study area.
>
> Knowledge of cultural sites which may be impacted by the project, e.g., historic sites, archaeological sites, burials, etc…
>
> Knowledge of traditional gathering practices in the study area-both past and present.
>
> Cultural associations with the study area through legends, traditional use or otherwise.
>
> Referrals of *kūpuna* who might be willing to share their cultural knowledge of the study area in general.
>
> Any other cultural concerns the community might have related to Hawaiian or other cultural practices in this area of Kapa'a, Island of Kaua'i.

The individuals, organizations, and agencies we attempted to contact and the results of any consultations are presented in Table 5. Cultural Surveys Hawai'i starts out with a list of community contacts and then follows up on their referrals.

Table 5 Community Consultations

Name	Organization, Affiliation	Comments
Ako, Valentine	Kapa'a Resident and *Kupuna*	Referred to Ernest Garcia
Batisite, Brian	Kaua'i County Council	No comment.
Garcia, Ernest	Hunter	No longer uses the area. More familiar with areas west of project area.
Iida, Ron	Royal Order of Kamehameha Kaumauali'i Chapter No. 3	No comment.
Kaneakua, James	Kapa'a Resident	No comment.
Kanoho, Ezra	Hawai'i State Capitol State Representative 13th District	No comment.
Kapaka-Arboleda,La France	Kaua'i/Ni'ihau Island Burial Council, Kapa'a Representative, and Office of Hawaiian Affair, Kaua'i Office Community Resource Coordinator	It is unlikely that SHPO will require various test pits along the project proposed, if something is found burial council will be asked for their recommendation etc. I am not privy to any burial sites in the area.
Kapeliela, Kana'i	State Historic Preservation Division Cultural Historian	No comment.
Kekua, Kehaulani	Kaua'i Cultural Center Director	No comment.
Lauretta, Mike	Department of Land and Natural Resources Kaua'i Land Division	DLNR has no input to offer regarding traditional Hawaiian activities; archaeological or cultural sites; nor cultural associations that could be recommended as they affect the project area.
Markell, Kai	State Historic Preservation Division Burials Director	No comment.
McMahon, Nancy	State Historic Preservation Division Kaua'i Archaeologist	No cultural concerns.
Muraoka, Beverly	Kapa'a Resident and Kupuna	No Comment.
Napōka, Nathan	State Historic Preservation Division Cultural and History Branch	No comment.

Requilman, Mary	Kaua'i Historical Society Executive Director	No comment.
Rogers, Lucille	Ke Ola Pono No Nā Kūpuna Project Coordinator	No comment.
Rogers, Nancy	Hui Ho'okipa O Kaua'i Contact Person	No comment.
Sugiyama, Richard	Kapa'a Resident	No cultural concerns or impacts in the project area. He thanks CSH for keeping him informed on different project in his area.
Tsuchiya, Rick	Kaua'i Historic Preservation Review Commission, Kaua'i County Planning	The project will be reviewed at the September meeting. A written statement will be sent to CSH.

VI. TRADITIONAL CULTURAL PRACTICES

Traditional cultural practices are based on a profound awareness concerning harmony between man and their 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, Hawaiian 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 Hawaii's communities today.

This project seeks to assess traditional cultural practices as well as resources pertaining to the project area within Kapa'a Ahupua'a. This section will convey the different types of traditional practices and cultural resources associated with the vicinity.

A. Gathering for Plant Resources

Hawaiians utilized upland resources for a multitude of purposes. Forest resources were gathered, for not only the basic needs of food and clothing, but for tools, weapons, canoe building, house construction, dyes, adornments, hula, medicinal and religious purposes. The present project area is dominated by alien vegetation (albezia, ginger, California grass) although some traditional cultigens (banana, bamboo, *kī*) and historically introduced food plants (papaya) are present as well. Within the project area itself no specific documentation was found regarding gathering of plants during traditional Hawaiian times. During this assessment there were no ongoing practices related to traditional gathering of plant resources identified in the present project area. None of the individuals contacted for this assessment identified any native plant gathering practices within the project area.

B. Historic Properties

No historic properties were identified within the project area or in the vicinity. The density of identified historic properties is far greater near the coast of Kapa'a Ahupua'a. For a listing of the historic properties of Kapa'a, Kaua'i, see Table 4.

C. Burials

No burials are believed to be present within the project area and none are known in the vicinity.

D. Trails

Based on nineteenth and twentieth century maps the primary transportation routes *mauka/makai* correlated closely to the existing major roadways. During this assessment there were no trail systems identified in the proposed project area.

VII. SUMMARY AND RECOMMENDATIONS

In summary, a cultural impact assessment was conducted for a proposed mauka reservoir locality in Kapa'a Ahupua'a, Kaua'i. Historic research of the project areas was carried out to identify any cultural resources or traditional cultural practices associated with the area encompassing the proposed study area(s). An attempt was made to contact 21 parties regarding cultural knowledge, land use history, cultural sites and traditional Hawaiian or other cultural practices in the vicinity of the project area. Four of the six individuals who responded had no cultural concerns in the project study area(s) or in the vicinity of the project areas. Two of the organizations contacted, the Kaua'i/Ni'ihau Island Burial Council and the Kaua'i County Planning Departments, Historic Preservation Review Commission indicated an intention to discuss the matter at scheduled meetings for September 2004. No comments or concerns have been received.

Hawaiian traditions centered on Kapa'a suggest the area's significance and association with the *ali'i* in pre-contact times. A survey of traditional mythological literature shows Kapa'a prominently associated with some of the most famous legendary and historical figures including Maui, Kawelo, Mō'īkeha, Māweke, Palila, Paka'a Kanaka Nunui Moe. The fourteen documented *heiau* of Kapa'a is a testament to both the substantial population and the social/political/religious importance of this *ahupua'a.*

A famous O'ahu chief, Mō'ikeha (dates ca. A.D. 1340-1360 by the 20 years per generation count), according to tradition, sailed off to Kahiki and on his return settled in Wailua, Kaua'i, where the Puna family of chiefs welcome him. "On the death of Puna, Mō'īkeha became the principal chief (*Ali'i nui*) of Kaua'i, and remained there the balance of his life" (Fornander 1969:54).

Historic research provided information regarding sugar cane cultivation, settlement patterns, rice cultivation, the opening of Hawaiian Canneries and the construction of the Ahukini Terminal & Railway Company in 1820.

Previous archaeological research shows that the majority of study areas are located within urban Kapa'a near the shore and that little data has been developed for more inland areas. Archaeological research has identified numerous historic properties along the coastal regions of Kapa'a (see Table 4).

Based on the above findings, the proposed project will have minimal or no impact on Hawaiian culture, its practices and traditions.

It should be noted, however, that subsurface properties associated with former traditional Hawaiian activities in the project area, such as burials, artifacts and cultural layers, may be present despite the previous development of the proposed project areas. As a precautionary measure, personnel involved in future development activities in the area should be informed of the possibility of inadvertent cultural finds, and should be made aware of the appropriate notification measures to follow.

VIII. REFERENCES CITED

Akina, Joseph

1913 *"I Ke hou i Ka Lulu-o-Moikeha i ka laula o Kapa'a", Kū'oko'a.* May 2-9, 1913. Bishop Museum Archives HEN Place Names, Kaua'i.

Alexander, William Patterson

1991 "A Tour of Kaua'i in 1849: Private Journal of William DeWitt Alexander," *The Kaua'i Papers*, Kaua'i Historical Society, A Kaua'i Historical Society Publication, Lihue, Kaua'i, HI.

Beckwith, Martha

1970 *Hawaiian Mythology*, The University Press of Hawai'i, Honolulu.

Bennett, Wendell C.

1931 *The Archaeology of Kaua'i*, Bishop Museum Bulletin 80, Honolulu, HI.

Borthwick, Douglas F. and Hallett H. Hammatt

1999 *Archaeological Monitoring and Burial Treatment Plans for the Proposed Improvements to the Kapa'a Seventh-day Adventist Church, Kapa'a Ahupua'a, Puna District, Kaua'i Island (TMK 4-5-03: 19),* Cultural Surveys Hawai'i, Kailua, HI.

Bishop Museum Archives

HEN I: 214 "Heiaus of Kealia and Kapa'a" and "Well Known Things [or Places]".

HEN I: 215 "Famous Things mentioned by Two Men".

HEN I: 216 "Heiaus from Kapa'a to Kealia" and "Things for which Kapa'a was Known".

Bureau of Land Conveyances

Grant 8248

Bushnell, K.W., and Hallett H. Hammatt

2000 *An Archaeological Monitoring Report for Improvements to the Kapa'a Seventh-Day Adventist Church, 1132 Kuhio Highway, Kapa'a Ahupua'a, District of Puna, Island of Kauai (TMK 4-5-03:19),* Cultural Surveys Hawaii, Kailua, HI.

Bushnell, K.W., Melanie Mann, Douglas Borthwick, Tony Bush, Todd Tulchin, David Shideler and Hallett H. Hammatt

2003 *Archaeological Inventory Survey for the Proposed Kapa'a/Keālia Bike and Pedestrian Path, Kapa'a and Keālia, Kawaihau District, Kaua'i Island, Hawai'i (TMK 4-5, 4-6-14, 4-7-03 & 04).* Cultural Surveys Hawai'i, Inc. Kailua, HI.

Calis, Irene

2000 *End of Field Work Report: Human Burial Removal and Archaeological Monitoring, Kapa'a Beach Park Public Bathroom Installation, Kapa'a, Kaua'i* Scientific Consultant Services

Chafee, David B., Berdena Burgett and Robert L. Spear

1994a *An Inventory Survey of a Kukui Street Houselot, Kapa'a Ahupua'a, Kawaihau District, Puna, Island of Kaua'i (TMK: 4-5-09:10),* SCS Inc., Kāne'ohe, HI.

1994b *An Inventory Survey of a Māmane Street Houselot, Kapa'a Ahupua'a, Kawaihau District, Puna, Island of Kaua'i (TMK: 4-5-09:51),* SCS Inc., Kāne'ohe, HI.

Ching, Francis K. W.
1976 *Letter Report: Archaeological Reconnaissance - Report, Kapa'a "Wastewater Treatment and Disposal System*, ARCH 14-96, Letter to R. M Towill Corporation, ARCH, Lāwa'i, Kaua'i, HI.

Condé, Jesse C. and Gerald M. Best
1973 *Sugar Trains, Narrow Gauge Rails of Hawaii*, Glenwood Publishers, Felton, CA.

Cook, Chris
1999 "*Kaua'i, the Garden Island: A Pictorial History of the Commerce and Work of the People*", Donning Co., Virginia Beach, VA.

Creed, Victoria, Hallett H. Hammatt, Gerald K. Ida, Ian Masterson and John Winieski
1995 *A Summary of the Archaeological Monitoring for the Kapa'a Sewerline Project Waipouli and Kapa'a Ahupua'a, Puna District, Kaua'i (TMK:4-3-09 and 4-5-03 to 11),* Cultural Surveys Hawai'i, Kailua, HI.

Damon, Ethel M.
1931 *Koamalu*, two vols. Privately printed at the Honolulu Star-Bulletin Press, Honolulu.

Dega, Michael F. and James Powell
2003 *Archaeological Monitoring During Phase I of the Kaua'i Rural Fiber Optic Duct Lines Project, Kaua'i Island, Hawai'i.* Scientific Consultant Services

Dole, Charles S.
1916 "The Hui Kawaihau" pp.8-15. A Paper read at the November meeting of the Kaua'i Historical Society on November 16, 1916. In Līhu'e, Kaua'i.

Donohugh, Donald
2001 *The Story of Kōloa, A Kaua'i Plantation Town*, Mutual Publishing, Honolulu, HI.

Elmore, Michelle and Joseph Kennedy
2003 *An Archaeological Monitoring Report for the Proposed Kūhiō Drainage Improvements Kapa'a and Anahola (Project # 56AC-01-01) Located in Kawaihau District, Island of Kaua'i*, ACPI.

Foote, Donald E. E. L. Hill, S. Nakamura and F. Stevens
1972 *Soil Survey of the Islands of Kaua'i, O'ahu, Maui, Molokai and Lanai, State of Hawai'i* U.S. Department of Agriculture, U.S. Government Printing Office, Washington D.C.

Fornander, Abraham
1916-19 *Fornander Collection of Hawaiian Antiquities and Folk-Lore, with translations edited and illustrated with notes by Thomas G. Thrum*, Volume 4, First series, 1916 - 1917 notes by Thomas G. Thrum, Memoirs of the Bernice P. Bishop Museum, Vols. 4, 5, 6, Honolulu, HI.

Garden Island Newspaper
1955 "Geologists Says Kapa'a Coral Removal No Threat to Town". September 21, 1955.

1963 "Kapa'a Blames Federal Role As Erosion Continues. Says Barrier on Reef is Required". October 30, 1963.

1983 "Centennial Year, Kapa'a School Wants Pix of its 100 Years". April 1, 1983.

Giambelluca, Thomas W., Michael A. Nullet and Thomas A. Schroeder
1986 *Rainfall Atlas of Hawai'i,* Department of Land and Natural Resources, Honolulu, HI.

Hammatt, Hallett H.
1981 *Archaeological Reconnaissance of 52.56 Acres for a Proposed subdivision, TMK 4-6-13-1, Kapa'a, Puna, Kaua'i Island*, ARCH Report 14-236, Prepared for Waialeale Partners.

1986 *Archaeological Reconnaissance of the Makaleha Springs Water Source Development, Kapa'a, Kaua'i TMK: 4-6-01:1*, Cultural Surveys Hawai'i, Kailua, HI.

1991 *Archaeological Subsurface Testing for the Proposed Kapa'a Sewer line, Wailua, Olohena, Waipouli and Kapa'a, Kaua'i*, Cultural Surveys Hawai'i, Kailua, HI.

Hammatt, Hallett H., Rodney Chiogioji, Gerald K. Ida and Victoria S. Creed
1997 *An Archaeological Inventory Survey for the Kūhiō Highway Widening and Bypass Options Within the Ahupua'a of Wailua, South Olohena, North Olohena, Waipouli & Kapa'a, Island of Kaua'i*, Cultural Surveys Hawai'i, Inc., Kailua, HI.

Hammatt, Hallett H., Gerald K. Ida, and Rodney Chiogioji
1994 *Archaeological Document Review and Assessment of Three Alternative Widening and Bypass Options for the Kūhiō Highway Within the Ahupua'a of Hanamā'ulu, Wailua, South Olohena, North Olohena, Waipouli & Kapa'a, Līhu'e and Kawaihau Districts, Island of Kaua'i*, Revised 1994, Cultural Surveys Hawaii, Kailua, HI.

Hammatt, Hallett H., Gerald K. Ida and William H. Folk
1994 *Archaeological Inventory of a 1.87-Acre Parcel, Kapa'a, Kaua'i (TMK 4-5-05:6),* Rev. August 1994, Cultural Surveys Hawai'i, Kailua, HI.

Hammatt, Hallett H. and David W. Shideler
2004 *Archaeological Assessment of Alternative Routes Proposed for the Lydgate to Kapa'a Bike and Pedestrian Pathway Project Within the Ahupua'a of Wailua, South Olohena, North Olohena, Waipouli and Kapa'a*, Cultural Surveys Hawai'i, Kailua, HI.

Hammatt, Hallett H., David W. Shideler and William H. Folk
2002 *Archaeological Study in Support of Proposed Kūhiō Highway Improvements (Kapa'a By-Pass) Hanamā'ulu to Kapa'a Ahupua'a, Kaua'i,* Cultural Surveys Hawai'i, Kailua, HI.

Handy, E.S. Craighill and Elizabeth G. Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*, B.P. Bishop Museum Bulletin 233, B.P. Bishop Museum, Honolulu, HI.

Hawaii State Archives
1837 Interior Department, Land, Incoming Letter. August 1837.

1882 Interior Department, Letter book, Vol. 20, p. 426, Letter from Spalding to the Honorable Jacob Hardy, Circuit Judge–Fourth Circuit Kaua'i.

Hawaii Territorial Planning Board
1940 *Master Plan of the Town of Kapa'a,* In collaboration with the Kaua'i County Board of Supervisors, Publication No. 8. Advertiser Publishing Co., Honolulu, HI.

Honolulu Advertiser
1997 "Amfac to put more land up for sale: Tracts on Kaua'i, Big Island" by Mike Gordon. July 7, 1997. Section B1.

1960 "Kaua'i Tries to See into Future. March 20, 1960.

Joesting, Edward
1984 *Kaua'i, The Separate Kingdom*, University of Hawaii Press and Kaua'i Museum Association, Ltd., Honolulu.

Jourdane, Elaine
1995 *Inadvertent Discovery of Human Remains at 1382-A Inia Street, Kapa'a, Kaua'i (Kapa'a Sewerline Project Laterals) Site 626*, SHPD, Honolulu, HI.

Kalākaua, David
1888 *The Legends and Myths of Hawaii*, Edited by R.M. Dagget, Charles L. Webster and Co., New York.

Kamakau, Samuel Manaiakalani
1976 *The Works of the People of Old, Nā Hana a ka Pō'e Kahiko*, Bishop Museum Special Publication, No. 61, Honolulu, HI.

Kapa'a Elementary School
1983 *Kapa'a School 1883-1983: A "Century of Knowledge".* Kapa'a Elementary, Kapa'a, Kaua'i.

1933 *Kapa'a Elementary School, Kula O Kapa'a, 1883-1933*, Published by the school on its fiftieth anniversary, Kapa`a, Kauai, HI.

Kawachi, Carol T.
1994 *Inadvertent Burial at 1316 Inia Street (Jasper) TMK 4-5-08:33, Kapa'a, Kawaihau, Kaua'I 50-30-08-871*, State Historic Preservation Division, Honolulu, HI.

Kikuchi, William K. and Susan Remoaldo
1992 *Cemeteries of Kaua'i,* Volume 1, Kaua'i Community College and University of Hawai'i, Puhi, Kaua'i, HI.

King, Robert D.
1935 "Districts in the Hawaiian Islands" In Coulter, John Wesley (compiler) *A Gazetteer of the Territory of Hawaii*, University of Hawaii Research Publications, No. 11, University of Hawaii, Honolulu, Hi.

Lai, Violet L. assisted by Kum Pui Lai
1985 *He Was a Ram, Wong Aloiau of Hawaii*, Published for the Hawaii Chinese History Center and the Wong Aloiau Association by University Press of Hawaii, Honolulu.

McMahon, Nancy A.
1994 *Inadvertent Burial Find, Kapa'a, Kawaihau, Kaua'i*, SHPD, Honolulu, HI.

1996 *Archaeological Inventory Survey for 5 Unit Apartment, TMK: 4-5-05:8, Kapa'a, Kawaihau, Kaua'i*, Exploration Associates, LTD., Koloa, Kaua'i, HI.

Nakuina, Moses K.
1990 *The Wind Gourd of La'amaomao*, Translated by Esther T. Mookini and Sarah Nakoa, Kalamaku Press, Honolulu.

Office of the Commissioner of Public Lands
1929 *Indices of Awards, Made by the Board of Commissioners to Quiet Land Title in the Hawaiian Islands*.

Perzinski, Mary and Hallett H. Hammatt
2001 *A Summary of Archaeological Monitoring for the Kūhiō Highway, Waikaea Bridge Widening Project Kapa'a Ahupua'a, Kawaihau District, Kaua'i Island (TMK: 4-3-06 to 4-3-08),* Cultural Surveys Hawai'i, Kailua, HI.

Pukui, Mary Kawena
1983 *'Ōlelo No'eau: Hawaiian Proverbs and Poetical Sayings*, Bishop Museum Special Publication No.71, Bishop Museum Press, Honolulu, HI.

1986 *Hawaiian Dictionary*, 2nd Edition, University of Hawaii Press, Honolulu, HI.

1974 *Place Names of Hawaii*, University of Hawai'i Press, Honolulu, HI.

Rice, William Hyde
1974 *Hawaiian Legends*, Bernice P. Bishop Museum Bulletin 3, Honolulu, HI; originally published 1923, Kraus Reprint, Millwood, New York, N.Y.

1923 *Hawaiian Legends*, Bernice P. Bishop Museum Bulletin 3, Honolulu.

Spear, Robert L.
1992 *Letter Report Concerning Monitoring for the Cost-U-Less Project Kapa'a, Kaua'i, Hi.*(TMK: 4-5-5:4&9), Scientific Consultant Services Inc., Honolulu, HI.

Thrum, Thomas G.
1906 "Heiaus and Heiau Sites Throughout the Hawaiian Islands, Kaua'i, in: *Hawaiian Almanac and Annual 1907*, pp. 36-48, Honolulu, HI.

1923 *More Hawaiian Folk Tales*, A.C. McClurg & Co., Chicago, IL.

Van Ryzin, Karl and Hallett H. Hammatt
2004 *An Archaeological Assessment For The Proposed Water Reservoir, Kapa'a Ahupua'a, Kaua'i TMK 4-6-03:10* Cultural Surveys Hawai'i, Kailua, HI.

Wichman, Frederick B.
1998 *Kaua'i Ancient Place Names and Their Stories*. University of Hawaii Press: Honolulu

Wichman, Frederick B.

1985 *Kauai Tales*, Bamboo Ridge Press, Honolulu, HI.

IX. APPENDIX

At the request of Belt Collins Hawai'i Ltd., Cultural Surveys Hawai'i, Inc. (CSH) conducted a Cultural Impact Assessment for the Proposed Water Reservoir Location, *Mauka* Locale in the uplands of Kapa'a, Kaua'i Island. During this assessment two other locations (the "*Makai* 1 Locale" and the "*Makai* 2 Locale") in seaward Kapa'a were also assessed as possible alternatives for the *Mauka* Locale, (Figures 7 to 10):

A. *Makai* Locale 1 Project Area

The *Makai* Locale 1 (TMK 4-6-11:3) project area is located at the corner of Kawaihau Road and Ka'apuni Road at an elevation of 91 m (300 ft) at a distance of approximately 4.18 km (2.6 mi) from the coast. Foote et al (1972) describes the soil in this area as being "Puhi Silty clay loam" (PnB) which is defined as being "well-drained soils on uplands on the island of Kaua'i. These soils developed in material derived from basic igneous rock. They are nearly level to steep. Elevations range from 175 to 500 feet." (Foote et al.1972). *Makai* Locale 1 receives an average annual rainfall of approximately 2000 mm (79 inches) (Giambelluca 1986:47).

On June 10th, 2004, Cultural Surveys Hawai'i staff made a field inspection of the *Makai* Locale 1 alternative water tank installation project area. Access was via Highway 56, turning off to the west on Highway 581, then turning off to the northwest on Kaehulua Road.

The *Makai* Locale 1 is comprised of a 0.84-acre State property of which a portion is fenced and contains an existing 0.2 MG wooden reservoir (Figure 11). Survey transects oriented north-south were conducted through the project area. Based on observations the entire existing and proposed tank locale had previously been bulldozed and graded. The existing tank area consists of mowed grass lawn. The remainder of the property is an open, level pasture containing large patches of California grass, bananas, and various weeds and vines (Figures 11 and 12). No archaeological sites were observed. Based on background research *Makai* Locale 1 was, during the early 20th century, under sugar cane cultivation. The field check examined the areas of proposed impact and found no archaeological sites or historic preservation concerns in the vicinity. No further historic preservation work was recommended.

In the course of the present Cultural Impact Assessment work the nineteen parties contacted (summarized in "Table 5 Community Consultation") were asked if they had any concerns for the *Makai* Locale 1 area that was initially under consideration. No concerns were expressed.

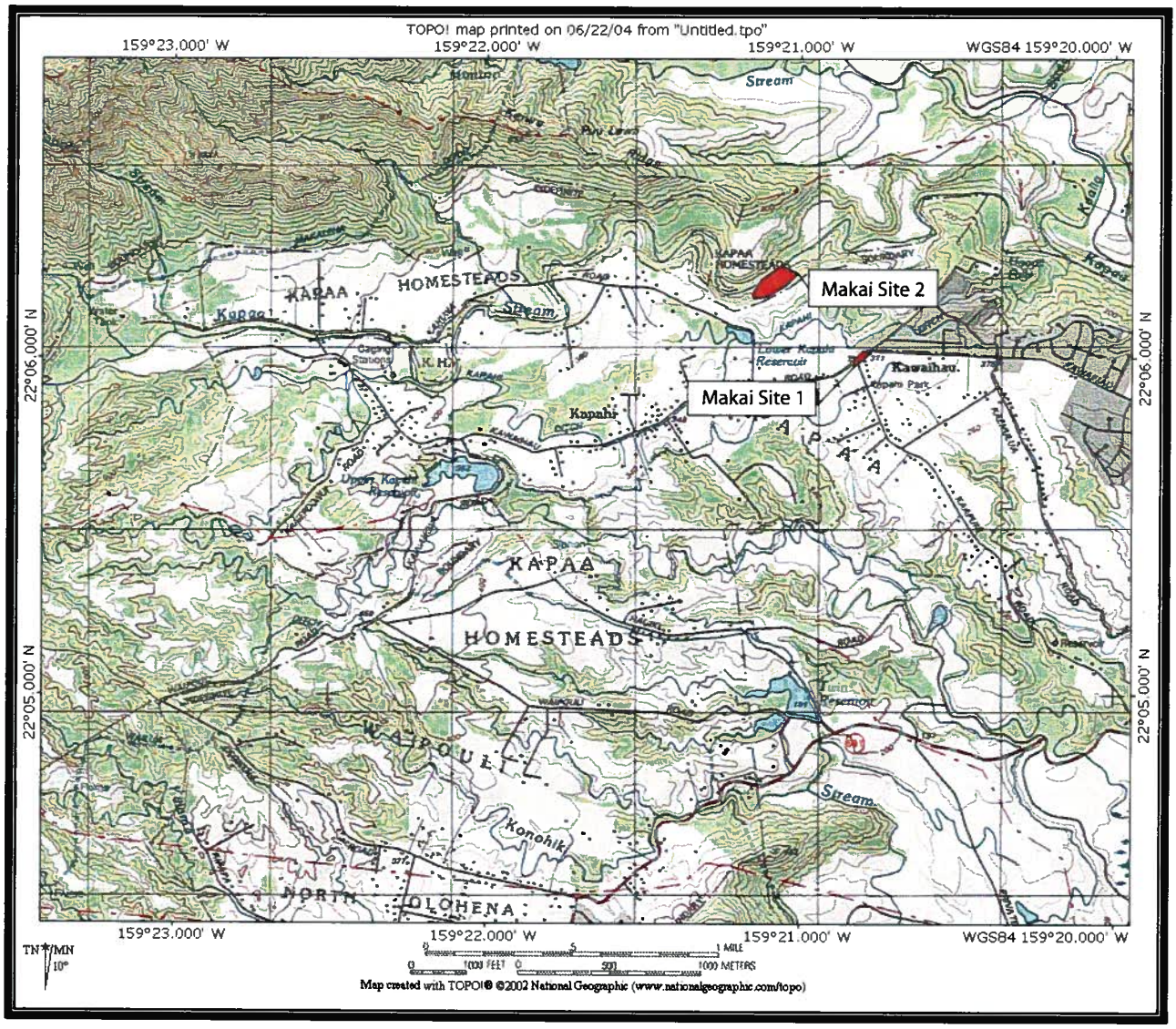


Figure 7. Portion of U. S. Geological Survey map showing alternative *Makai* 1 Locale and *Makai* 2 Locale

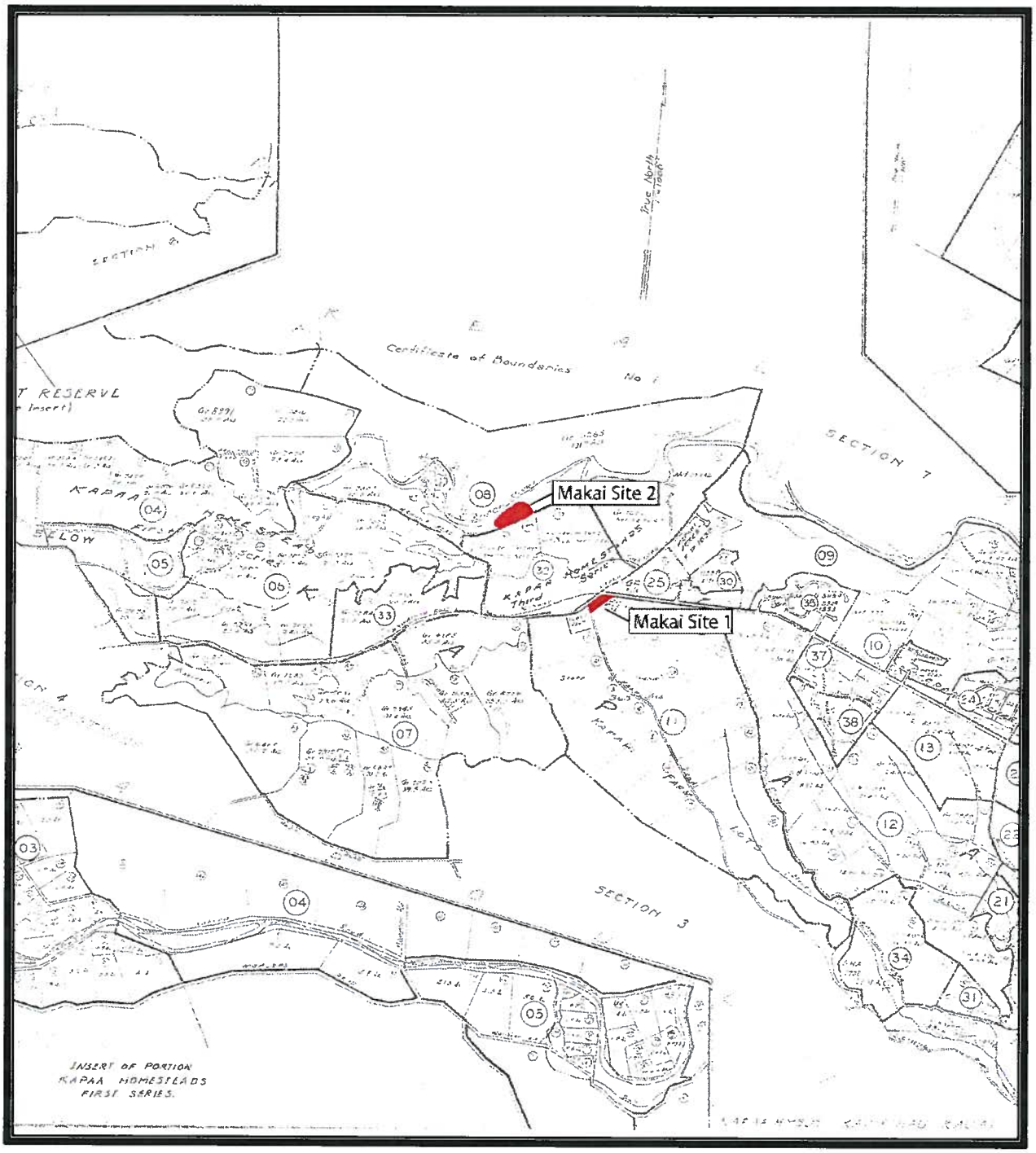


Figure 8. TMK map 4-6 Showing alternative locations *Makai* 1 Locale and *Makai* 2 Locale

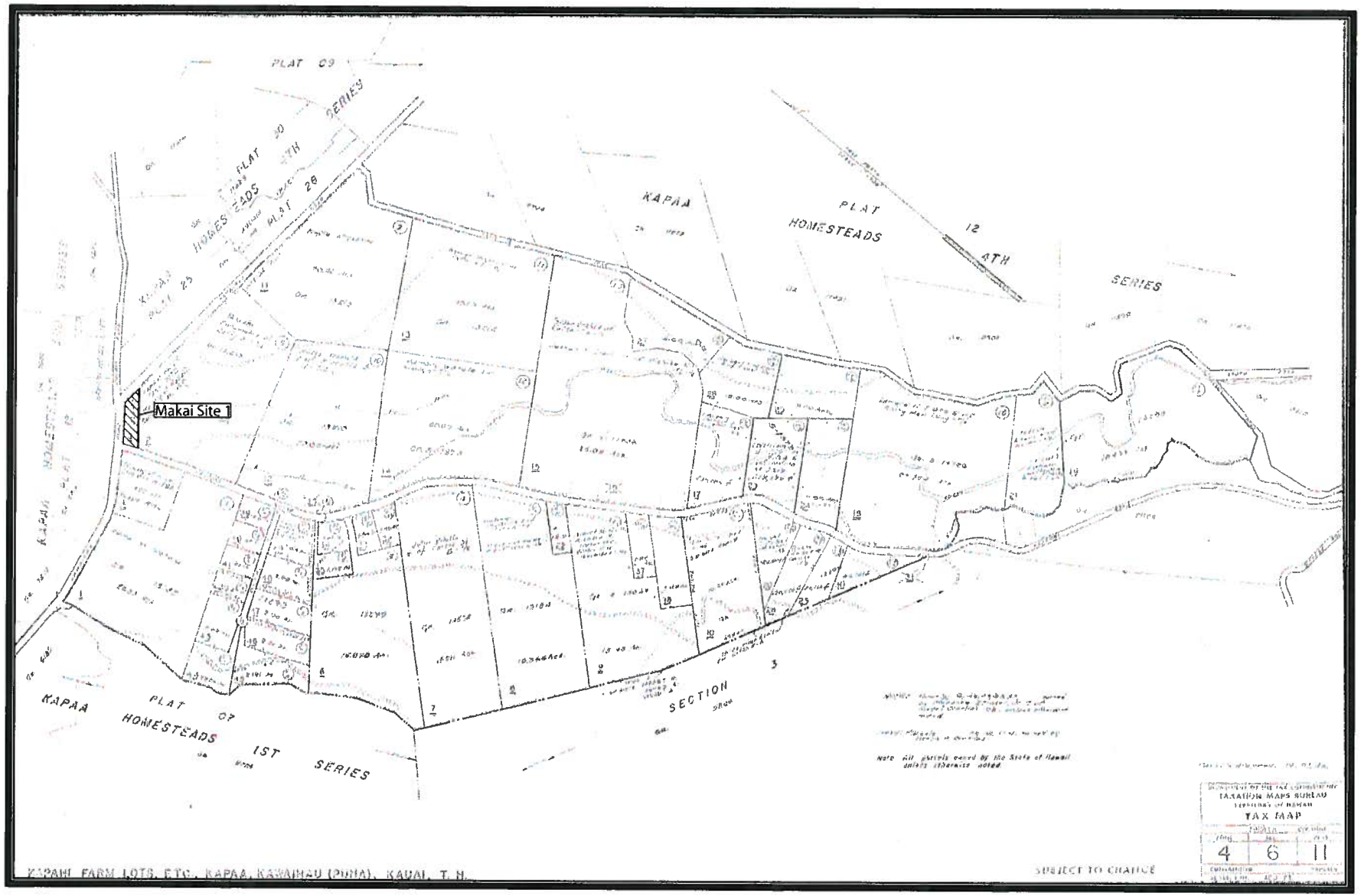


Figure 9. TMK Map 4-6-11:33 Showing *Makai* 1 Locale

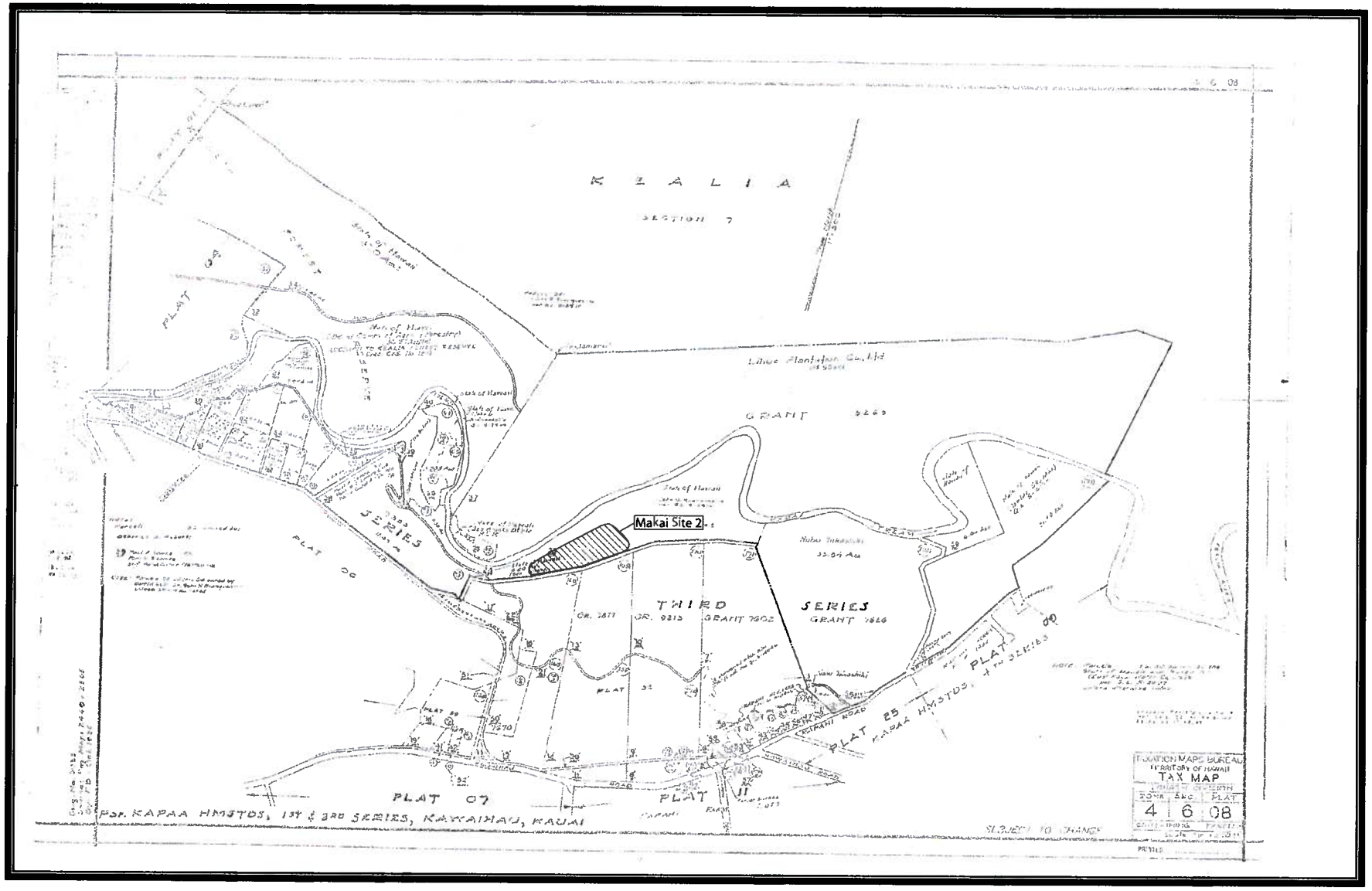


Figure 10. TMK Map 4-6-08:24 Showing *Makai* 2 Locale

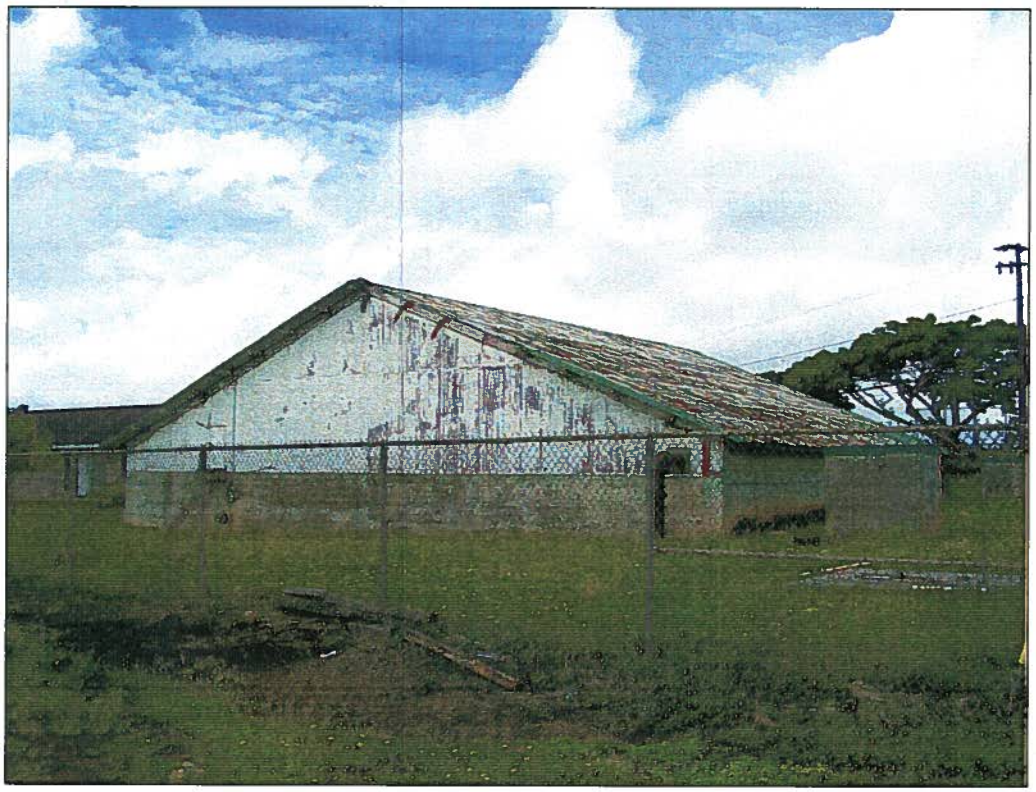


Figure 11. Fenced section of *Makai* Locale 1 project area, view to the southwest.

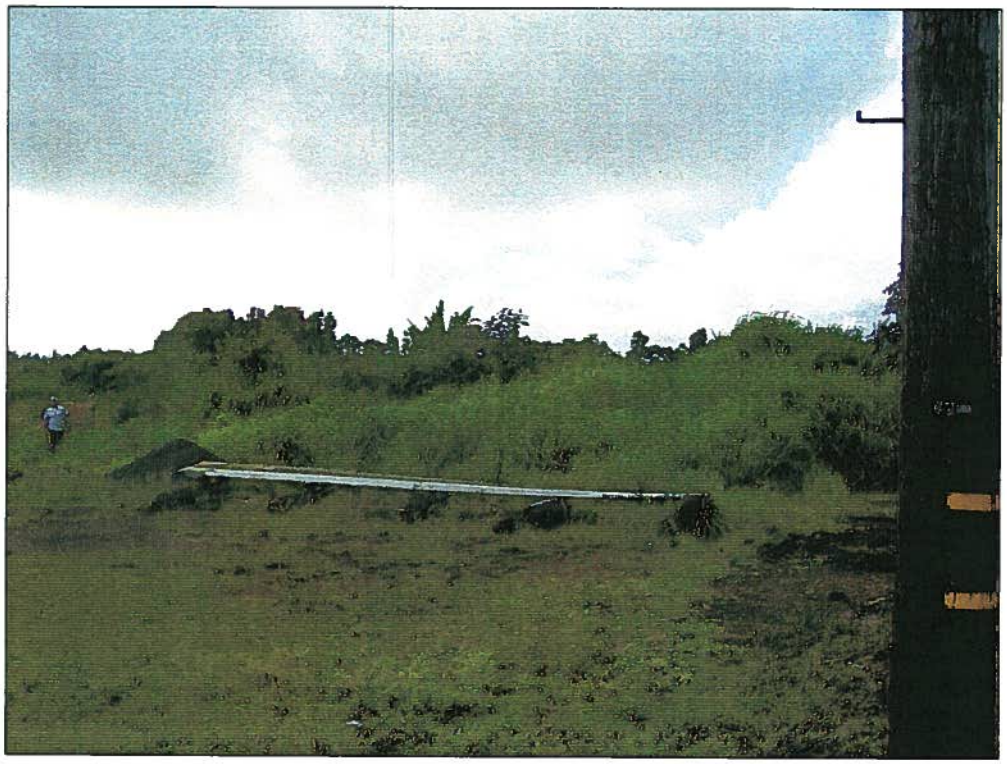


Figure 12. *Makai* Locale 1 project area, view to the southeast.

B. *Makai* Locale 2 Project Area

The *Makai* Locale 2 (TMK 4-6-08:24) project area is located approximately 400 m north of Lower Kapahi Reservoir and immediately south of Kapa'a Stream. The elevation runs from 60 m to 91 m (200-300 ft) and the project area is approximately 4.59 km (2.85 mi) from the coast. Foote et al (1972) described three types of soils within this project area – rough broken land (rRR), rock outcrop (rRO), and Hanalei silty clay (HrB). Rough broken land consists of "very steep land broken by numerous intermittent drainage channels. In most places it is not stony. The slope is 40 to 70 percent. Runoff is rapid, and geologic erosion is active." (Foote et al.1972). Rock outcrop consists of "areas where exposed bedrock covers more than 90 percent of the surface. The rock outcrops are mainly basalt and andesite. This land type is gently sloping to precipitous. … This land type is not suited to farming. It is used for water supply, wildlife habitat, and recreation" (Foote et al.1972). Hanalei silty clay consists of "somewhat poorly drained to poorly drained soils on bottom lands of the islands of Kaua'i and O'ahu. These soils developed in alluvium derived from basic igneous rock. They are level to gently sloping." (Foote et al.1972). *Makai* Locale 2 receives an average an annual rainfall of approximately 2000 mm (79 inches) (Giambelluca 1986:47).

On June 10th, 2004, Cultural Surveys Hawai'i Inc. archaeologist Karl Van Ryzin, B.A., and supervising archaeologist David Perzinski, B.A., made a field inspection on the Makai Locale 2 alternative water tank installation project area. Access was via an unmarked privately owned dirt road that runs northeast from Kahuna Road.

The *Makai* Locale 2 is comprised of an unmarked, approximately 3.7 acre site off a dirt access road and is located immediately south of Kapa'a Stream. The majority of the project area lies on a 45 to 90 degree angle slope that descends down into Kapa'a Stream (Figures 13 and 14). Survey transects oriented north-south were conducted throughout the relatively level upper portion of the project area. For the lower portion of the project area transects were done along the contour of the slope. Vegetation is dense with the project area dominated by ginger, ferns, *ti*, palms, albezia, and exotic grasses. No archaeological sites were observed. The field check examined the areas of proposed impact and found no archaeological sites or historic preservation concerns in the vicinity. No further historic preservation work was recommended.

In the course of the present Cultural Impact Assessment work the nineteen parties contacted (summarized in "Table 5 Community Consultation") were asked if they had any concerns for the *Makai* Locale 2 area that was initially under consideration. No concerns were expressed.

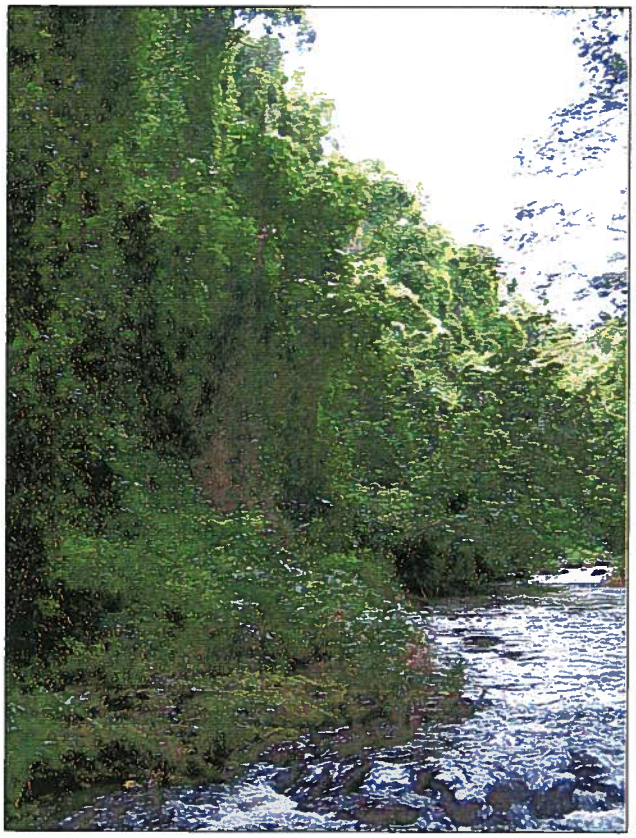


Figure 13. *Makai* Locale 2 project area south of Kapa'a stream showing steep slope, view to the west.

Figure 14. *Makai* Locale 2 project area showing dense vegetation and steep slope, view to the east.