



March 27, 2012

Mr. Gary Hooser, Director Office of Environmental Quality Control Department of Health, State of Hawai'i 235 South Beretania Street, Room 702 Honolulu, Hawai'i 96813

Dear Mr. Hooser:

Kalāheo Water System Improvements Kalāheo, Kaua'i, Hawai'i TE MAR 27 P3:38

OFC. OF ENVIRONMENTAL CONTROL

The Department of Water, County of Kaua'i, hereby transmit the enclosed Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the Kalāheo Water System Improvements project situated at Tax Map Key 2-4-002, -003, -004, and -005 in the Kalāheo District of the island of Kaua'i for publication in the April 8, 2012 edition of The Environmental Notice.

Enclosed is a completed OEQC Publication Form, two (2) copies of the DEA-AFONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Glen Koyama at Belt Collins Hawaii, ph. (808) 521-5361.

Sincerely yours,

David Craddick, P.E.

Manager and Chief Engineer

Enclosures

cc: Glen Koyama, Belt Collins Hawaii

Agency Action Environmental Assessment Chapter 343, HRS Publication Form

Project Name: Kalāheo Water System Improvements

Type of Document: DEA with AFONSI

Date: March 27, 2012

Island: Kauaʻi District: Kalāheo

TMK: 2-4-03: 7, 2-4-09: 3, and 2-4-04: 39 & 49;

and Pu'uwai Road, Po'ohiwi Road, and Kikala Road

Statutory/Administrative Authorities: Use of State/County lands/funds (Section 343-5(a)(1), HRS),

and Use of Conservation District (Section 343-5(a)(2), HRS).

Permits: State of Hawai'i

Conservation District Use Permit, Water Use Permit, Well Construction & Pump

Installation Permits, NPDES Permit,

County of Kaua'i

Class IV Zoning Permit, Use Permit, Building Permit, Grading Permit, Water Pipeline

Installation

Proposing/Determination

Agency: Mr. David Craddick, P.E., Department of Water, County of Kaua'i, P.O. Box 1706,

Līhu'e, Hawai'i 96766. (808) 245-5408

Consultant: Mr. Glen Koyama, Belt Collins Hawai'i LLC, 2153 North King Street, Suite 200,

Honolulu, Hawai'i, (808) 521-5361

Status: Statutory 30-day comment period

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page):

The Department of Water (DOW), County of Kauai, is proposing to upgrade its aging water system in upland Kalāheo, Kaua'i to meet Maximum Day Demand storage capacity and fire flow requirements for current and future demand in the Kalāheo-Lāwa'i-'Ōma'o Water Service Area. Proposed improvements include replacing two existing water tanks with two new 0.5 million gallon tanks and constructing a new production well, 12,500 linear foot transmission main, modified booster pump station, upgraded booster pumps, and relocated existing pressure reducing valve stations. The project area is located approximately 1.2 miles upland (north) of Kaumuali'i Highway on Pu'uwai Road, Po'ohiwi Road, and Kikala Road.

The improvements will occur primarily on existing DOW properties and County road rights-of-way which are occupied by existing public facilities. One of the properties was recently acquired by DOW and will require removal of an abandoned dwelling. Installation of the transmission main will occur within the road rights-of-way but traffic control measures will be employed to assure continual vehicular passage through the construction area.

DRAFT ENVIRONMENTAL ASSESSMENT

KALĀHEO WATER SYSTEM IMPROVEMENTS

Kalāheo, Kaua'i, Hawai'i

Tax Map Keys: 2-4-03: 7, 2-4-09: 3, and

2-4-04: 39 & 49; and Pu'uwai Road, Po'ohiwi Road, and Kikala Road

March 2012

Prepared for:

DEPARTMENT OF WATER SUPPLY COUNTY OF KAUA'I

Prepared by:



DRAFT ENVIRONMENTAL ASSESSMENT

KALĀHEO WATER SYSTEM IMPROVEMENTS

Kalāheo, Kaua'i, Hawai'i

Tax Map Keys: 2-4-03: 7, 2-4-09: 3, and

2-4-04: 39 & 49; and Pu'uwai Road, Po'ohiwi Road, and Kikala Road

March 2012

Prepared for:
Department of Water Supply
County of Kaua'i
4398 Pua Loke Street
Līhu'e, Hawai'i 96766

Prepared by: Belt Collins Hawaii LLC 2153 North King Street, Suite 200 Honolulu, Hawai'i 96819

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2011.74.0100

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Appendix A Hydrologic Assessment

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Appendix D Archaeological Survey

Appendix E Cultural Impact Assessment

Appendix F Preconsultation Letters

Acronyms and Abbreviations

BLNR Board of Land and Natural Resources (State of Hawai'i)

BMP Best Management Practices

CDUP Conservation District Use Permit
CDP Community Development Plan
CIA Cultural Impact Assessment

CWRM Commission on Water Resource Management (State of Hawai'i)

dBA A-weighted decibels

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)
DP Department of Planning (County of Kaua'i)
DPW Department of Public Works (County of Kaua'i)

DWRM Division of Water Resource Management (State of Hawai'i)

EA Environmental Assessment

EIS Environmental Impact Statement

EMS Emergency Medical Service

FEMA Federal Emergency Management Agency

FIRM Flood Insurance Rate Map

FONSI Finding of No Significant Impact

gpm gallons per minute

HAR Hawaiʻi Administrative Rules HRS Hawaiʻi Revised Statutes

IWS individual wastewater system

MAV moving average MG million gallons

MGD million gallons per day mg/L milligrams per liter msl mean sea level

ND not detected

NPDES National Pollutant Discharge Elimination System

OEQC Office of Environmental Quality Control

ppb parts per billionppm parts per million

SCADA Supervisory Control and Data Acquisition

SHPD State Historic Preservation Division

SMA Special Management Area

SY sustainable yield TCP Traffic Control Plan

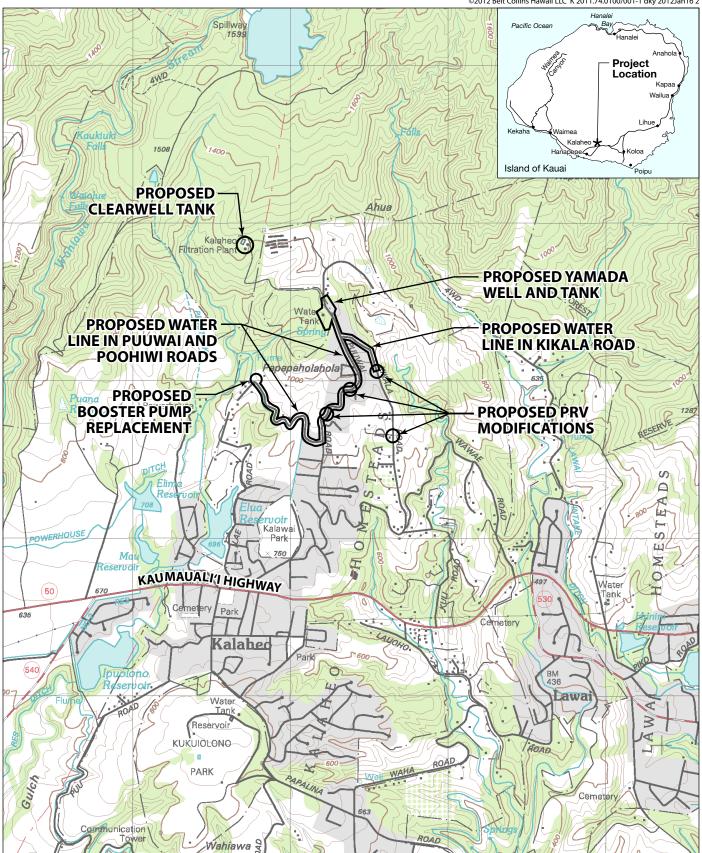
TMK Tax Map Key

USFWS United States Fish and Wildlife Service

USGS United States Geological Survey

1 SUMMARY

PROPOSING AGENCY:	Department of Water (DOW), County of Kauaʻi
APPROVING AGENCY:	DOW, County of Kauaʻi
GENERAL PROJECT DESCRIPTION:	The DOW is proposing to install two new 0.5 million gallon (MG) water tanks, a production well, and 12,500 feet of water main, and upgrade the booster pumps and other appurtenances in Kalāheo, Kaua'i to improve the water system serving the community.
PROJECT LOCATION:	The project area is located approximately 1.2 miles upland (north) of Kaumuali'i Highway on Pu'uwai Road, Po'ohiwi Road, and Kikala Road in Kalāheo, Kaua'i (see Figure 1). The new well will be located on the lot identified as Tax Map Key (TMK) (4) 2-4-03: 7; the two tank sites will be located at TMK (4) 2-4-03: 7 and (4) 2-4-09: 3; the new transmission mains will be located within Kikala Road, Po'ohiwi Road, and Pu'uwai Road; and the replacement of the booster pump upgrade at the 908' tank will be located on TMK (4) 2-4-04: 49 (see Figures 2 through 5).
PRELIMINARY DETERMINATION:	Anticipated Finding of No Significant Impact (AFONSI)
CONSULTED AGENCIES:	State Agencies Environmental Planning Office, Department of Health (DOH) Division of Water Resource Management, Department of Land and Natural Resources (DLNR) Land Division, DLNR State Historic Preservation Division, DLNR County Agencies Planning Department Department of Public Works (DPW) Department of Water (DOW) Utility Companies Kauai Island Utility Cooperative (KIUC) Hawaiian Telcom





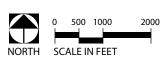


Figure 1 **LOCATION MAP** Kalāheo Water System Improvements Kalāheo, Kaua'i

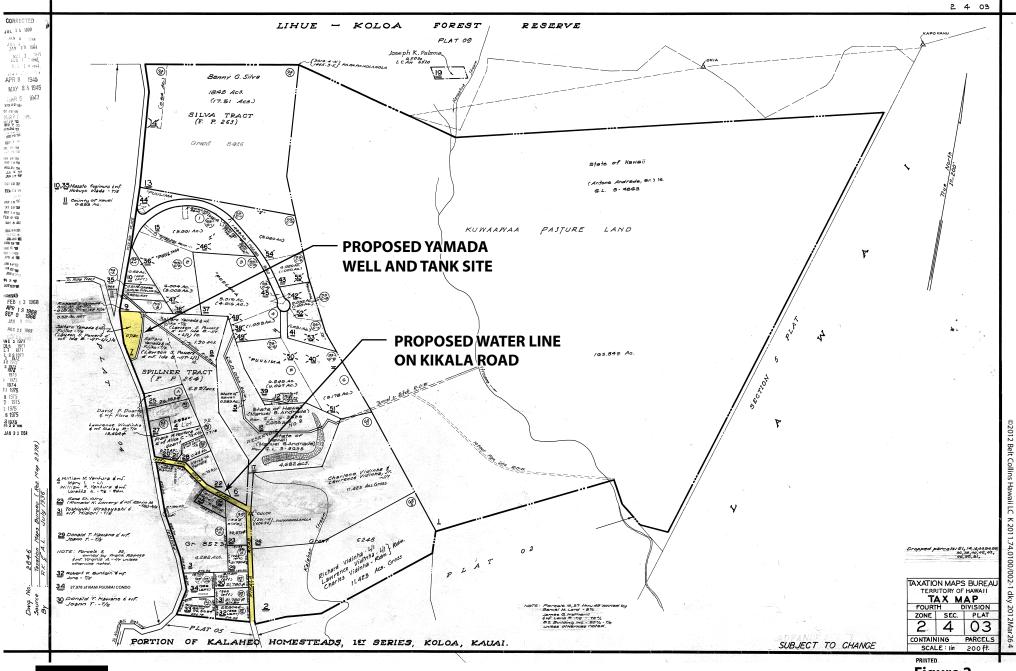






Figure 2 TAX MAP OF YAMADA TANK AND WELL SITE

Kalāheo Water System Improvements

Kalāheo, Kaua'i

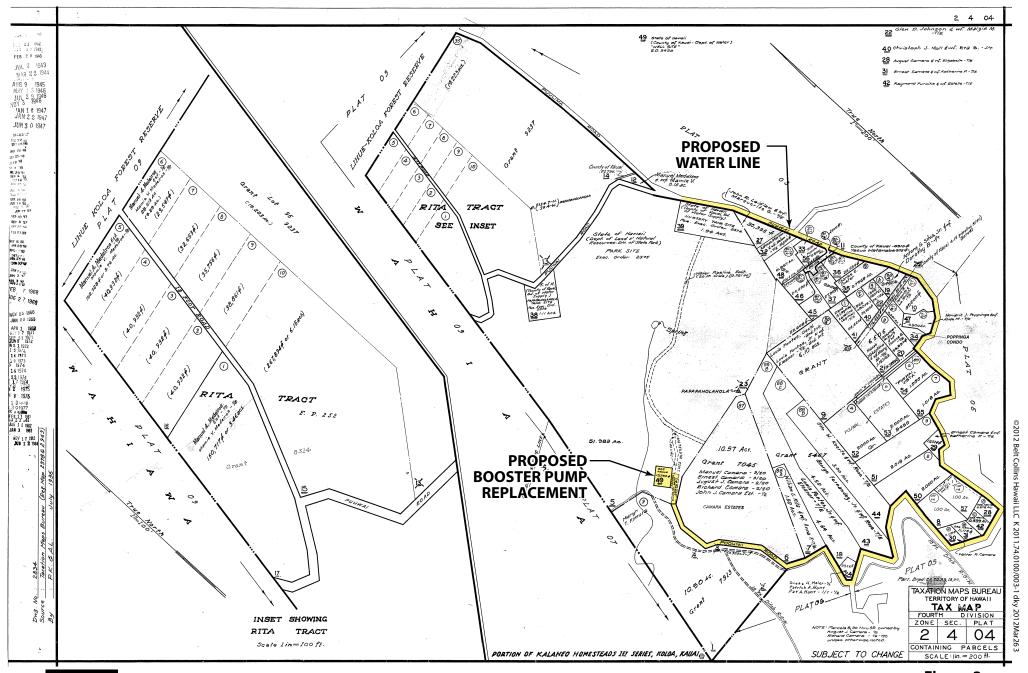






Figure 3
TAX MAP OF BOOSTER PUMP REPLACEMENT SITE AND WATER LINE SITE

Kalāheo Water System Improvements

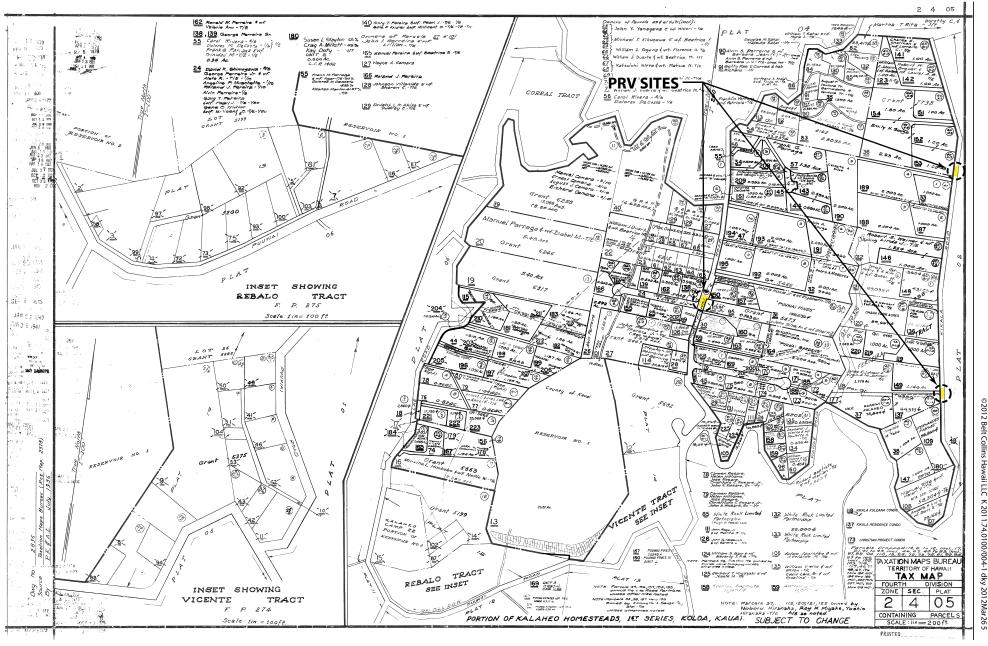






Figure 4
TAX MAP OF PRV MODIFICATION SITE
Kalāheo Water System Improvements
Kalāheo, Kaua'i

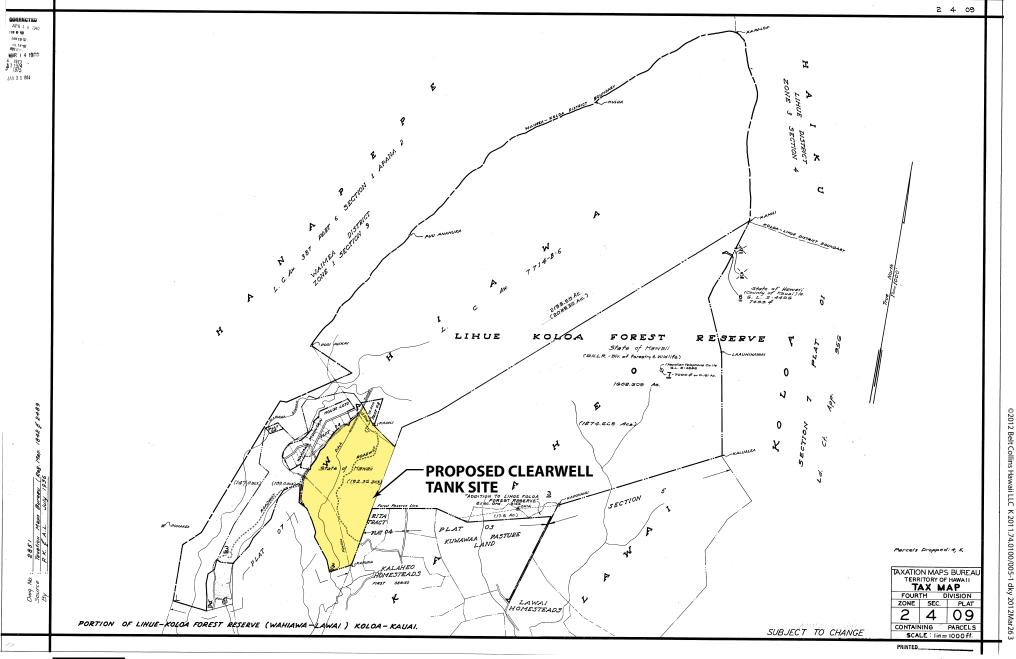






Figure 5 TAX MAP OF CLEARWELL TANK SITE Kalāheo Water System Improvements Kalāheo, Kaua'i

DESCRIPTION OF PROPOSED ACTION

2.1 PROJECT OBJECTIVE

- 4 The objective of the proposed action is to upgrade the aging water system in upland
- 5 Kalāheo, Kaua'i to meet future Maximum Day Demand (MDD) storage capacity and fire flow
- 6 requirements. Planned improvements include replacing two existing water tanks, and
- 7 constructing a new production well, new transmission main, booster pump upgrade,
- 8 relocation of existing pressure reducing valve stations, and modifying a booster pump
- 9 station affected by the upgrades. These improvements are needed to adequately serve the
- current and future Kalāheo-Lāwa'i-'Ōma'o water service area.
- 11 Two existing tanks, Nursery Tank and Clearwell Tank, will each be replaced with a new 0.5-
- MG water tank. The Nursery Tank replacement will be located on a nearby property
- acquired from the Yamada family and will be identified as the Yamada Tank. The new
- 14 Clearwell Tank replacement will be located near the existing Clearwell Tank.
- Along with the new tank, a production well and booster pump station will be constructed on
- the Yamada site. At the existing 908 Tank site modifications will be made to the existing
- 17 booster pump station and a new transmission main will be constructed along Po'ohiwi Road
- and Pu'uwai Road all the way to the Yamada Tank site. There are also planned
- improvements for extending the transmission main in Kikala Road. Modifications to
- 20 existing and proposed pressure reducing valve stations are also planned within Pu'uwai
- 21 Road and Kikala Road.
- 22 Growth in residential population and to a lesser extent commercial areas, require additional
- 23 sources of water to service the area. Currently, there is one source being explored to add to
- the existing water supply for the Kalāheo-Lāwa'i-'Ōma'o area. The present water system is
- over 65 years old, requiring DOW to comprehensively review its system for needed repairs,
- upgrades, or replacement of aging equipment.

1 2.2 BACKGROUND

2.2.1 History of Kalāheo

- 3 The Kōloa District of Kaua'i consists of a mix of agricultural lands, small rural residential
- 4 communities, and a coastal resort community. The primary agricultural crops include
- 5 diversified truck crops and coffee. The lands were predominantly used to grow sugarcane
- 6 until the last sugar plantation closed in 2009.
- 7 The rural residential communities of 'Ele'ele, Kōloa, Lāwa'i, and Kalāheo comprise the major
- 8 communities in the Kōloa district. Kalāheo has the largest residential population of 5,929 in
- 9 the group. Poʻipū, the coastal community within this district, comprises the resort attraction
- of sand beaches, hotels, vacation rentals, golf courses, tennis, spas, and shopping villages. It
- has developed into a popular visitor destination, and nearby Kōloa has become its
- 12 commercial center.

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- 13 The project site is located in the upland elevations of Kalāheo and includes a mix of
- residential, commercial and community facilities, including retail shops, medical clinics,
- churches, restaurants, gas station, schools, and playgrounds. Kaumuali'i Highway which
- circles the southern half of the island, passes through the business district as its main street.

2.2.2 Growth in the District

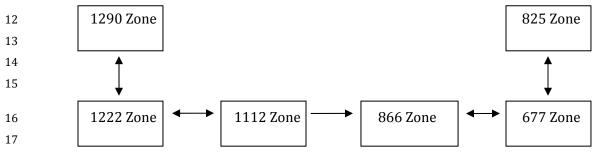
- According to the *Kauai General Plan*, which was adopted in 2000, the population growth of
- 19 Kalāheo is expected to be slow and steady, continuing to be a mostly residential
- 20 neighborhood. Projections of growth in the area follow the same steady historical pattern
- with a 2020 population of 5,596 people, a 2050 population of 6,762, and a build-out
- population of 10,790 people. The 2050 population is based on the forecasted growth
- between 2010 and 2020. The build-out scenario is based on vacant lands from a lot survey
- 24 performed by the DOW.
- 25 Commercial square footage in Kalāheo is expected to increase with the population, while
- 26 industrial and multi-family housing growth will remain flat. Most of the small-town
- commercial uses are located along Kaumuali'i Highway.

2.2.3 County Water System

- 29 The Department of Water's Water Plan 2020 serves as the long-range guide for water
- 30 resource development in the County. The goal of the plan is to "guide the DOW for future
- 31 operations and to identify the needed improvements and facilities required to continue to
- 32 provide safe, affordable, and reliable water service to our community in a sustainable and
- financially secure manner." This includes work to replace deteriorating water systems,

- 1 ensure water quality standards are met, increasing customer service, and operating with a
- 2 sustainable budget.
- The oldest water pipeline installed in Kalāheo was back in 1942. Problems with the current
- 4 water supply system include deficient fire flows in agricultural/open zoned areas,
- 5 undersized mains, and the aging system. Within the Kalāheo-Lāwa'i Water System service
- area there are six pressure zones (see Table 1). Each zone has at least one storage tank with
- 7 some units having booster pumps to pump its water up to a higher zone. The Kalāheo
- 8 Booster Station/PRV transfers the water between the service areas in order to meet the
- 9 service demands for the areas. Pressure reducing valves (PRVs) and hydro-pneumatic
- valves are also used to control the flow of water within these zones.

Table 1. Kalāheo-Lāwa'i Water System Pressure Zones



18 Source: DOW

11

24

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- According to The Water Plan, the 1290 and 866 zones are currently deficient in water
- 20 storage capacity. Additional storage tanks are required to meet the fire flow requirements
- in the 1290 zone and storage requirements in the 866 zone. Future demand projections
- based upon population data are also creating a need to upgrade and increase the supply and
- 23 storage for the area.

2.3 PROPOSED ACTION

2.3.1 Production Well and Appurtenance

- The Yamada Well will be located mauka of Kaumuali'i Highway at the 1136-foot elevation in
- Kalāheo (see Figures 1, 6A, and 6B). Based upon the hydrologic assessment for the new
- 28 well (see Appendix A Hydrologic Assessment), the groundwater at the site is estimated to
- be approximately 40 feet above sea level, but the well should be drilled at least an
- additional 100 feet until it is within the water-bearing Waimea volcanics region.
- Information from the hydrologic assessment states that 11 of 13 wells in the area are also
- 32 pumping water from this region; therefore, it is likely that the proposed well would also be

- able to reach this region. Taking into account the depth of nearby wells, the total estimated
- depth to be drilled is 1,375 feet or 240 feet below mean sea level (msl).
- A 1,000-gpm pump with 400-horsepower motor is proposed to bring the water to the
- 4 surface and into the new tank located on the same lot. There are two options proposed for
- 5 the type of motor to be used, a submersible pump or a line shaft turbine pump. A 20-inch
- 6 diameter casing is required for the submersible pump. The lined shaft turbine requires an
- 7 18-inch minimum diameter casing. A proposed section of the production well is shown on
- Figure 7. The pump will be operated by electricity and coordinated for service with Kauai
- 9 Island Utility Company (KIUC). A control building will be constructed nearby to monitor
- operations and will include a liquid chlorination system. Within the building there will be a
- motor control center, a backup generator, and Supervisory Control and Data Acquisition
- 12 (SCADA) equipment.
- Once the pump is installed, exploratory testing will commence to determine the well's
- potential yield. One of the tests includes a step-drawdown test, which pumps water out at
- various rates to estimate the well's hydraulic capacity (quantity withdrawn per foot of
- drawdown). Once this is concluded, a 96-hour constant rate pump test is performed to
- determine the quality of water produced during this period.
- Water testing at nearby wells will also be performed at the same time as the pump test to
- determine if there are any changes in water level or salinity. Once the samples are analyzed
- and the pump tests are completed, the results are presented in a report to the State
- 21 Department of Health (DOH). Should results from the pump tests show sufficient
- sustainable yield and no organic contamination, the well will be converted into a production
- 23 well.

24

2.3.2 Storage Tanks and Appurtenances

- 25 Two new 0.5-MG tanks will be located on separate properties, identified as TMK (4) 2-4-03:
- 7 and TMK (4) 2-4-09: 3. The first tank will be on the former Yamada property, which has
- 27 0.71 acre and the second tank will be at the Clearwell site, a 192-acre parcel owned by the
- 28 State of Hawai'i and occupied by an existing water treatment facility (see Figures 6A, 6B, 9A
- 29 & 9B). On the Yamada property, there is currently an abandoned residence and dense
- vegetation. On the Clearwell property, a portion of the existing treatment facility will be
- demolished to accommodate the new storage tank. The existing tank on the Clearwell site
- will remain in service until the new 0.5-MG tank is operational.
- 33 Generally, each tank will be cylindrically shaped, have a 72-foot diameter, and a 22-foot
- height (see Figure 8 Proposed Tank Section). The proposed tanks will be constructed of
- reinforced concrete in a white or off-white color. Paved access will be provided around the
- base of the tanks. Vehicular access to the Yamada Tank will be from Pu'uwai Road, while

- vehicular access to the Clearwell Tank is an existing dirt road that connects with Pu'uwai
- 2 Road near Pu'ulima Road, north of the Yamada Tank. This 1,000-foot-long driveway,
- 3 located within the Clearwell Tank property, will be paved.
- 4 The 0.5-MG Yamada Tank will be located on the same site as the Yamada Well. It will have a
- 5 finished floor elevation of 1,136 feet, with a spillway elevation of 1,156 feet. The tank will
- 6 conform to DOW standard specifications and be fed by the new well in addition to a new
- 7 booster main from the existing 908 booster tank site. A service road will surround the well
- and provide access to the well and control building while a chain link fence with gate access
- 9 will surround the tank, well, control building, and appurtenances.
- 10 Two grading options are being considered for the Yamada Tank site; the first option
- requires a retaining wall varying in height between 4 feet and 20 feet along the north and
- east sides of the property (see Figure 6A); the second option would grade into the adjacent
- property, thereby reducing the retaining wall height by 10 feet (see Figure 6B). The
- 14 additional graded area could provide the additional staging area anticipated during
- construction of the well. DOW is in discussions with the adjacent land owner.
- 16 The washout and overflow line from the new tank will connect to a few drain inlets
- dispersed throughout the site. All this runoff will be piped across Pu'uwai Road with an 18-
- inch diameter drain line and discharged to the larger Nursery Tank parcel (TMK 2-4-04: 39).
- The other 0.5-MG storage tank will be located at the existing Clearwell site. It will have a
- 20 finish floor elevation of 1,224 feet with a spillway elevation of 1,244 feet. Two grading plan
- options are shown for this tank facility (see Figures 9A and 9B). The new tanks will be
- 22 constructed adjacent to the existing rectangular storage tanks, which will remain
- 23 operational until the new tank is completed. A paved vehicular access will be provided
- 24 around the tank. Option 1 requires building a retaining wall around the tank to minimize
- 25 grading impacts to the surrounding land. Option 2 eliminates the retaining wall by grading
- back to existing grades with a maximum 2:1 slope and includes benches as required by
- 27 County regulations. Approximately 900 feet of the access road will also be improved with
- 28 concrete pavement.
- 29 The washout and overflow line will connect to the perimeter drain around the new tank and
- discharge runoff to the south in a heavily vegetated area where it will ultimately flow
- toward an existing gulch. Surface runoff near the improved access road will sheet flow
- down the road, similar to existing conditions.
- 33 Proposed improvements at the Clearwell site also include construction of a hydro-
- pneumatic booster tank to serve a property above the service elevations of the water tank.

2.3.3 Transmission Lines and Appurtenances

- 2 New transmission lines will be constructed to connect the tanks and wells to the existing
- system (see Figures 1 and 10). Approximately 7,300 linear feet of 8-inch diameter pipe will
- 4 connect the 908 Tank to the Yamada Tank and along Kikala Road; 3,300 linear feet of 6-inch
- 5 diameter pipe is proposed in Po'ohiwi Road to replace its existing undersized line; and
- 6 approximately 1,900 linear feet of 12-inch diameter pipe will replace smaller lines near the
- 7 Clearwell and Yamada Tanks. All new water lines will be constructed entirely within the
- 8 road right-of-way.

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- 9 Additionally, the existing 6-inch booster main that is located in an easement from the 908
- Tank to the Nursery site will be abandoned in place. The existing booster pump on the 908
- site will be upgraded to pump water to the new Yamada Tank through the new pipe lines
- installed in Pu'uwai Road and Po'ohiwi Road.
- 13 Two new pressure reducing valves (PRVs) will be installed; one on Pu'uwai Road and one
- on Kikala Road. Two existing PRVs on Pu'uwai Road and Kikala Road will also be modified
- to adjust the water pressures of the new system based upon DOW's specifications.

2.4 ESTIMATED CONSTRUCTION COST

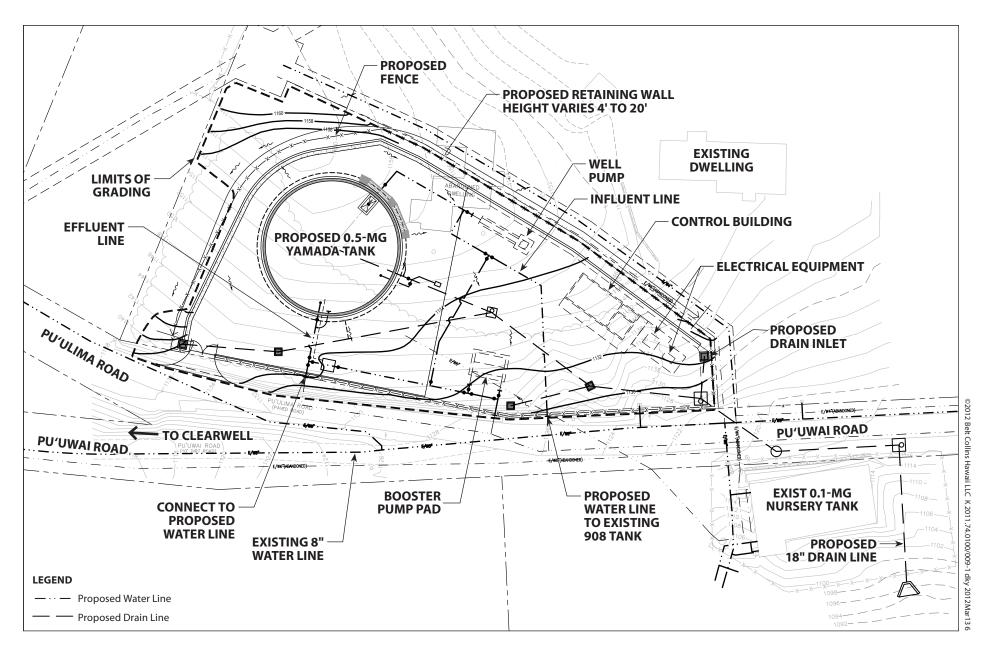
- The order of magnitude cost for design and construction of the well, tanks, transmission
- mains and accessories is divided into four packages totaling \$16.2 million (see Table 1
- below for breakdown). The source of funding for the project is anticipated to be from the
- 20 Capital Improvement Programs of the DOW.

Table 1. Construction Costs

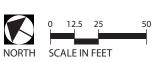
Package	Design Cost	Construction Cost	Subtotal
A (Yamada Tank Site)	\$310,000	\$4,950,000	\$5,260,000
B (Clearwell Tank Site)	\$275,000	\$4,550,000	\$4,825,000
C (Water main and accessory improvements)	\$410,000	\$3,000,000	\$3,410,000
D (Yamada Well Site)	\$105,000	\$2,600,000	\$2,705,000
Grand Total	\$1,100,000	\$15,100,000	\$16,200,000

2.5 PRELIMINARY CONSTRUCTION SCHEDULE

- 2 Drilling and testing of the well are expected to begin in the second quarter of 2012 and be
- 3 completed approximately 12 months later. Final design and construction of the well will
- 4 take an additional 12 to 14 months thereafter. Meanwhile, installation of the tanks and
- 5 transmission mains would occur simultaneously and would begin in the fourth quarter of
- 6 2012.







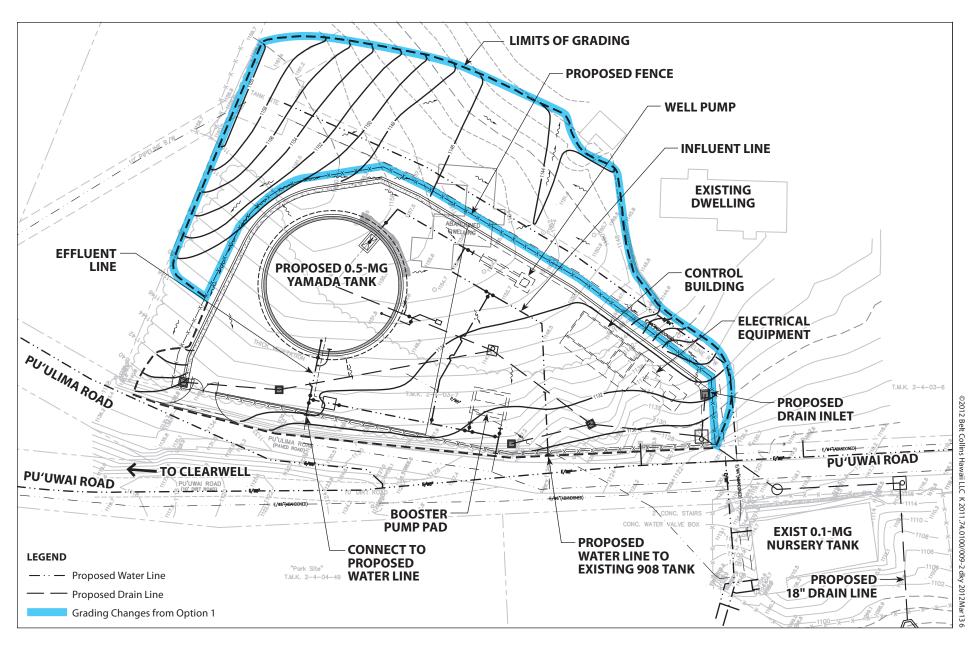
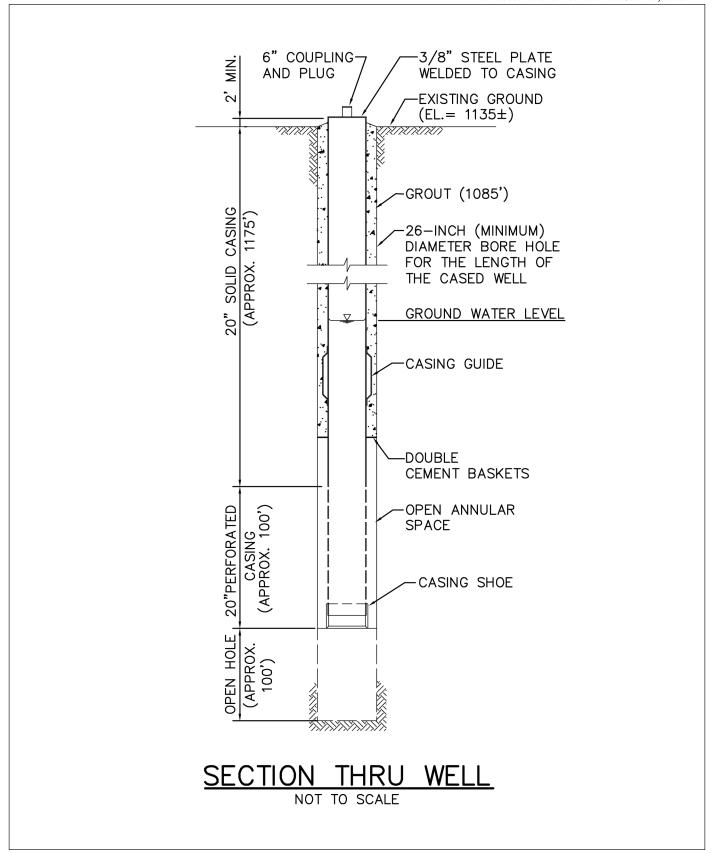


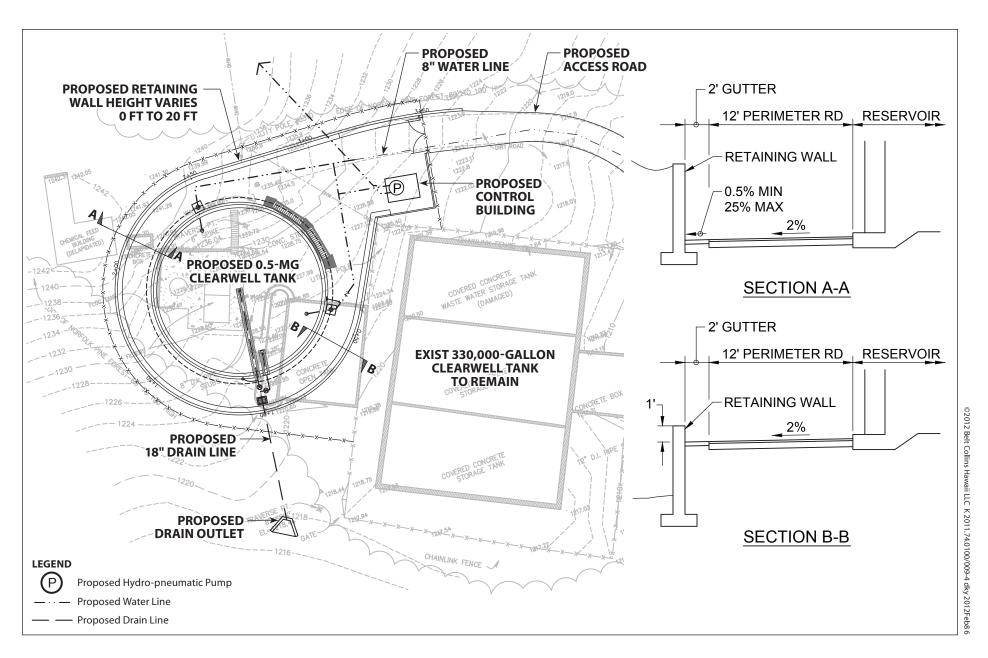




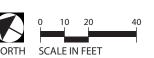
Figure 6B
PROPOSED YAMADA TANK—OPTION 2
Kalābao Water System Improvements

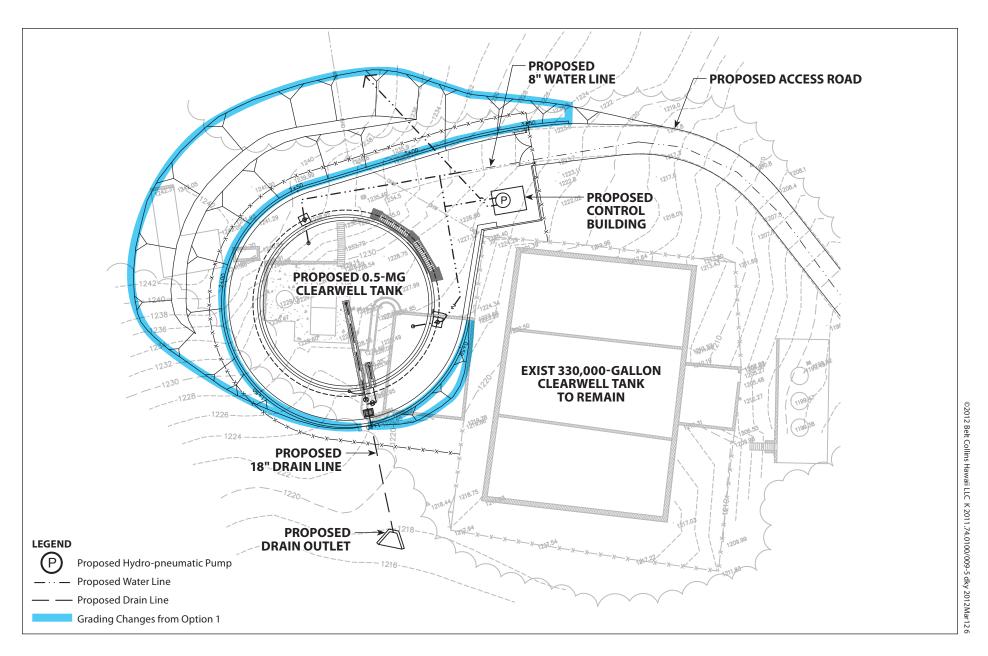






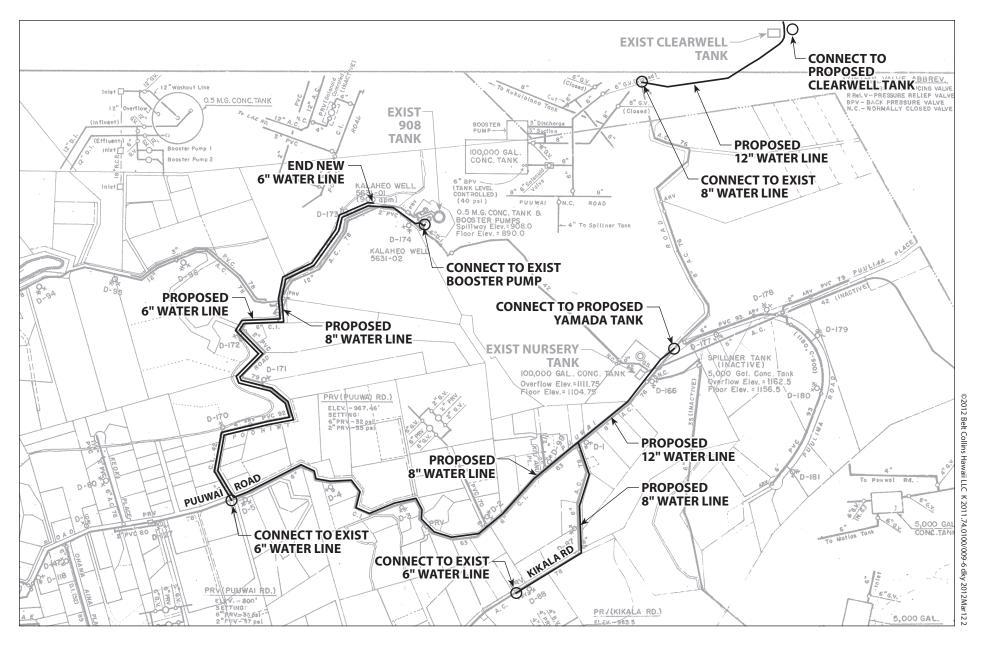














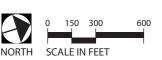


Figure 10 PROPOSED WATER LINE IMPROVEMENTS

Kalāheo Water System Improvements Kalāheo, Kaua'i

DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 EXISTING LAND USE

3.1.1 Region

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- 5 The Kōloa District of Kaua'i consists of a mix of agricultural lands, small residential
- 6 communities, and a coastal resort community. The primary agricultural crops include
- 7 diversified truck crops and coffee. Earlier, these lands were predominantly in sugarcane
- 8 until the sugar plantations on the island closed, the last in 2009.
- 9 The rural residential communities of 'Ele'ele, Kōloa, Lāwa'i, and Kalāheo comprise the major
- settlements in the district. Poʻipū, a coastal community, comprises the resort attraction in
- the district with such facilities as hotels, vacation rentals, golf courses, tennis, spas, and
- shopping villages. It has developed into a popular visitor spot with its warm climate and
- sandy beaches, and nearby Kōloa has become its commercial center.
- 14 The project site is located in the upland elevations of Kalāheo, which is the largest of the
- four residential communities. This thriving community has a population of approximately
- 4,000 residents and includes a business district with a diversity of commercial and
- 17 community facilities, including retail shops, medical clinics, churches, restaurants, gas
- station, schools, and playgrounds. Kaumuali'i Highway which circles the southern half of the
- island, passes through the business district as its main street.

3.1.2 General Project Area

- 21 The proposed project is located in an upland rural area approximately 1.2 miles (linear
- distance) from the center of Kalāheo town. The area consists of scattered residential homes
- 23 surrounded by abundant open space (see Figure 1). The Līhu'e-Kōloa Forest Reserve is
- located mauka or north of the area.
- 25 The former Yamada property now owned by Kaua'i Couty DOW and identified by Tax Map
- 26 Key as 2-4-03: 7, is located on Pu'uwai Road. The existing Nursery property is also located
- on Pu'uwai Road and is identified as TMK 2-4-04: 39. The 908 Tank is located on Po'ohiwi
- 28 Road and identified as TMK 2-4-04: 49. And finally, the Clearwell Tank is located on State of
- 29 Hawai'i owned land on TMK 2-4-09: 3 (See Figures 2 through 5). Access to the Clearwell
- Tank is by a dirt road that branches off Pu'uwai Road.

3.1.3 Project Site and Existing Facilities

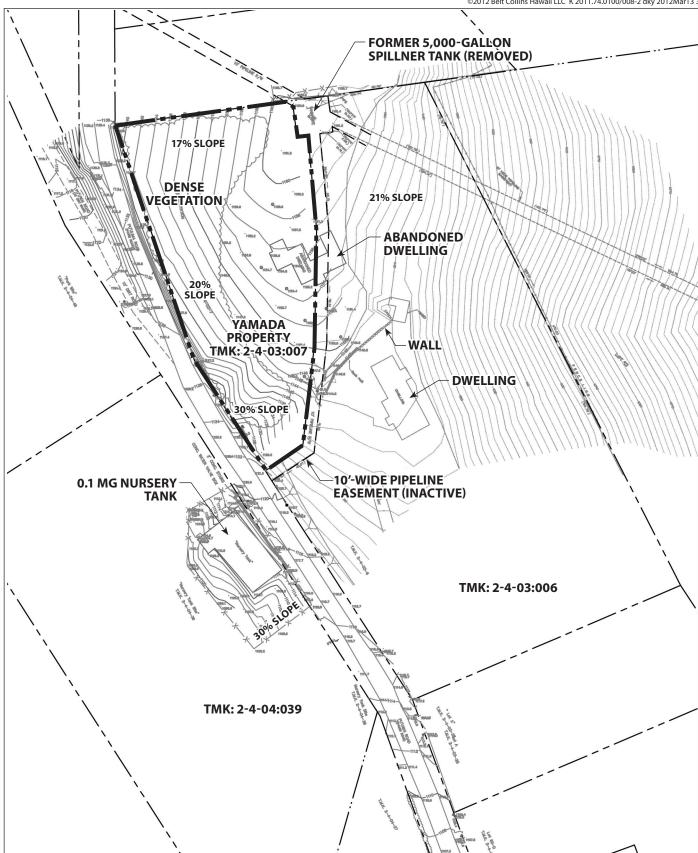
2 Yamada Site

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- 3 The Yamada property now owned by Kaua'i County DOW is primarily vacant but includes
- 4 an old, abandoned residence occupying a small rear section of the parcel (see Figure 11 –
- 5 Existing Site Conditions Yamada Property). The abandoned residence, which was built in
- 6 the early 1950s, was never completed nor occupied. A portion of the existing residence
- 7 extends over the rear property line and into the adjacent parcel (TMK 2-4-03: 6), which is
- 8 owned by the Yamada family.
- 9 Along the outside eastern boundary of the property is a water pipeline easement. The 10-
- foot wide easement, believed to contain a 4-inch diameter pipeline, connects with a former
- tank site easement at the northeast corner outside of the subject property. According to the
- DOW water facilities map, this tank was known as the Spillner Tank and had a 5,000-gallon
- capacity. The 10-foot wide easement that came from this tank site contained a pipeline that
- connected the Spillner Tank with the 100,000-gallon Nursery Tank located across Pu'uwai
- Road. Although the tank site is still on record as an easement, there is no storage facility on
- the property.
- In addition to the pipeline easement that runs along the rear property line, another 10-foot
- wide pipeline easement traverses the adjacent northern parcel to connect with another tank
- to the southeast of the Spillner Tank. The DOW water facilities map shows this easement
- contains a 6-inch diameter pipeline that connects to the Matias Tank, a 5,000-gallon tank,
- located approximately 1,800 feet to the southeast of the Yamada property. The DOW water
- facilities map indicates that the pipeline and the Matias Tank are both inactive.
- 23 The remainder of the Yamada property is in a natural state. Mature vegetation on the
- 24 property includes trees, shrubs, and groundcover (see Section 3.5 and 3.6), both native and
- 25 introduced species.

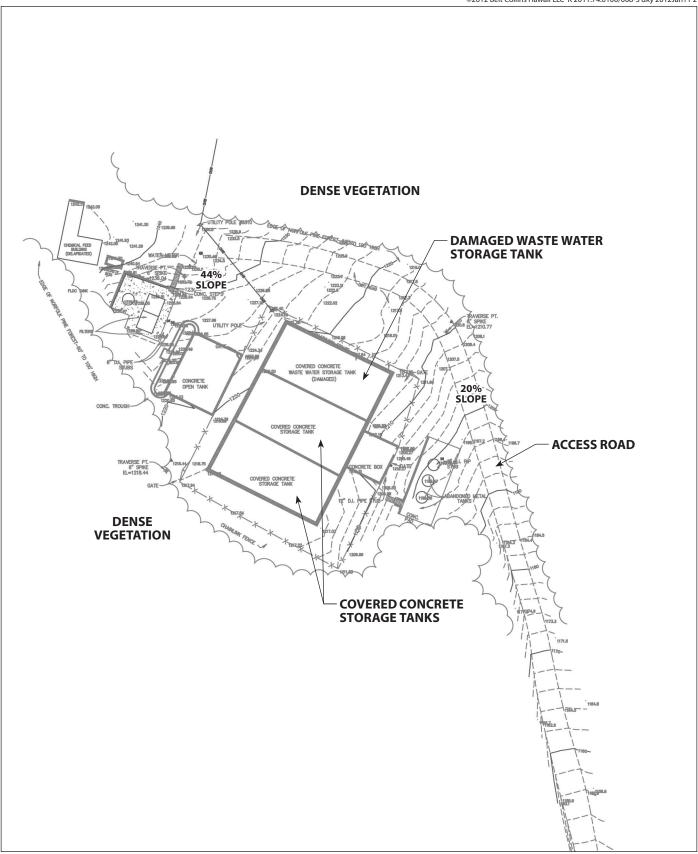
Clearwell Site

- 27 This site currently houses the Kalāheo Treatment Facility where there are three equally-
- 28 sized concrete tanks providing 330,000 gallons of water storage (see Figure 12 Existing
- 29 Site Conditions Clearwell Property). One of the tanks was deactivated due to damages
- 30 sustained from the 1992 hurricane. Access to the site is through a dirt road that connects
- 31 with Pu'ulima Road.



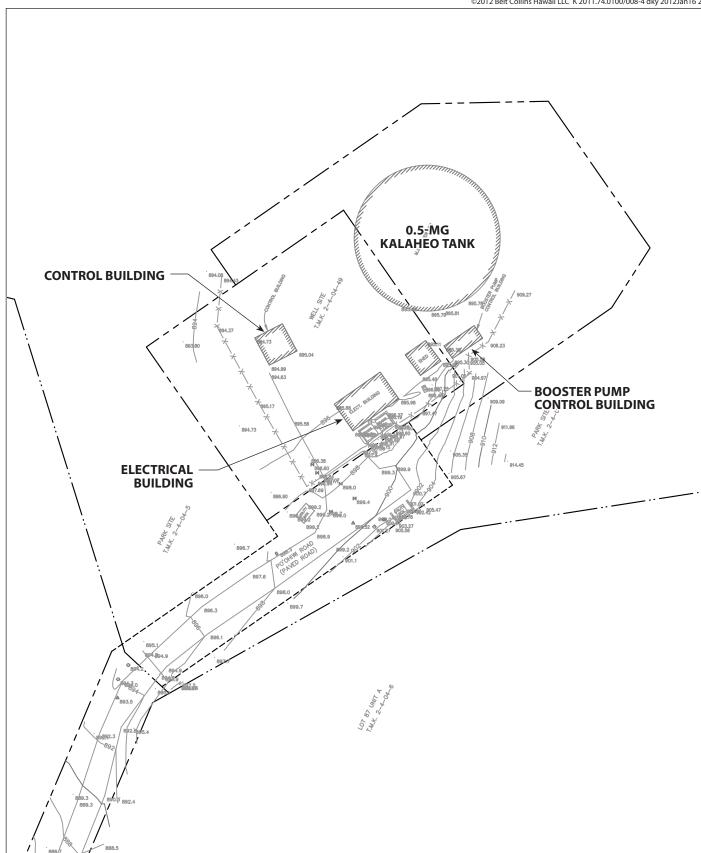
















908 Tank Site

- 2 The 908 Tank site has a 0.5-MG reservoir that was built in 2004 and stores water pumped
- from two wells, Kalaheo Wells A and B. These wells are on the same property as the
- 4 reservoir (see Figure 13 Existing Site Conditions 908 Tank Property). The tank, wells,
- 5 support buildings, and other equipment are surrounded by a chain link fence. Access to the
- 6 site is through a gated entry off Po'ohiwi Road, which is paved.
- A 12-inch pipe line exiting the reservoir provides water to the system in the area. There is
- also a booster pump that delivers water to the Nursery tank through an 8-inch pipe that
- 9 runs northeast through a 20-foot wide pipeline easement across State land.

3.2 LAND TENURE

- 11 The Yamada property was owned by the Saitaro and Mildred Yamada family who has had
- the property since 1939. Negotiations for acquiring the property began in August 2008 and
- an appraisal was conducted by the County in 2009. Purchase of the land by the DOW was
- completed in 2011.

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- 15 The Nursery site and 908 Tank site are owned by the State of Hawaii for use by the County
- of Kaua'i, Department of Water under Executive Orders 2374 and 2375. Work on the
- pipeline systems will occur entirely within the road rights-of-way, which are maintained by
- the County of Kaua'i.

3.3 GEOLOGY/PHYSIOGRAPHY

3.3.1 Geology

- 21 The subject property is situated between 3.0 to 3.8 miles from the shoreline, between the
- 800-foot and 1,200-foot elevations. The island of Kaua'i is the oldest of the main Hawaiian
- 23 Islands, and was formed by shield volcano. The volcanic rocks of Kaua'i were originally
- separated into the Waimea Canyon Volcanic Series and Kōloa Volcanic Series. The Waimea
- 25 Canyon Volcanic Series, which was later subdivided into four formations; Nāpali, Hā'upu,
- Olokele, and Makaweli, represents the shield stage formation of the island, and the younger
- Kōloa Volcanic Series, which dominates the eastern half of Kaua'i, represents the island's
- rejuvenated stage formation. Kalāheo is located on the southern slopes of Mt. Wai'ale'ale in
- the Waimea Canyon Volcanic Series.
- 30 According to the U.S. Department of Agriculture, Soil Conservation Service's (SCS) Soil
- 31 Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (1972), soils on
- 32 the project site consist of Puhi silty clay loam (PnC), 8 to 15 percent slopes, Puhi silty clay

- loam (PnD), 15 to 25 percent slopes, and Puhi silty clay loam (PnE), 25 to 40 percent slopes.
- 2 The Puhi series is characterized by well-drained soils that are derived from typical igneous
- 3 rock, and occur on the upper slopes on the island of Kaua'i. The erosion hazard for PnC is
- 4 described as slight and runoff on the soil is considered slow. The erosion hazard for PnD is
- 5 moderate and runoff is medium, since it is on a slightly steeper grade. PnE has the steepest
- 6 grade and is described as having a rapid runoff rate and severe erosion hazard. The land
- 7 capability classifications for PnC is IIIe (irrigated or non-irrigated), IVe (irrigated or
- 8 nonirrigated) for PnD, and VIe (non-irrigated) for PnE.¹

3.3.2 Physiography

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- Elevations at the Clearwell Tank site are approximately 1,200 feet above sea level.
- Elevations at the Yamada Tank, well, and pump site are around the 1,130-foot level. For the
- transmission line site, elevations range between the 840 and 1,130 feet above sea level.
- 13 The topography on the Yamada site is relatively flat around the abandoned dwelling, but
- relatively steep, as much as 30% grade, along Pu'uwai Road(see Figure 11 Existing Site
- 15 Conditions Yamada Property). Access to the Yamada site is from Pu'uwai Road. The
- existing Clearwell Tank site has an average slope of 17 percent, with some areas reaching
- approximately 50 percent (see Figure 12 Existing Site Conditions Clearwell Property).
- 18 The dirt roadway to the tank has a typical grade of 20 percent. The transmission main will
- be installed within the road rights-of way where grades are moderate.

3.4 HYDROLOGY AND WATER RESOURCE

3.4.1 Island Hydrology

- Rainfall is the principal source of the island's groundwater resource. Average annual rainfall
- in Kalāheo is 73 inches.² There are no streams in the proposed project area, only dry
- ditches. The nearest stream to the proposed improvements is Wahiawa Stream, which is
- 25 two miles to the west and flows in the southwest direction.
- 26 Kaua'i has several types of groundwater resources. The most extensive is the basal
- freshwater lens that floats on seawater under much of the island. The complexity of Kaua'i's

The SCS land capability classification includes eight different soil categories, ranging from I to VIII. The classification system describes the suitability of soils for most kinds of crops, where lower roman numerals represent soils with fewer limitations and that are consequently more suitable for croplands. Letter designations appended to the classification numbers describe the following soil limitations: e – erosion; w – excess wetness; s – shallow, droughty or stony soils; and c – climactic limitations.

Mink, John F. and Lau, L. Stephen, Water Resources Research Center, University of Hawaii, September 1992. Technical Report No. 186 Aquifer Identification and Classification for Kaua'i: Groundwater Protection Strategy for Hawai'i.

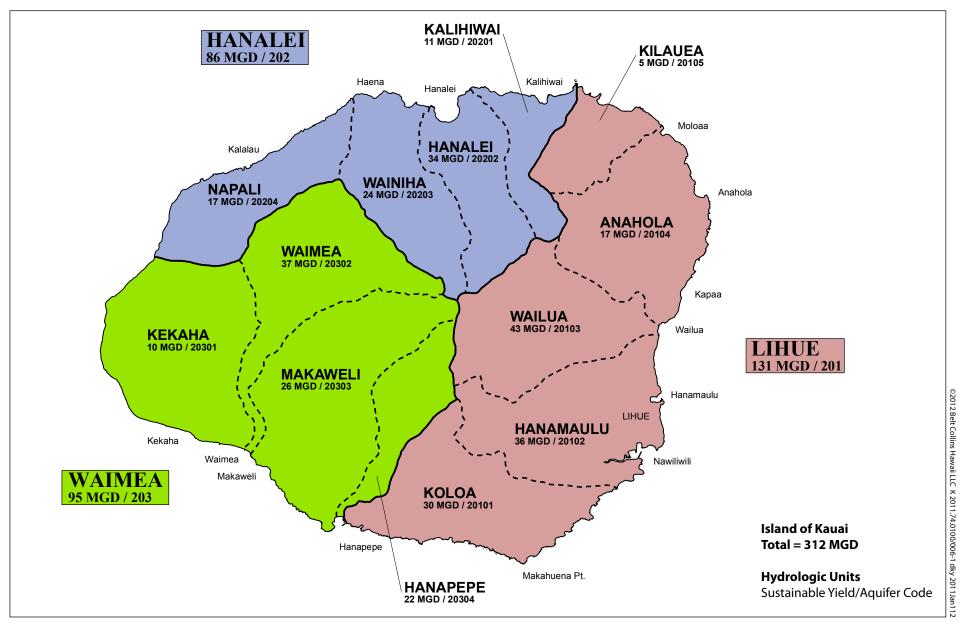
- geology and the wide range in permeability of its substrata create a variegated formation of
- the basal lens, different than what is well formed for the islands of Oʻahu and Maui. The
- 3 Kalāheo area is identified as having perched groundwater. This type of water is "perched"
- 4 on top of layers of impermeable material such as dense volcanic rock, beds of weathered
- 5 and solidified ash, or clay-bearing sediments.

6 3.4.2 Kõloa Hydrologic Unit

- 7 The State Department of Land and Natural Resources (DLNR) Commission on Water
- 8 Resource Management (CWRM) established groundwater hydrologic units that generally
- 9 divide each Hawaiian island into regions with similar hydro-geologic properties. These
- 10 hydrologic units were established to provide a consistent basis for managing the State's
- groundwater resources. The subject property is part of the Kōloa Hydrologic Unit, which
- extends from Hanapēpē to Poʻipū from the 3,310-foot elevation above Kalāheo at Kapalaoa
- Peak to the shore. The Kōloa Hydrologic Unit has a sustainable yield of 30 million gallons
- per day (MGD) out of a total 312 MGD for the island; see Figure 14 Hydrologic Units.

3.4.3 Groundwater Resource in Kalāheo

- The upper Kalāheo area consists of two types of volcanic formations; the Kōloa volcanics
- and the outcrops of the older shield-building Napali formation of the Waimea volcanics. The
- Kōloa volcanics are moderate to poorly permeable, were formed over the Waimea volcanics
- and is around 300 to 600 feet thick. At Kalaheo Well A, the transition from Kōloa to Waimea
- volcanics occurred at around 540 feet above msl. Most of the wells in the Kalāheo area tap
- 21 into the Waimea volcanics, with 11 out of 13 penetrating the Kōloa volcanics before
- reaching ground water in the Waimea volcanics.
- 23 The Hydrologic Assessment of a New Well for the Kauai Department of Water's Kalaheo
- 24 System, which was prepared by Tom Nance Water Resource Engineering (see Appendix A),
- 25 states that the Waimea volcanics in Kalāheo are not at depths considered impractical for
- well development. Developing a high capacity well for DOW requires drilling through the
- 27 Kōloa volcanics, which is between 300 to 600 feet thick, to reach the Waimea volcanics.
- Information from the driller's log at Kalaheo Well A suggests the transition between the two
- 29 volcanics occurred at a depth of 540 feet above sea level. A practical depth to reaching the
- Waimea volcanics for the new well should also not be more than 300 feet below msl.



Source: Commission on Water Resource Management Website, October 2011.





3.4.4 Existing Water Systems and Usage

- The water system in Kalāheo is connected to the Lāwa'i and 'Ōma'o systems, combining
- 3 supply and storage to provide a more reliable source of water for the area. The combined
- 4 systems service rural and residential subdivisions within the rolling hills that range from
- 5 300 to 1,200 feet in elevation. The transfer of water between the systems occurs at the
- 6 Kalāheo Booster Station/PRV. The current production pump capacity at the existing wells
- in the Kalāheo-Lāwa'i-'Ōma'o area is provided in the following Table 2.

Table 2. Existing DOW Pump Capacity in the Kalāheo Aquifer System

Well Name	Installed Pump Capacity (GPM)
Lawai Cannery	1,540
DOW Lawai 1	425
DOW Lawai 2	550
DOW Piwai 2	1,050
DOW Piwai 3	1,050
DOW Kalaheo A	1,000
DOW Kalaheo B	1,000

- 8 The main water supply for the Kalāheo area comes from the DOW Kalaheo A and B wells
- 9 that are located on the 908 Tank site. These wells have a combined pump capacity of 2,000
- gpm, although only one pump is turned on at a time. The Lāwa'i-'Ōma'o system water
- supply comes primarily from DOW well Lawai 1 and DOW well Lawai 2. Existing wells in
- the Kalāheo-Lāwa'i-'Ōma'o area adequately provide for the existing maximum day demand;
- however, fire flows are deficient for agricultural and open zoned areas. Additionally, the
- system has many old pipes that are undersized and therefore unable to provide the current
- 15 required flows.
- Within the Kalāheo-Lāwa'i-'Ōma'o water system there are six different pressure zones: four
- zones in Kalāheo including the 1290, 1222, 1112, and 886 zones; and two zones in Lāwa'i-
- 18 'Ōma'o including the 886 and 677 zones. Within each pressure zone is a storage tank. Table
- 19 3 lists the storage tanks by pressure zone and available storage.

Table 3. Existing DOW Storage for Kalāheo

Tank Name	Pressure Zone	Available Storage (gallons)
Kalāheo		
Backwash Tank	1290	15,000
Clearwell Tank	1222	330,000
Nursery Tank	1112	100,000
908 Tank	886	500,000
Kukuiolono Tank (Inactive)	886	200,000
Kukuiolono Tank	886	250,000
Kakela Makai Tank (Puu Road Tank)	886	200,000
TOTAL		1,600,000

Source: Water Plan 2020, March 2001

- 1 The DOW's Water Plan 2020 includes a discussion on the criteria needed for meeting fire
- 2 flow and the maximum daily requirements. The water plan cites a deficiency of 222,000
- 3 gallons for Kalāheo and 227,000 gallons for Lāwa'i and 'Ōma'o. Capital Improvement
- 4 projects noted in the water plan include constructing a 500,000-gallon tank at the 906-foot
- elevation for the 886 zone and a 500,000-gallon tank for the 677 zone. A progress report on
- 6 the Water Plan 2020, issued in 2011, notes that the 0.5-MG tank for the 677 zone is
- 7 currently in construction. The other 0.5-MG tank for Kalāheo was built in 2004 next to
- 8 Kalaheo Wells A and B and is called the 908 Tank.
- 9 The aging Nursery Tank and damaged Clearwell Tank located in the next higher zones also
- require replacing. Proposed improvements include replacing the 0.1-MG Nursery Tank
- with the 0.5-MG Yamada Tank and replacing the 330,000-gallon Clearwell Tank with a 0.5-
- MG tank. This will effectively increase the storage for the area by 570,000 gallons.

3.4.5 Future Demand and Source Development

- 14 Water usage in the Kalāheo district is projected to increase slowly and steadily every year
- with gradual development of homes and businesses. DOW's projections show a modest 4%
- increase from 2010 to 2020 and a 25% increase by 2050; see Table 4. Similar increases are
- also projected for the Lāwa'i-'Ōma'o district. The added growth in the area will be
- accommodated by the excess capacity due to the larger tank replacements. To meet this
- demand, the proposed well will also provide for the projected water demands in the area.

Table 4. DOW Water Use Projections for Kalāheo Aquifer System

	W	Water Use (1,000 gallons/day)					
District	2005	2010	2020	2050			
Kalāheo	704	717	746	902			
Lāwaʻi-'Ōmaʻo	435	443	458	564			

Source: DOW, Water Plan 2020

3.4.6 Project Supply and Storage Impacts on Existing Area Wells and Groundwater Resource

- 4 Existing wells within Kalāheo, Lāwa'i, and 'Ōma'o, as identified in the hydrologic assessment
- 5 by Tom Nance Water Resource Engineering (2011), are shown on Figure 15 Existing
- 6 Tanks and Wells and listed in Table 5.

1

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Table 5. Existing Wells in the Project Vicinity – Physical Characteristics

	rable of Existing Wells in the Project Viennity			,					
Well No.	Well Name	Casing Diameter (Inches)	Year Drilled	Ground Elev.	Depth (feet)	Static Head (in elev.)			
Wells Tappi	Wells Tapping Waimea Volcanics (Napali Formation)								
5429-01	McBryde TH-4	1	1950	372	-228	12			
5529-01	McBryde TH-6	1	1950	511	-19	64			
5529-03	McBryde Poeleele	20	1954	464	-255	59/29			
5530-01	Lawai Cannery	1	1950	499	-123				
5530-02	Lawai Cannery	16	1951	440	-310	124			
5530-03	DOW Lawai 1	12	1962	594	-101	53			
5530-04	DOW Lawai 2	14	1986	662	-148	24			
5629-01	DOW Piwai 2	16	2003	648	-127	48			
5629-02	DOW Piwai 3	16	2004	655	-115	50			
5630-01	McBryde TH-2	1	1950	626	+1	64/55			
5631-01	DOW Kalaheo A	14	1974	887	-238	40			
5631-02	DOW Kalaheo B	14	1985	892	-138	41			
5631-03	A&B Brydeswood	14	In Progress	1005	-240	40			
Wells Tappi	ng the Kōloa Volcanio	cs							
5430-01	McBryde TH-3	1	1950	386	-8	366			
5529-02	McBryde TH-5	1	1951	510	-23	11			

Table 5. Existing Wells in the Project Vicinity – Physical Characteristics

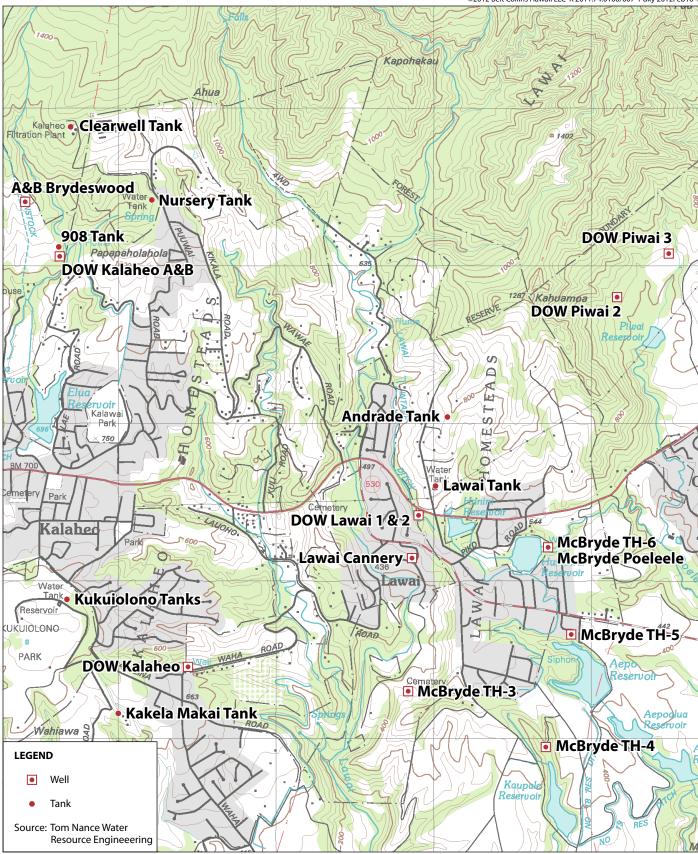
Well No.	Well Name	Casing Diameter (Inches)	Year Drilled	Ground Elev.	Depth (feet)	Static Head (in elev.)
5531-01	DOW Kalaheo	8	1963	630	-322	43

- 1 Source: State Commission on Water Resource Management
- One well, the A&B Brydeswood well is currently in construction and will be used to supply a
- 3 private development. Water from this well will feed a private water system that will not
- 4 connect to the County's water system.
- 5 Table 6 identifies the existing wells that are currently in use citing their installed pumping
- 6 capacity with comparison to their current pumping rate.

Table 6. Existing Wells – Pumping Capacity

		Hydraulic Performance Drawdown @ Flowrate	Installed Pump Capacity
Well No.	Well Name	(Feet @ gpm)	(in MGD)
5631-01	DOW Kalaheo A	0.8 @ 1000	1.440
5631-02	DOW Kalaheo B	1.5 to 1500	1.440
5530-03	DOW Lawai 1	2.6 @ 580	0.612
5530-04	DOW Lawai 2	0.6 @ 1000	0.792

- Notes: The "installed capacity" is another measure showing the quantity of water that a well's pump is capable of delivering in
- 8 one day.
- 9 Source: CWRM
- 10 Installation of the Yamada Well requires testing to determine the groundwater's sustainable
- yield and the drawdown effects from the Yamada well on the nearby wells. There are also
- 12 required water quality tests. Should testing results meet current DOH regulations, there
- would be no impacts to the nearby existing DOW Kalaheo Wells A and B and the planned
- 14 A&B Brydeswood Well, which are both within half a mile of each other. All other active
- wells in the Kalāheo area are over one mile away from the Yamada well and are expected to
- 16 have little or no adverse impact.
- 17 The cumulative impact on the aquifer could have a long-term impact on the groundwater
- resource. Groundwater monitoring will be watched closely to prevent excessive pumping.
- 19 Further water conservation efforts will promote reduced water consumption and prolong
- 20 sustainable yield in our water resources.





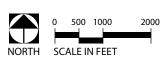


Figure 15
EXISTING TANKS AND WELLS
Kalāheo Water System Improvements

3.4.7 Potential Contamination

- 2 Existing land use and future development around the proposed Yamada Well is limited to
- 3 residential and agricultural uses. Homes are scattered throughout the area and agricultural
- 4 land, where there could be a potential for pesticide contamination, is on a small scale. The
- 5 area further inland from the well is generally open space occupied by forested lands. The
- 6 Kekaha Landfill is the closest landfill to the well, but is over 12 miles away on the southwest
- 7 side of the island.
- 8 Major commercial and industrial facilities are mainly stationed in Līhu'e and Nāwiliwili, the
- 9 primary urban center of the island. Within the town center of Kalāheo along Kaumuali'i
- Highway, there are a few gas stations; however, they are a little over one mile downslope of
- 11 the well site.

- There is currently no wastewater treatment facility in Kalāheo, Lāwa'i, or 'Ōma'o.
- 13 Residential and commercial properties rely on individual wastewater systems (IWSs),
- which are permitted and regulated by the State Department of Health (DOH). Most of the
- 15 IWSs installed were cesspools, although DOH has since changed its regulations and now
- requires the use of septic tank systems. Septic systems collect and store wastewater,
- allowing separation of the solids and allowing biodegradation of the fluids before it is
- allowed to overflow to a drain field and absorbed into the ground. Septic systems were
- designed to better protect watersheds in comparison to cesspools, which experience
- 20 untreated overflow and public health problems. No new IWSs will be allowed to be
- installed within 1000 feet of the new well.
- Water quality testing is regularly performed by the DOW as a requirement by the DOH. The
- following Table 7 lists test results from January 1, 2010 through December 31, 2010 in the
- 24 Kalāheo-Kōloa water system.

Table 7. Existing Operational Wells in Project Vicinity – Water Quality Contaminants

Regulated Contaminants	Level Found	Range of Detections	Violation Yes/No	Source of Contaminant
Microbiological Contaminants	ND			
Inorganic Contaminants				
Chromium (ppb)	3	ND - 3	No	Erosion of natural deposits
Nitrate (ppm)	0.8	0.3 - 0.8	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

Table 7. Existing Operational Wells in Project Vicinity – Water Quality Contaminants

Regulated Contaminants	Level Found	Range of Detections	Violation Yes/No	Source of Contaminant
Organic Contaminants				
Total Trihalomethanes (ppb)	8	ND - 8	No	By product of drinking water chlorination
Trichloropropane (ppb)	0.05	ND - 0.05	No	Contaminate in pesticides used in soil fumigation
Dichlorobenzen (ppb)	1.5	ND - 1.5	No	Discharge from industrial chemical factories
Haloacetic Acids (ppb)	1	ND – 1	No	By-product of drinking water chlorination

- 1 Source: DOW, Water Quality Report, 2011
- 2 Keys: ND = Not detected
- 3 ppm = parts per million
- 4 ppb = parts per billion
- 5 The State also has strict requirements for any new sources of water that connect to an
- 6 existing system that serves the public. DOW will need to submit an engineering and water
- 7 quality testing report identifying any potential sources of contamination and evaluating any
- 8 alternatives to reduce or eliminate the contamination, including treatment of the water
- 9 source. Results of the water quality analysis on the new Yamada Well must be submitted as
- part of an engineering report to demonstrate that it meets current drinking water
- 11 standards.

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3.5 FLORA

3.5.1 Background

- 14 Isle Botanica conducted a botanical survey of the project site in May of 2011. The
- objectives of the survey were to identify the vegetation types present at the site, create a
- checklist of all plants encountered, and locate any federally-listed threatened or endangered
- 17 plant species.

3.5.2 Methodology

- 19 Prior to conducting a "walk-through survey" of the site, a literature review of previous
- studies in the area was undertaken, and a search was made of the United States Fish and
- 21 Wildlife Service (USFWS) official database for endangered species previously reported in
- the surrounding area. In addition, the Hawai'i Natural Heritage Program database of

- federally-listed plant species was researched. During the field survey, a record of all the
- 2 plant species encountered was created, and notes were taken on the vegetation types
- present, indicating the dominance and frequency of the different plant species. A
- 4 comprehensive listing of the recorded vegetation is provided in Appendix B.
- 5 Three types of vegetation were identified within the project site: (1) Managed Land
- 6 Vegetation; (2) Plantation Forest; and (3) Artificial Marsh. Managed Land Vegetation
- 7 describes vegetation on areas under periodic or frequent management (e.g., roadsides,
- lawns, and gardens). Plantation Forest is comprised of forests dominated by trees that have
- 9 been replanted in a revegetation scheme. Artificial Marsh includes vegetation dominated by
- herbaceous plants that are adapted to constantly wet soil. A description of each vegetation
- type is also provided in Appendix B.
- 12 Vegetation within the project site is predominantly of the Managed Land Vegetation. This
- type of vegetation can be found in large areas surrounding the used and abandoned
- structures on the Clearwell Tank site, throughout the entire Nursery Tank site, in open
- areas of the Yamada Well site, and along a majority of the roadways.
- 16 The Plantation Forest vegetation occurs in the area surrounding the clearing where the
- structures on the Clearwell Tank site are located. A patch of Plantation Forest is also
- located on the western portion of the Yamada Well site.
- 19 Artificial Marsh was only found inside an exposed concrete tank in the Clearwell Tank site.
- 20 The tank area is minimal and is not classified as a wetland that would need to be protected.

21 3.5.3 Existing Conditions

- 22 Of the 108 vascular plant species recorded at the site, two were indigenous and none were
- endemic. Both of the indigenous species are common in Hawai'i and are not classified by
- 24 the USFWS as "Threatened" or "Endangered". According to the Natural Heritage Program
- database of federally-listed plant species, no threatened or endangered plant species have
- ever been recorded in the area. A majority of the 108 species encountered are classified as
- 27 naturalized or weedy "alien" plants that were accidentally or intentionally introduced to
- 28 Hawai'i. No undisturbed native vegetation or other sensitive types of vegetation were
- 29 found in the project site.

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3.5.4 Impacts and Mitigation Measures

- 31 Mitigation measures would not be necessary because no endemic plant species or native
- 32 plants are present in the project site. Findings from the botanical survey also note that
- 33 encountering any threatened or endangered plant species in the future would be unlikely
- due to the extensive and pervasive nature of disturbance to the area.

1 3.6 FAUNA

3.6.1 Existing Conditions

- Fauna consultant Phillip L. Bruner conducted a survey of the project site in July of 2011 (see
- 4 Appendix C). The primary objective of the survey was to record the birds and mammals
- observed on or near the site, with particular interest in the presence of native and
- 6 migratory species listed as threatened or endangered.
- 7 Ten alien bird species were observed in the area, none of which are listed as endangered or
- 8 threatened. A list of the ten alien species is provided in Appendix C. No native land birds or
- 9 native waterbirds were observed. The only native species that may occur in the area is the
- Hawaiian Short-eared Owl or Pueo (*Asio flammeus sandwichensis*), which is listed by the
- 11 State as endangered on O'ahu but not on Kaua'i.
- No migratory shorebirds were observed in the project area and no seabirds would be
- expected. It should be noted that the only migratory species that may occur in the area
- would be the Pacific Golden Plover or Kōlea (*Pluvialis fulva*), which is not a threatened or
- endangered species. Migratory shorebirds are present in Hawai'i typically between August
- and April.

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- Feral mammal species observed in the project area are limited to Rats (*Rattus spp.*), Mice
- (*Mus muscullus*), feral cats (*Felis catus*), and Pig (*Sus scrofa*). Ultrasound equipment was
- used to detect the endangered Hawaiian Hoary Bat (Lasiurus cinereus semotus). Although
- 20 not observed, the bat species is known to occur on the islands of Kaua'i and Hawai'i and
- forage for flying insects in a wide variety of habitats including forests, agricultural lands,
- urban areas, and over bays and ponds.

3.6.2 Impacts and Mitigation Measures

- 24 The proposed project is not anticipated to have any significant adverse impacts on
- 25 populations of birds and mammals in the region. The endangered Hawaiian Hoary Bat may
- 26 potentially forage in the area, primarily in the early evening hours. However, construction
- 27 activities that would primarily occur during day-time hours and operation of the proposed
- 28 improvements are not anticipated to result in significant impacts to the native species or its
- 29 habitat. The proposed improvements would be primarily limited to relatively small areas
- that have already been developed.

1 3.7 AIR QUALITY

3.7.1 Existing Conditions

- The rural characteristics of Kalāheo contribute to the area's clean air quality. There are no
- 4 sources of major air contaminants in the vicinity, such as emissions from high-volume
- 5 vehicular traffic, agricultural burnings, incinerators, manufacturing plants, and power
- 6 generators.

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3.7.2 Impacts and Mitigation Measures

- 8 The proposed project is not expected to generate significant impact on air quality
- 9 considering the type of operational facilities installed under the proposed action.
- 10 Construction activities, however, may result in short-term air quality impacts, including the
- generation of dust from soil excavation and emissions from construction vehicles and
- equipment. To mitigate these impacts, the contractor will be required to comply with the
- DOH Hawai'i Administrative Rules (HAR), Title 11, Chapter 60.1, "Air Pollution Control."
- 14 Compliance with State regulations will require adequate measures to control fugitive dust
- by such methods as:
 - Planning different phases of construction, focusing on minimizing the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes, and locating potentially dusty equipment to areas of the least impact;
 - Frequent watering of exposed dirt areas;
 - Landscaping and rapid covering of bare areas, including slopes;
 - Controlling of dust from unpaved access roads;
 - Controlling dust from debris being hauled away from the project site; and
 - Constructing a dust barrier/fence.
- 25 Exhaust emissions from construction vehicles are anticipated to have negligible impacts on
- 26 air quality, as emissions would be relatively minor and readily dissipated.

3.8 ACOUSTICAL ENVIRONMENT

3.8.1 Existing Conditions

- 29 The area's rural setting sets the tone for its serene environment and low ambient noise
- levels. Most of the area's ambient sounds are what is heard in nature and, on occasion, from
- vehicles traveling mauka or makai on the County roads.

3.8.2 Impacts and Mitigation Measures

- 2 No significant adverse impacts are anticipated for the long-term operation of the wells and
- 3 storage tanks. Daily monitoring inspection and periodic maintenance work is expected.
- 4 Otherwise, most of the time the pump and tanks will be unmanned. Well pump noise is
- 5 expected to be insignificant.

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- 6 To mitigate short-term construction-related noise impacts, compliance with the provisions
- of HAR 11-46, "Community Noise Control," will be exercised. A noise permit will be required
- 8 if the noise levels from construction activity are expected to exceed specified standards. It
- 9 will be the contractor's responsibility to minimize noise by properly maintaining mufflers
- and other noise-attenuating equipment. If construction work is required during evenings,
- 11 night, and weekend hours, a variance will be sought from the DOH.

3.9 NATURAL HAZARDS

3.9.1 Flood

- 14 The Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management
- Agency (FEMA) for the County of Kaua'i indicate that the project site is spread over two
- maps: Map No. 1500020292F (effective November 26, 2010), which is printed and shows
- the project within Flood Zone X, an area determined to be outside the 0.2% annual chance
- floodplain; and Map No. 1500020285E (effective September 16, 2005), which is not printed
- and identifies no special flood hazard areas. The State DLNR notes that for the latter map,
- the subject property is, in fact, located in Flood Zone X, areas of minimal potential flooding.
- 21 The Flood Insurance Program does not have any regulations for development within this
- 22 flood zone.

3.9.2 Earthquakes

- 24 Kaua'i is the furthest of the major Hawaiian islands from where most of the earthquake
- activities occur, that being on and around the island of Hawai'i. Earthquakes are most
- 26 significant there due to volcanic activity from the island's two active volcanoes, Mauna Loa
- and Kīlauea. Strong earthquakes, while infrequent, may endanger people and property by
- shaking structures, and causing ground cracks, ground settling, and landslides. They can
- 29 destroy buildings, water tanks, rupture pipes, and damage roads. The most significant
- 30 earthquake in recent years in the islands was a 5.2 on the Modified Mercalli Scale and
- occurred on April 14, 2009 on Hawai'i island, over 300 miles southeast from the project site,

- but did not cause any property damage on Kaua'i.3 Due to its distance from known volcanic
- 2 activity, the project area is not considered to be threatened by earthquakes.

3 3.9.3 Hurricane

- 4 Since 1950, when adequate records began, 8 hurricanes affected the Hawaiian Islands and
- 5 12 others posed as threats by their passage. Hurricane 'Iniki was the most recent, and most
- 6 powerful hurricane to strike Hawai'i in recorded history.
- 7 Hurricanes can be damaging to trees, vegetation, crops, overhead transmission lines, and
- 8 lightly built dwellings and structures. However, well facilities and underground water lines
- 9 are less susceptible to damage from those forceful winds. Consequently, hurricanes are not
- 10 considered a threat to the proposed action.

3.9.4 Volcanic

- 12 Kaua'i is the oldest of the major Hawaiian Islands and does not contain any active or
- dormant volcanoes. Volcanic eruption or lava flow, as a result, in not a threat to the project
- 14 areas.

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15 **3.9.5 Tsunami**

- Although tsunami inundation can be devastating to coastal properties, the proposed project
- will not be impacted. The well and storage facilities and transmission lines will be located
- 18 far above any potentially hazardous areas. The lowest portion of the proposed facilities
- (water line in Po'ohiwi Street) will be at an elevation 800 feet above msl and more than 2.9
- 20 miles from the shoreline.

21 3.9.6 Wildfires

- 22 Most of the project is within a rural community surrounded by residential and small
- agricultural developments. Only the Clearwell site is adjacent to a densely vegetated area.
- Any adverse impacts from wildfires on the proposed tank would be minor with the fire
- 25 protection assistance of the County of Kaua'i's Fire Department.

26 3.10 SCENIC RESOURCES

27 3.10.1 Existing Conditions

³ See USGS website at http://earthquake.usgs.gov/earthquakes/eqinthenews/2009/hv00033612/

- 1 The scenic resources of Kalāheo are primarily the large open spaces scattered around the
- 2 countryside and vast forest reserves in the region's upland elevations. Views of the project
- 3 site from Kaumuali'i Highway are obstructed by vegetation, rolling hills, and intervening
- 4 properties. From the site's upper elevations, the Pacific Ocean provides a backdrop of views
- 5 toward the makai lands.

6 3.10.2 Impacts and Mitigation Measures

- 7 Minor visual alterations to the land will result from the proposed action's 0.5-MG water
- 8 tanks; however, significant adverse impacts to surrounding scenic resources are not
- 9 expected. The proposed structures will be modest in size and the two tanks will be tucked
- into the slope of the site to at least partially shield the structures from view. Existing on-site
- vegetation will provide additional visual screening for the water facilities. Predominant
- view planes of the ocean and mountains from nearby properties will be retained.

3.11 ARCHAEOLOGICAL RESOURCES

14 3.11.1 Background

- 15 Cultural Surveys Hawai'i, Inc., (CSH) conducted an archaeological literature review and field
- inspection of the project area in December 2011 (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 been recorded on or near the project area. The study also included
- 20 limited field inspection of the project area to identify any surface archaeological features
- 21 and an assessment of potential impacts to such sites, as well as identification of any
- 22 sensitive areas that may require further investigation or mitigation before the project is
- 23 implemented.

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- 24 The study's findings indicated that previous large-scale modification in the form of slope
- cutting and lot leveling of the Nursery Tank site and to a smaller degree the Clearwell site
- 26 virtually eliminated the potential for the presence of subsurface archaeological sites.
- 27 Subsurface features and deposits could still be a possibility within the roadways and within
- 28 limited areas of the Clearwell site based on the lack of previous subsurface disturbance
- 29 there. However, previous archaeology in the vicinity of the project area suggests such
- deposits are unlikely to occur.
- 31 During CSH's field inspection, no historic properties were observed within the project area.
- 32 In conclusion, CSH recommended no further archaeological work for the proposed project.

3.11.2 Impacts and Mitigation Measures

- 1 Considering that previously unidentified subsurface historic properties may still be a
- 2 possibility within the project area, the County is committed to the responsibility of stopping
- work in the immediate area of any unexpected discovery during project construction, and
- 4 promptly notifying the State Historic Preservation Division (SHPD) of DLNR. Work will not
- 5 resume in the construction vicinity until specifically authorized by the SHPD.

6 3.12 CULTURAL IMPACT ASSESSMENT

3.12.1 Existing Resources

- 8 CSH conducted a cultural impact assessment (CIA) in November 2011 (see Appendix E).
- 9 Document research and ongoing cultural consultation efforts provided information
- 10 pertinent to the assessment of the proposed project's impacts to cultural practices and
- 11 resources.

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- Background research on the Kalāheo and Wahiawa ahupua'a provided information about
- the large cinder cone Kukuiolono, mo'olelo of Pele's creation of Nōmilu, sixteen culturally
- 14 significant põhaku, Kukuiolono heiau (the largest heiau on Kaua'i), three smaller heiau, and
- numerous cultural sites. Research also indicated that portions of Kalāheo were used for
- agriculture, which included cultivation of taro and sweet potatoes, and salt pans.
- 17 Throughout the course of the CIA preparation, 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. The effort was made by letter, email, telephone and in-person contact.
- 21 CSH attempted to contact thirty individuals, of whom ten responded, two provided written
- 22 statements, and three participated in formal interviews. The community consultation
- 23 provided information about the connection to the male mo'o, potential locations of cultural
- or archaeological sites, and the places used for hunting, fishing, and plant gathering.
- 25 Participants in the community consultation recommended establishing a buffer zone
- around Papapaholahola Spring and identified cultural practices for access and gathering,
- spirituality at sacred sites, and protecting ancient burials as potential issues should the
- 28 project expose or degrade such cultural resources or sites.

3.12.2 Impacts and Mitigation Measures

- 30 Based on its studies for the CIA, CSH identified a couple of potential impacts to Native
- 31 Hawaiian cultural resources and burials and provided recommendations for mitigation.
- 32 The archaeological literature review and field inspection did not identify any archaeological
- 33 sites within the project area, but there is a possibility that land-disturbing activities during

- construction may uncover presently undetected burials or other cultural finds. In addition,
- 2 historic-era terraces, rock mounds, platforms, and walls were previously identified just
- west of the project area (SIHP #50-30-10-406, Perzinski et al. 2001). As indicated above,
- 4 should burials or other cultural finds be identified during ground disturbance, work in the
- 5 immediate area will be stopped and the appropriate agencies will be notified. Work will not
- 6 resume in the construction vicinity until authorized by the SHPD.
- 7 Although not a probability, land-disturbing activities during construction may disturb
- 8 cultural sites outside of the project area, such as Papapaholahola Spring. Regardless of that
- 9 probability, DOW will employ best management practices in its construction methodology
- to avoid disturbing such possible sites.

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4 SOCIOECONOMIC SETTING

4.1 SOCIOECONOMIC SETTING

- In the early 1900s, the uplands of Kalāheo were subdivided into homesteads, and ranching
- became the primary land use. At the lower elevations, sugar cane cultivation was the major
- activity which included an elaborate irrigation water system consisting of ditches, tunnels,
- and reservoirs. Plantation camps were a major presence in the area.
- 17 According to long-time residents, Kalāheo was first populated by Spanish and later
- 18 Portuguese settlers during the plantation period. Truck crop, dryland taro, pineapple,
- 19 sugarcane, and grapes were grown. During World War II, military personnel constructed a
- 20 communications structure at the top of Papapaholahola Hill.
- Today, Kalāheo is a small bedroom community with a population of approximately 3,913
- 22 (2000 U.S. Census). Residents work on the lands and in businesses within the community as
- well as in the adjacent and surrounding areas, such as Lāwa'i, Kōloa, Po'ipū, Wahiawā coffee
- 24 fields, 'Ele'ele, Port Allen, Hanapēpē, and beyond. Kalāheo has a small commercial or town
- center consisting of retail and service enterprises, restaurants, convenience shops, and
- 26 community facilities.

4.2 ECONOMIC CONSIDERATIONS

- 2 The estimated cost of \$14.5 million to construct the proposed water system improvements
- 3 will generate substantial beneficial effects in the local economy. During the design and
- 4 construction stage of the project, work would be created in planning, engineering,
- 5 construction trades, material and supply vendors, and related fields. Secondary and induced
- 6 effects will occur as monies from these industries are spent and re-spent generating a
- 7 greater impact in the economy.

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- 8 In the long-term, the proposed improvements would accommodate continued urban
- 9 development. It would support the development of new homes and businesses, prompt
- 10 additional mobilization in the construction industry, stir another round of income and
- spending, and continue to generate state income tax and sales tax revenues.

4.3 SOCIAL CONSIDERATIONS

- All state, county, regional, and community plans discussed in subsequent sections recognize
- the social and moral obligations of government and community leaders to plan for and
- provide the necessary infrastructure that support residential growth in the County. The
- County of Kaua'i's Kōloa-Po'ipū-Kalāheo Development Plan states that the objective of social
- development is to "enable the residents to achieve purposeful and satisfying lives in stable,
- 18 harmonious, healthy communities.
- 19 The proposed water system improvements will enable DOW to continue to provide a vital
- 20 service to the Kalāheo area. Water service supports a variety of land uses (residential,
- commercial, recreational, agricultural, public facilities, etc.) that allows the residents to
- achieve balanced, healthy and satisfying lives. The proposed improvements will also enable
- 23 DOW to expand its services to accommodate anticipated residential growth in the area.

5 PUBLIC FACILITIES AND SERVICES

5.1 CIRCULATION AND TRAFFIC

- Kaumuali'i Highway, a two-lane State right-of-way, provides regional access to Kalāheo
- from the greater southern half of the island. The highway stretches from Līhu'e on the east
- to the Pacific Missile Range Facility in Mānā on the west.

- Access to the project area is primarily provided by Pu'uwai Road and Kikala Road, both two-
- 2 lane paved County roads. At their makai terminus, Pu'uwai Road intersects with Lae Road
- 3 and Kikala Road intersects with Kuli Road. Lae Road and Kuli Road both connect to
- 4 Kaumuali'i Highway further makai from the project area.
- 5 Roadways that would be directly affected by construction within the right-of-way include
- 6 Pu'uwai Road, Kikala Road, and Po'ohiwi Road. Due to the relatively low-density
- 7 development within Kalāheo, mauka of Kaumuali'i Highway, low levels of traffic can be
- 8 expected on roadways within the project vicinity. Further, the area mauka of the highway
- 9 primarily consists of residential properties, while the commercial/town center is located
- 10 makai of the highway.
- Long-term operation of the proposed facilities would not generate a noticeable increase in
- traffic. Traffic would likely be limited to small crews of inspection and monitoring
- personnel, maintenance personnel, and repair personnel. This traffic would typically be
- infrequent and not result in multiple trips on a per-day basis.
- 15 Short-term traffic impacts would include an increase in vehicles travelling to and from the
- 16 well and tank sites for construction-related activities. This is additional traffic that would
- likely result in localized traffic delays. The delays, however, are expected to be brief and
- intermittent and would occur during normal working hours when residents generally are
- 19 already at their work place.
- 20 Construction within the rights-of-way would result in short-term traffic impacts, including
- 21 temporary lane closures. However, construction would take place within low-volume
- roadways at the northern reaches of the town, and would only affect a small portion of the
- Kalāheo population. Further, during the design and construction phases of the project, a
- traffic control plan would be prepared by the DOW and implemented to mitigate the
- 25 temporary traffic impacts.

5.2 INFRASTRUCTURE

5.2.1 Water

- 28 The DOW currently operates nine separate, unconnected water systems on the island of
- 29 Kaua'i, including the Kalāheo Water System. The proposed improvements are situated near
- the highest elevations of the Kalāheo system. As described in the previous Background
- 31 Section, there are many sources for the existing system. Distribution mains are located
- 32 within roadways and provide water service to residences and other properties in the area.
- The existing distribution system within the project area consists of water mains, tanks,

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- pressure reducing valve stations, standpipes, and fire hydrants located along Pu'uwai Road,
- 2 Kikala Road, and Po'ohiwi Road.

3 **5.2.2** Sewer

- 4 The County Department of Public Works (DPW), Division of Wastewater Management is
- 5 responsible for developing and operating the County's wastewater infrastructure. However,
- 6 there are no municipal wastewater collection and disposal systems in Kalāheo. Private
- 7 individual wastewater systems presently serve properties in the area.

8 5.2.3 Electricity

- 9 Electricity is provided by Kauai Island Utility Cooperative (KIUC) via overhead lines along
- 10 roadways leading to the project area. Operation of the new well and support facilities will
- require electrical power. The power demand from the new improvements is not anticipated
- to result in a significant impact on the power supply to the Kalāheo area. Replacement of
- Nursery Tank and Clearwell Tank and modifications to the booster pump station at the
- Kalāheo Tank site are expected to generate no noticeable increase in power demand during
- their operation.

16 5.2.4 Telecommunications

- Hawaiian Telcom provides land-line telephone services to residents of Kaua'i. The project
- area is served by overhead lines along roadways within the area. Telemetering equipment
- or a Supervisory Control and Data Acquisition (SCADA) system would be installed at the
- 20 new well site to monitor well operations. SCADA instrumentation would also be installed at
- 21 the Clearwell Tank and Yamada Tank sites. The SCADA systems would be connected to
- 22 existing Hawaiian Telcom lines.

5.3 SOLID WASTE

- 24 The DPW, Solid Waste Division operates and maintains an island-wide municipal solid
- 25 waste collection and disposal system. The solid waste program includes a landfill in Kekaha,
- on the west side of Kaua'i, and four refuse transfer stations; one each in Hanalei, Kapa'a,
- 27 Līhu'e, and Hanapēpē. The County is in the process of finding a new landfill site for Kaua'i's
- future demand. The refuse transfer station nearest to the project area is the Hanapēpē
- 29 facility.

- 30 Anticipated impacts to the solid waste system would be minimal and primarily short-term,
- 31 limited to waste materials generated during construction activities. Generation of solid
- 32 waste during normal operation of the facilities is not anticipated, except possibly during
- 33 DOW repair and maintenance activities.

5.4 PUBLIC FACILITIES AND SERVICES

- 2 **Police.** Kalāheo is located within the Kaua'i Police Department's Waimea District, which
- 3 covers approximately half of the island. The Waimea Substation is located along Kaumuali'i
- 4 Highway, approximately nine miles to the west of Kalāheo. The Kaua'i Police Department is
- 5 headquartered in Līhu'e.
- 6 **Fire and Emergency.** The Kalāheo Fire Station is located near the town commercial center
- 7 along Kaumuali'i Highway. Fire stations are also located in the nearby towns of Hanapēpē
- and Kōloa. Fire stations provide fire, rescue, hazmat and emergency medical services.
- 9 **Medical.** The Kaua'i Medical Clinic operates two satellite facilities in the nearby towns of
- 10 'Ele'ele and Kōloa. These satellite clinics do not provide emergency services. Emergency
- medical services are available at the Wilcox Memorial Hospital in Līhu'e and West Kaua'i
- 12 Medical Center in Waimea.
- Public Education. The nearest public school is Kalāheo Elementary School, which is located
- to the south of the project area towards Kaumuali'i Highway. Kalāheo Elementary is located
- within the Central Kaua'i high school district⁴, which includes Kaua'i High School and
- 16 Chiefess Kamakahelei Middle School in Līhu'e.
- Due to the purpose and function of the proposed project, adverse impacts to public facilities
- and services, such as police, fire and emergency as well as medical and public education
- 19 facilities are not anticipated. Short-term impacts generated by project construction are
- addressed in Section 7.1 of this document.

21 6 RELATIONSHIP TO PUBLIC AND LAND USE POLICIES

6.1 HAWAI'I STATE PLAN

- The Hawai'i State Planning Act (Planning Act) has served as a guide for the long-range
- development of the state since its adoption into law in 1978 as Hawai'i Revised Statutes

⁴ Hawaii Statewide GIS Program website.

- 1 (HRS) Chapter 226. The Planning Act identifies goals, objectives, and policies for the state
- 2 to: (1) provide a basis for determining priorities and allocating limited resources, such as
- 3 public funds, services, human resources, land, energy, water, and other resources;
- 4 (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
- 6 coordination to provide for an integration of all major state and county activities.
- 7 Three sections included in HRS Chapter 226 are directly applicable to the proposed project:
- 8 (1) HRS §226-13 Objectives and Policies for the Physical Environment Land, Air, and
- 9 Water Quality; (2) HRS §226-14 Objective and Policies for Facility Systems In General;
- and (3) HRS §226-16 Objectives and Policies for Facility Systems Water. The following
- table presents the applicable sections, measures conformance with the plan's goals and
- objectives, and summarizes the project's benefits and probable impacts.

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	Chapter 226		ORMS	Not
Section	Part I. Overall Theme, Goals, Objectives and Policies	Yes	No	Applicable
226-13	Objectives and Policies for the Physical Environment—Land,	, Air, and	l Water	Quality
(a)	Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:			
(1)	Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.	$\sqrt{}$		
(2)	Greater public awareness and appreciation of Hawai'i's environmental resources.	$\sqrt{}$		
(b)	To achieve the land, air, and water quality objectives, it shall be the policy of this State to:			
(1)	Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.			$\sqrt{}$
(2)	Promote the proper management of Hawai'i's land and water resources.	$\sqrt{}$		
(3)	Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.	$\sqrt{}$		
(4)	Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.			$\sqrt{}$
(5)	Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.			$\sqrt{}$
(6)	Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.	$\sqrt{}$		

	Chapter 226		ORMS	Not
Section	Part I. Overall Theme, Goals, Objectives and Policies	Yes	No	Applicable
(7)	Encourage urban developments in close proximity to existing services and facilities.	$\sqrt{}$		
(8)	Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.	$\sqrt{}$		

DISCUSSION:

The project will increase the existing storage capacity of the DOW water system, improve the distribution system, and may add a new source to the water system. The long-term impact of the project will improve the County's capacity to serve customers in the Kalāheo area. No long-term detrimental impacts on the County's existing water supply system are anticipated.

226-14	Objective and Policies for Facility Systems—In General	
(a)	Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.	\checkmark
(b)	To achieve the general facility systems objective, it shall be the policy of this State to:	
(1)	Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	\checkmark
(2)	Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.	$\sqrt{}$
(3)	Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	\checkmark
(4)	Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.	\checkmark

DISCUSSION:

The proposed project fully supports the objectives and policies for "facility systems" as set forth in HRS §226-14. It is also consistent with the Kaua'i General Plan, Kōloa-Po'ipū-Kalāheo Development Plan, and DOW Water Plan. The well and other water system improvements will allow DOW to continue water services to existing customers in the Kalāheo area and accommodate an anticipated growth in the residential population. Initial construction of an exploratory well will determine the feasibility of converting the exploratory well to a production well, thereby assuring resource protection. During the design phase, the engineer will determine cost-effective methods for construction and operation of the improvements.

226-16 Objective and Policies for Facility Systems—Water

Section	Chapter 226 Part I. Overall Theme, Goals, Objectives and Policies	CONFORMS		- Not
		Yes	No	Applicable
(a)	Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.	$\sqrt{}$		
(b)	To achieve the facility systems water objective, it shall be the policy of this State to:			
(1)	Coordinate development of land use activities with existing and potential water supply.	$\sqrt{}$		
(2)	Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.	$\sqrt{}$		
(3)	Reclaim and encourage the productive use of runoff water and wastewater discharges.			\checkmark
(4)	Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	$\sqrt{}$		
(5)	Support water supply services to areas experiencing critical water problems.	$\sqrt{}$		
(6)	Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.	$\sqrt{}$		

DISCUSSION:

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DOW recognizes the potential growth of the residential population in Kalāheo and the need to plan for future water demands. DOW also recognizes the need to upgrade and replace aging facilities in the water system. The project will address these issues and in doing so, will conform to policies established for water facility systems.

6.2 STATE LAND USE LAW

- The project area is located in the Rural, Agricultural and Conservation Districts, as
- 4 delineated by the State Land Use District Maps. Section 205-5(c) of the HRS, Chapter 205,
- 5 states that "public, quasi-public, and public utility facilities" are permitted uses within the
- The latest and public field when the second second
- 6 Rural District. Section 205-4.5 of the HRS, Chapter 205, also states that "public, private, and
- quasi-public utility lines and roadways, transformer stations, communications equipment
- 8 buildings, solid waste transfer stations, major water storage tanks, and appurtenant small
- 9 buildings such as booster pumping stations" are permitted uses within the Agricultural
- District. The proposed improvements are permitted uses within the State Rural District and
- 11 Agricultural District.

- Section 205-5(a) of the HRS states that Conservation Districts shall be governed by the
- 2 Department of Land and Natural Resources (DLNR), pursuant to Chapter 183C. According to
- 3 DLNR's Conservation District Subzone Map for the Kalāheo area (November 2005), the
- 4 project area is designated in the Conservation District Limited Subzone, Resource Subzone,
- 5 and General Subzone. The proposed action is consistent with Hawai'i Administrative Rules
- 6 (HAR), Title 13, Chapter 5, which states that public purpose uses, such as water systems, is
- 7 an identified land use in all three identified subzones. To move the project to
- 8 implementation, a Conservation District Use Permit approved by the Board of Land and
- 9 Natural Resources (BLNR) permit will be required per HAR Title 13, Chapter 5.

6.3 STATE ENVIRONMENTAL POLICY

- 11 The proposed action conforms with the State Environmental Policy, as stated in HRS,
- 12 Chapter 344, to "conserve the natural resources, so that land, water, mineral, visual, air and
- other natural resources are protected by controlling pollution, by preserving or augmenting
- natural resources, and by safeguarding the State's unique natural environmental
- characteristics in a manner which will foster and promote the general welfare, create and
- maintain conditions under which humanity and nature can exist in productive harmony,
- and fulfill the social, economic, and other requirements of the people of Hawai'i." The "land,
- water, mineral, visual, air, and other natural resources" guideline for implementing the
- 19 environmental policy states: "encourage management practices which conserve and fully
- 20 utilize all natural resources" and "encourage management practices which conserve and
- 21 protect watersheds and water sources, forest, and open space areas."
- 22 As a public utilities entity, DOW operates under the purpose of conservation and protection
- of the island's water resource to provide safe, drinkable water to the people of Kaua'i. Its
- 24 planning and programming of source development, storage, and distribution facilities
- 25 carefully weigh the importance of the area's natural resources as environmental
- 26 assessments are prepared in conjunction with the development of those facilities. Any
- 27 major impact that may be generated in the development of those facilities will include
- 28 mitigation measures to reduce or minimize the effect of those impacts.

6.4 COUNTY OF KAUA'I GENERAL PLAN

- The Kaua'i General Plan was updated and adopted by the County in November 2000. The
- 31 plan includes policies that guide future growth on the island with the welfare of the physical
- environment, public, culture, and island's historical rural character in mind.

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- Section 7.4 of the General Plan states that existing municipal water systems of Kaua'i
- 2 generally have adequate source and storage capacity but recognizes that many of the
- 3 systems are at or near capacity and would need to be expanded to meet future growth
- 4 demands. Section 6.4 of the General Plan identifies Kalāheo as an area with a growing
- 5 population.
- 6 The Land Use Map of the General Plan designates the project area as "Agriculture", "Open",
- 7 and "Residential Community". The primary and secondary intents of the Agriculture
- 8 designation are to "conserve land and water resources" and to "provide an opportunity for
- 9 Kaua'i citizens to reside in an agricultural community", respectively. The proposed
- improvements will enable DOW to continue to provide water in support of both agricultural
- and residential uses, while conserving and protecting the island's water resources.
- 12 The intent of the Open designation is to "preserve, maintain or improve the natural
- characteristics of non-urban and water areas that: (1) are of significant value to the public
- as scenic or recreation resources; (2) perform essential physical and ecologic functions
- important to the welfare of surrounding lands, waters, and biological resources; (3) have
- the potential to create or exacerbate soil erosion or flooding on adjacent lands; (4) are
- potentially susceptible to natural hazards such as flood, hurricane, tsunami, coastal erosion,
- landslide or subsidence; or (5) form a cultural, historic or archaeological resource of
- 19 significant public value."
- The proposed improvements that are within lands designated as Open will not conflict with
- the intent of the County designation. With exception to the well, the proposed
- improvements will mainly replace or upgrade existing water facilities and would have a
- 23 minimal impact on surrounding land uses and resources. The well and booster pump
- station would not significantly affect the existing use of the site, which contains an
- abandoned house, and surrounding areas. Proper design and construction of the proposed
- 26 improvements will ensure that the project does not result in erosion and flooding. The
- 27 project area has been surveyed and there are no archaeological resources in the area. The
- 28 project area is also not particularly prone to natural hazards, as discussed in Section 3 of
- 29 this report.
- 30 The Residential Community designation is one of the six urban land use designations
- specified in the General Plan. The key policy governing the urban land uses is to "promote"
- 32 growth and development in compact urban areas." The General Plan also states that
- Residential Community areas may be used for government facilities. As a County water
- 34 system project, the proposed action conforms to policies set forth for the Residential
- 35 Community designation.

- Overall, the proposed action is consistent with policies established for each of the applicable
- 2 land use designations and therefore conforms to the Kaua'i General Plan.

6.5 KŌLOA –POʻIPŪ-KALĀHEO DEVELOPMENT PLAN

- 5 The Kōloa-Poʻipū-Kalāheo Development Plan, which was adopted in 1983, is in the process
- 6 of being updated. The community-based plan supplements the Kaua'i General Plan by
- 7 providing more detailed development policies for the Kōloa-Poʻipū-Kalāheo region.
- 8 One of the objectives in the Development Plan that is consistent with the General Plan is
- 9 "developing service, utility and circulation systems consistent with an anticipated or
- potential population by controlling density and intensity of use." A general recommendation
- specified in the Development Plan is to "improve water, sewer and road systems within
- existing urban areas to facilitate infilling and redevelopment." As a water system project
- that will serve a residential area, the proposed action conforms to the overall goals,
- objectives and recommendations of the Kōloa-Poʻipū-Kalāheo Development Plan.

6.6 COUNTY ZONING ORDINANCE

- The County of Kaua'i Comprehensive Zoning Ordinance (CZO) establishes regulations and
- standards for land development and land use on the island of Kaua'i. The CZO consists of six
- major land use districts and two special districts, each having its own set of permitted uses
- and structures, and development standards.
- The portion of the project area that is located in the State Conservation District is subject to
- 21 State DLNR land use regulations rather than County CZO regulations. The proposed project
- 22 will comply with DLNR regulations. The portion of the project area not located within the
- 23 State Conservation District is designated by the County CZO in the Residential R-2 District
- 24 and Agriculture District, and subject to the CZO's regulations. Pursuant to the County zoning
- 25 ordinance, public utility facilities in the Agricultural Zoning District will require a Class IV
- 26 Zoning Permit and Use Permit from the County Planning Commission. Public utilities and
- 27 facilities in a Residential Zoning District will require a use permit.

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6.7 COASTAL ZONE MANAGEMENT AND SPECIAL MANAGEMENT AREA

- 3 Hawaii's Coastal Zone Management (CZM) Program was enacted in 1977 (HRS Chapter
- 4 205A) through the passage of the Federal CZM Act of 1972. The objective of the CZM
- 5 program is to protect and manage Hawai'i's coastal resources through land and water use
- 6 regulations. Special Management Areas (SMA) have been established throughout the state
- 7 under the CZM Program, and land use rules and regulations for those specially designated
- 8 areas are being administered by the individual County planning authorities. The project
- 9 area is located outside of the SMA and is not subject to the County's SMA rules and
- 10 regulations.

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6.8 OTHER PERMITS AND APPROVALS

- 12 Construction permits will be required for the drilling and outfitting of the production well
- and construction of its appurtenant facilities. These would include a water use permit,
- issued by the CWRM, and well construction and pump installation permit, approved by the
- 15 State DOH. A National Pollutant Discharge Elimination System (NPDES) general permit
- 16 coverage authorizing discharge of stormwater associated with construction activities will
- be required from the State DOH.
- At the County level, a grading permit and building permit must be obtained from the County
- 19 DPW. Water pipeline installation plans are reviewed and approved by the DOW.

6.9 SUMMARY OF REQUIRED PERMITS AND APPROVALS

- The following is a summary of the required permits and approvals for the construction of
- the proposed well, well appurtenants, reservoir, water lines, booster pump stations, and
- 24 pressure reducing valves.

Table 8. Summary of Required Permits and Approvals for the Project

Permits/Approvals	Approving Agency		
State of Hawai'i			
Conservation District Use Permit	Board of Land and Natural Resources		
Water Use Permit	Commission on Water Resource Management		

Table 8. Summary of Required Permits and Approvals for the Project

Permits/Approvals	Approving Agency		
Well Construction & Pump Installation Permits	Commission on Water Resource Management		
NPDES Permit	Department of Health		
County of Kaua'i			
Class IV Zoning Permit	Planning Commission		
Use Permit	Planning Commission		
Building Permit	Department of Public Works		
Grading Permit	Department of Public Works		
Water Pipeline Installation	Department of Water		

7 SUMMARY OF MAJOR IMPACTS

7.1 SHORT-TERM PROBABLE IMPACTS

- 3 Construction activities associated with the proposed improvements will generate short-
- 4 term, temporary impacts. At the Yamada and Clearwell sites, construction activities will
- 5 include site preparation work and construction of a control building, reservoir, driveway,
- 6 pavement, utilities, and landscaping. Construction related to well drilling will only occur on
- the Yamada site. Construction cleanup on both sites will follow. Construction noise, fugitive
- 8 dust, storm water runoff, and sedimentation are probable impacts associated with these
- 9 activities. On the roadways, construction vehicles would be delivering equipment and
- supplies to the site and construction workers would be commuting to and from the
- designated work areas. Construction related traffic would be minimal and could occur at
- various times during the day outside the peak morning and afternoon traffic times.
- 13 Well testing, which requires releasing pumped water into the drain system would have
- minimal short term impacts. The drain system would connect to the existing Nursery Tank
- overflow pipes and would discharge the water at the existing outlet, ultimately allowing
- water to flow into a nearby flume that leads to a reservoir.
- 17 At the 908 Tank site construction activities to upgrade the existing booster pump will also
- 18 generate short-term temporary impacts. Construction activities will include site

- 1 preparation work and construction of a new pump adjacent to the existing booster pumps
- 2 and rerouting the piping to connect to the water system in Poohiwi Road.
- 3 Construction of the new water lines and pressure reducing valves in Po'ohiwi Road, Pu'uwai
- 4 Road, and Kikala Road would use conventional trenching methods. Installation would be
- 5 phased over a 6-month period and would involve temporary impacts from site preparation,
- 6 trenching, pipeline placement, installation of the pressure reducing valves, backfilling, and
- 7 clean up. Heavy vehicles and equipment including jack hammers, backhoes, dump trucks,
- 8 pick-up trucks, flatbed trucks, asphaltic concrete hauling trucks, pavers, and rollers would
- 9 also be used. For temporary power supply, diesel-powered generators may be used.
- 10 Pipeline excavation will create noise and fugitive dust that could affect adjacent residential
- 11 properties. To minimize these impacts, mitigation measures and best management
- practices will be employed, Section 8.1 provides more details.
- 13 Although existing and as-built utility plans have been reviewed, unexpected or altered
- utility line alignments may be encountered during trenching for the new water lines.
- Additionally, despite no evidence of surface archaeological features within the road rights-
- of-way, underground archaeological deposits may be encountered. Mitigation measures as
- described in the next section will be employed.
- The installation of water lines and pressure reducing valves within the road rights-of-way
- will also disrupt vehicular travel as traffic will be diverted to adjacent lanes or rerouted
- while the work is being performed. No encroachment on adjacent private properties is
- anticipated; however, vehicle access to some adjacent properties may be temporarily
- obstructed when construction occurs in the area.
- The economic impact of the proposed action would be positive and include the mobilization
- of construction personnel and equipment in the construction industry and the purchases of
- construction material and supplies in the local market generating a multiplier effect as
- 26 monies are spent and re-spent on other purchases in the economy.

7.2 LONG-TERM PROBABLE IMPACTS

- Once all of the proposed improvements are in full operation, the long term impacts to area
- 29 residents would be positive. Additional supply and storage of water to a growing
- 30 population would be a major benefit to the community. The new tanks would also provide
- 31 enough storage to meet current fire flow requirements.
- 32 The Yamada Well would be tested hydraulically and for water quality to determine if there
- are impacts to any of the nearby wells. Pumpage tests at the new well would need to

- demonstrate that the nearby existing wells would not experience a significant lowering of
- the water level. If no significant drawdown occurs, no long-term effects are anticipated on
- 3 the sustainable yield of the aquifer.
- 4 The proposed well and tanks would be unmanned operations monitored by telemetry and
- 5 associated telecommunications equipment. Regular daily electronic monitoring and
- 6 periodic maintenance of the facilities by DOW personnel are not expected to create any
- 7 notable impacts on traffic. Periodic maintenance would also include cleaning out the
- 8 reservoirs which would require water to be discharged through the tank's
- 9 washout/overflow drain lines. No discharge will be made directly to an adjacent private
- property or to existing State waters and will be conducted in a manner that complies with
- all NPDES permit conditions.
- 12 Staffing requirements to maintain the facilities in good operating condition would comprise
- of a few technicians, maintenance personnel, and groundskeepers. DOW is not expected to
- 14 hire additional staff to maintain the water improvements.
- Nominal changes to the water service pressures at individual service laterals are expected
- 16 along Pu'uwai and Kikala Streets. Services may experience either an increase or decrease in
- water pressure as a result. The resulting pressure will, however, remain within the
- acceptable operating ranges. Plumbing fixtures that operated normally may develop a drip
- or may have a reduced flow.
- Noise associated with the pumps at the 908 site and at the Yamada site will vary depending
- on the type of pump in operation. Booster and well pumps will not operate continuously.
- The deep well pump at the Yamada well may be a source of moderate noise due to its size.
- 23 The booster pumps at 908 and Yamada and the hydro-pneumatic tank at Clearwell are
- significantly smaller than the deep well pump and are not expected to be a significant
- 25 source of noise.

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- 26 Electrical requirements to operate the pumps and associated equipment would not exhaust
- the current supply of power in the area.

7.3 CUMULATIVE IMPACTS

- 29 The cumulative effect of pumping water from the Yamada site could have a major long term
- impact on the area's groundwater supply or quality. A second wall is currently being drilled
- at the A&B Brydeswood location, approximately 1 mile northwest of the Kalaheo A&B Wells.
- 32 This well would also tap into the Waimea Volcanics groundwater source. It is planned to

- provide water service to a new residential development in the Kalāheo area. Testing on the
- well will begin in March 2012.
- 3 Development and use of the Brydeswood Well and Yamada Well would need to
- 4 demonstrate that the draw down does not exceed the sustainable yield of the area's aquifer.
- 5 However, careful monitoring of the water supply along with regulatory controls for
- 6 groundwater protection procedures should help ensure the protection of the aquifers. The
- 7 CWRM is required to develop a minimum standard to prevent pollution, contamination,
- 8 minimize wasting, and saltwater intrusion into wells and groundwater to protect this
- 9 resource.

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8 PROPOSED MITIGATION MEASURES

8.1 MITIGATION MEASURES FOR SHORT-TERM IMPACTS

- 14 The noise generated from construction activities will be short-term and localized to the
- immediate vicinity of the construction work in progress. A community noise permit will be
- sought from the DOH prior to the commencement of any construction activity. Night-time
- 17 construction is not anticipated, but should such activity occur, a public informational
- meeting would be held for the affected residents and property owners. DOH's maximum
- 19 permissible noise level for construction equipment during night hours in residential areas is
- 45 dBA. If the generated noise is expected to exceed the State's maximum permissible level,
- a noise variance will be sought from the DOH.
- 22 Construction equipment and on-site vehicles that emit gas or other emissions during
- operations (excluding pneumatic hand tools weighing less than 15 pounds) must be
- equipped with mufflers.
- 25 Dust control measures would include the use of dust screens, if necessary, frequent water
- sprinkling of exposed dirt areas, and temporary ceasing of operations during high wind
- 27 conditions.
- 28 Based upon the archaeological survey there are no features on the proposed properties;
- 29 however if any buried cultural deposits are found during construction, work will cease in

- the immediate area of the find and the State Historic Preservation Division (SHPD) will be
- 2 notified and consulted regarding proper treatment before any construction work is allowed
- 3 to resume.
- 4 Erosion and sedimentation control measures and BMPs, such as berms, silt screens, snake
- 5 bags, and sedimentation basins, will be employed, if necessary, to ensure that no runoff
- 6 from the construction site flows onto adjacent properties and County storm water drainage
- 7 systems.
- 8 No dewatering will be required for the project. Groundwater is located far beneath the
- 9 surface of the site and will not be encountered during excavation or trenching operations.
- All solid waste and debris generated during construction will be collected and hauled away
- to a public landfill by the construction contractor.
- 12 A traffic control plan (TCP) for the water line construction along Po'ohiwi Road, Pu'uwai
- Road, and Kikala Road will be prepared and submitted to the County for review and
- approval. The TCP will include traffic controls and management provisions designed to
- maintain safe vehicular passage through or around the project construction area.
- 16 Traffic cones and posted signs will be placed far in advance of the construction site to
- 17 provide adequate warnings to motorists. Lane closures may be required during trenching
- and pipeline placement resulting in the use of the remaining lane for local traffic to past
- 19 through. Traffic monitors or flaggers will be employed to control and direct vehicular
- 20 movement through the construction area. Work on the water line will be conducted in
- 21 phases so affected areas would occur in short sections at a time.
- To further minimize traffic impact, work will be conducted during off-peak hours to avoid
- the day's heaviest traffic periods. In the event that the pipeline construction blocks a
- 24 resident's direct access to his or her home, the construction contractor will immediately
- cease work in the area, place a metal plate over the pipeline trench, and allow the property
- owner to traverse the obstructed area. This procedure would also apply to the County Fire
- 27 Department where access to its fire hydrants may be hindered during construction.
- The project engineers (or consultants) and construction contractor are expected to
- 29 coordinate construction of the water line with all potentially affected utility companies.
- 30 This coordination would begin early in the planning and design process, with the
- 31 construction contractor continuing the effort into the construction stage. The cost of any
- concessions or required alterations to the affected utilities may be borne by the project
- owner, contractor or design engineer, or a combination of these three.

8.2 MITIGATION MEASURES FOR LONG-TERM IMPACTS

- To protect the water supply, draw down tests will be performed to determine impacts to
- 4 the aguifer, similar to what is done for an exploratory well. All existing wells within 1 mile
- of the new well will be monitored to ensure that their combined pumping volume does not
- 6 exceed the sustainable yield for the aquifer. Once all the tests are completed, the results will
- be provided in a report to DOH and CWRM. Provided that those tests meet current DOH
- 8 water quality standards and CWRM regulations, the well will become a production well.
- 9 Visual impacts from the roadways of the new tanks and buildings will be mitigated by
- existing vegetation and by grading into the hillside to minimize the height of the tanks.
- Additional landscaping may also be used to soften the visual effect of the large tank from
- 12 Pu'uwai Road.

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- Several options are available to attenuate noise from the pumps at 908, Yamada, and
- 14 Clearwell, should the decibel levels be significant. Noise levels will be field verified at the
- critical receptor locations once the improvements are in operation. Should the decibel
- levels exceed allowed limits, sound attenuation will be provided in the form of solid fencing,
- landscaping, or prefabricated enclosures. Additionally, booster pumps with a low operating
- speed will be utilized to be as quiet as possible.
- 19 Electrical power to the well, tank control buildings, and pumps will be minor in scale and
- 20 not require additional conservation measures.
- 21 Adverse impacts to the social and economic environment of the community are also
- 22 expected to be minimal; therefore, no mitigative measures are necessary.

9 ALTERNATIVES CONSIDERED

9.1 NO ACTION ALTERNATIVE

- 25 At the Yamada site, the no action alternative would allow the area to remain undeveloped
- 26 with existing vegetation surrounding an abandoned house. At the Clearwell site, the
- 27 existing tanks, filters, and equipment would remain unaltered. Along the three County
- roads, no alteration of the rights-of-way or trenching in the roadways will occur and no

- construction related impacts will result. With this scenario, the project area would have in
- the near future an inadequate water supply and storage for the Kalāheo district, which may
- 3 result in interrupted service or an inadequate supply for severe fire-fighting efforts.
- 4 If DOW does not explore a potable groundwater source at the Yamada site, it would search
- 5 for another potential site. Additional discussion on alternative sites is in the following
- 6 Section 9.2, Alternative Location. Should the search for potential groundwater sources
- terminate, exploration of alternate water sharing methods may result; including restricting
- 8 further residential growth in Kalāheo via lands use controls, developing permanent water
- 9 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
- 11 activities, or wastewater flushing.
- 12 Restricting the residential growth via land use controls in Kalāheo would require
- adjustments in the County General Plan, which establishes the long-term growth policies for
- the area. Amending the General Plan to change the policy would require obtaining approval
- from the County Council and Mayor.
- 16 Implementing a water conservation program would involve heavy public advertising and
- community outreach strategies, if reducing water use is strictly voluntary. However, if they
- are made mandatory, government rules and regulations would need to be adopted. The
- 19 County already has information about water conservation measures on public outreach
- 20 materials which are available to view and/or download on DOW's website. Voluntary
- 21 community participation in water conservation programs will take time and initially have
- 22 limited effects, while establishing mandatory water conservation practices may require a
- 23 lengthy legislative or agency review and approval process.

9.2 ALTERNATIVE LOCATION

- 25 The Nursery Tank site as an alternative location for the new well since the property has
- adequate space and is owned by the DOW. However, the topographic constraints would
- 27 make developing the site difficult and expensive. Grades on the Nursery Tank site slope
- away from the roadway and at a steep gradient that would be difficult to place the new
- 29 water facilities without extensive grading. The usable space on the lot is currently occupied
- 30 by a 0.1-MG tank, which must remain in service until the proposed improvements are
- 31 operational.

- Another DOW owned property in the vicinity, TMK 2-4-04:038, identified as the 1.11 acre
- Papapaholahola Tank Site parcel was initially considered for the deep well location. The
- 34 parcel is generally located between the Yamada and Clearwell sites, along the route to

- 1 Clearwell. This site is uniformly forested with Norfolk Pine trees in excess of 50 feet in
- 2 height. These trees are likely to have been planted in a government forestry effort circa the
- mid 1900's. Development of this site would require extensive clear cutting of the pine trees
- 4 and construction of supporting electrical infrastructure. The location was deemed less
- 5 desirable due to the additional cost to prepare the site.
- 6 There are sufficient space and adequate infrastructure on the Yamada site to house the new
- 7 well, control building, and 0.5-MG tank. Development of the site would also be easier since
- 8 a portion of land has already been cleared.
- 9 For the Clearwell Tank site, no other locations for the new tank were considered. There are
- 10 no other available vacant State or County sites in the same pressure zone that readily
- connects to the existing system.

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9.3 ALTERNATIVE USE

The Yamada and Clearwell sites are located within the State-designated Rural, Agriculture, and Conservation Districts of the County of Kaua'i. Permitted uses within these districts include essential utilities for public purposes, such as water systems, agricultural operations, and residential development. Other uses permitted in this district would not be appropriate for the project because the Yamada well will fulfill the need of an essential utility to serve the Kalāheo area.

9.4 ALTERNATIVE DESIGN

14 9.4.1 Facility Size

- 15 Alternative sizes for the proposed tanks are generally dictated by potential sustainable yield
- of the well. Standard practice is to provide enough storage to accommodate the potential
- maximum sustainable production. It is anticipated that the Yamada Well would become a
- high output well, requiring a 0.5-MG tank.
- 19 The new Clearwell Tank will replace the existing 0.33-MG tank, however in order to meet
- current DOW standards there are standard tank sizes. Without reducing the capacity of the
- current tank the next standard tank size is a 0.5-MG.

9.4.2 Pipeline and Appurtenances

- 23 The existing booster pump at the 908 Tank site are inadequate for the proposed water
- 24 system, therefore a new booster pump must be installed.

- 1 The existing water line that connects the 908 Tank to Nursery Tank is in a backcountry
- 2 easement is overgrown with dense vegetation and has made it difficult to maintain. The
- 3 new pipeline will be installed within the road rights-of-way to provide better maintenance
- 4 access to the system.

5 9.4.3 Construction Material and Design Specifications

- The well, control building, tanks, pumps, and other appurtenants are required to meet DOW
- 7 design specifications. The proposed tank is required to be constructed of concrete per DOW
- 8 specifications.

10 PRELIMINARY DETERMINATION

- 10 This EA demonstrates that the proposed action will have no significant adverse impact on
- the environment and that an Environmental Impact Statement is not warranted. A Finding
- of No Significant Impact (FONSI) is anticipated for this project.

11 FINDINGS AND REASONS SUPPORTING THE DETERMINATION

- 16 The following findings and reasons indicate that the proposed action will have no significant
- adverse impacts on the environment based on the 13 significance criteria as provided in
- 18 HAR 11-200-12.

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- 1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.
- Alternative plans were considered in determining the best design for the proposed improvements and to avoid or minimize environmental impacts. The proposed improvements would not result in significant loss or destruction of the area's natural and cultural resources.
 - 2) Curtails the range of beneficial uses of the environment.

No curtailment of beneficial uses of the environment is anticipated. Proposed improvements would involve facility upgrades and existing land uses. The Yamada Tank and Well site was acquired by the DOW specifically for water system improvements. Pump tests for the proposed well will be conducted to ensure the protection of water resources. No negative long-term impacts are anticipated for the proposed water line improvements within the county rights-of-way, which are intended to accommodate public roads and utilities.

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 6.3 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 project is expected to improve, rather than degrade, the economic and social well-being of the community and surrounding region. Construction activities associated with the proposed improvements will mobilize existing labor forces and generate income and secondary effects in the local economy. Improvements to the existing water system will allow DOW to continue to provide a vital service that supports the social development and well-being of the community.

5) Substantially affects public health.

Existing State DOH regulations are intended to protect air and water quality in the state. The proposed improvements would not result in the uncontrolled and unsupervised use of hazardous materials or construction methodology that could detrimentally affect the area's public health and safety. Construction noise will be minimized through compliance with HAR Chapter 11-46, Community Noise Control. Air quality will be temporarily impacted by the emissions and dirt generated from construction activities, but will not have long term impacts. State DOH clean water requirements will also not allow water with contaminants to be used by the public.

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

One of the objectives of the proposed project is to improve the existing water system to accommodate anticipated growth in the area. To that effect, the proposed project is not intended to directly generate population changes or overburden public facilities.

7) Involves a substantial degradation of environmental quality.

The proposed tanks will occupy a large portion of the two lots, but will be mostly graded into the hillside to minimize visual impacts. At the Clearwell site some existing structures will be demolished to provide the space for the new tank, thus

- minimizing undisturbed areas on the property. The new well will be unmanned. As 1 a result, human activity at the site will be minimized to routine maintenance and 2 regular monitoring. 3
- 8) Is individually limited but cumulatively has considerable effect upon the 4 environment or involves a commitment for larger action. 5

The proposed action consists of all the components in the system improvements and 6 is not part of a multi-phased project. The proposed improvements represent the complete facility at each site, with no plans for future expansion. 8

- 9) Substantially affects a rare, threatened, or endangered species, or its habitat. 9
- The proposed action will not result in substantial negative effects on significant 10 fauna and flora species (rare, threatened, or endangered) in the area. 11
- 10) Detrimentally affects air or water quality or ambient noise levels. 12
 - The anticipated impacts associated with project construction, such as dust, noise, and possible erosion and sedimentation are short-term and temporary. These impacts would be minimized by the implementation of best management practices and mitigation measures in accordance with applicable statutes, laws, ordinances, and rules and regulations of the federal, state, and county governments. Long-term operation of the proposed improvements is anticipated to generate minor to no impacts on air quality, water quality or ambient noise levels. The unmanned facilities will require minimal human operations and minimal use of heavy machinery on site for repair and routine maintenance work.
- Affects or is likely to suffer damage by being located in an environmentally 22 11) sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, 23 geologically hazardous land, estuary, fresh water, or coastal waters. 24
 - The project area is located more than three miles from the shoreline. It is not susceptible to potential hazards of the coastal environment. Further, the project area is located outside of riverine flood zones and, if any erosion-prone areas are identified in the project area, erosion control measures will be incorporated into site design of the facilities.
- 12) Substantially affects scenic vistas and viewplanes identified in county or state 30 plans or studies. 31
 - The proposed improvements will not interfere with existing scenic vistas or view planes identified by Kaua'i County's long-range land use plans.
- 13) Requires substantial energy consumption. 34

The proposed improvements will require minimal electrical energy. Hence, no significant impacts will result on the area's power supply.

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- 14 Kailua, Hawai'i

APPENDIX A HYDROLOGIC ASSESSMENT

Hydrologic Assessment of a New Well for the Kauai Department of Water's Kalaheo System

Prepared for:

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

Prepared by:

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

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Introduction

This report presents a hydrologic assessment of a potential new well for the Kauai Department of Water's (DOW's) Kalaheo system. At present, this system is supplied by two side-by-side wells on TMK 2-4-4:49. The two wells, referred to as Kalaheo A and B (State Nos. 5631-01 and -02), both have nominal 1000 GPM line shaft turbine pumps with start/stop control by the water level in the adjacent 0.50 million gallon (MG), 886-foot elevation storage tank. With construction and outfitting of the proposed new well, DOW intends to develop a third source of supply of 1000 GPM capacity. Development of the new well will be undertaken in conjunction with other improvements to DOW's Kalaheo system, including a new 0.5 MG storage tank on the Yamada Tank site (TMK 2-4-3:7). It is assumed that this new tank will provide start/stop control for the new well pump.

Hydro-Geologic Circumstances and Groundwater Occurrence in the Kalaheo Area

Surficial geology in the upper Kalaheo area consists of the latter stage Koloa volcanics and outcrops of the older, shield building Napali formation of the Waimea volcanic series. Figure 1 identifies in green outline the areas of outcrops of the Waimea volcanics and alluvium which is a veneer over the Waimea as mapped in Bulletin 13 of the Hawaii Division of Hydrography (1960). Also shown on Figure 1 and compiled on Table 1 are the locations and pertinent data on the 16 wells that have been drilled in the area which provide information on groundwater occurrence. This information can be summarized as follows:

- The Koloa volcanics are moderate to poorly permeable and, in the Kalaheo area, are not suitable for the development of a high capacity well for DOW. As such, a new well for DOW which would draw from this formation is eliminated from further consideration.
- 11 of the 13 wells listed in Table 1 as drawing from the Waimea volcanics actually penetrated
 Koloa volcanics at the surface before reaching the water bearing Waimea volcanics at depth.
- Wells drawing from the Waimea volcanics have tapped into partially confined groundwater with piezometric heads in the range of 30 to 60 feet (msl) and yields in excess of 1000 GPM with modest drawdowns.
- The overlying and confining Koloa formation undoubtedly contributes to the high groundwater heads in the Waimea volcanics and also provides protection against seawater intrusion.
 Chlorides in the Waimea volcanics are typically 20 to 25 MG/L.
- Unlike other areas on Kauai such as Puhi-Lihue and the North Shore, the Waimea volcanics in Kalaheo are not at great depths which are impractical for well development. In areas where wells have been drilled, the overlying Koloa volcanics appear to be on the order of 300 to 600 feet thick.

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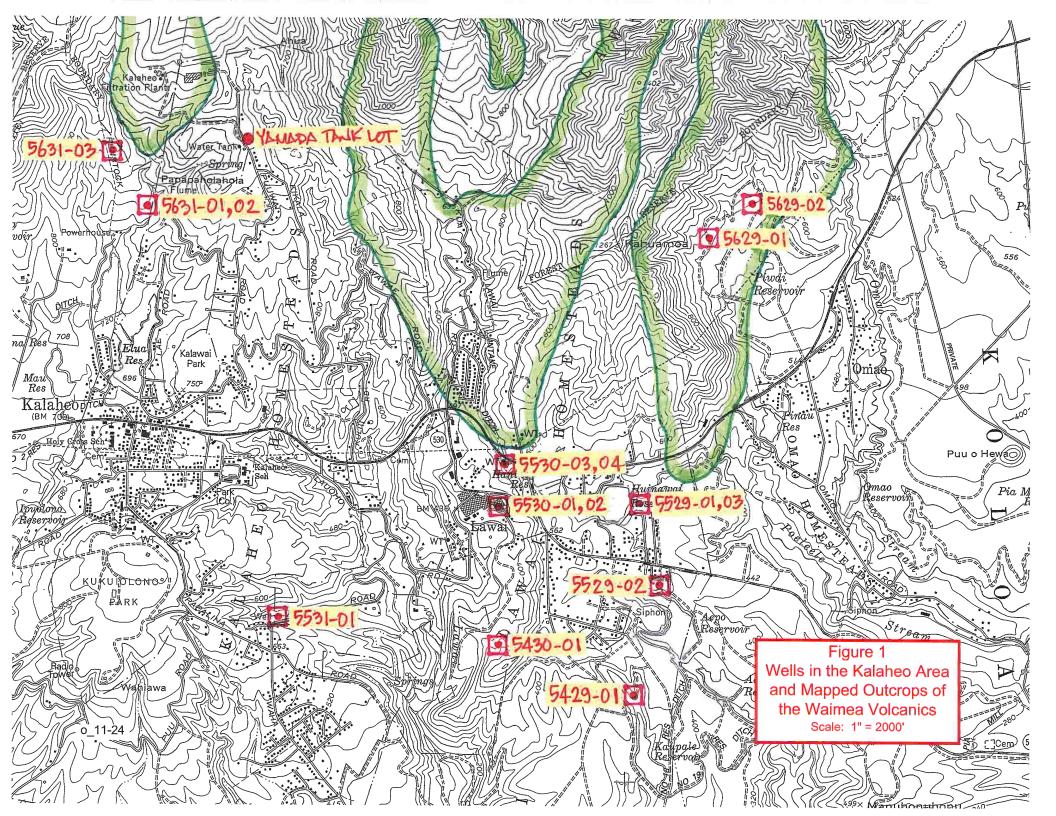


Table 1. Data on Wells in the Kalaheo Area*

	Well		Casing	Ground	Total	Elevation	Lengths	of Casing	Static Water		Hydraulic Performance	Installed
State Number	Owner / Name	Year Drilled	Diameter (Inches)	Elevation (Feet MSL)	Depth (Feet)	at Bottom (Feet MSL)	Solid (Feet)	Perforated (Feet)	Level (Feet MSL)	Chlorides (MG/L)	Drawdown @ Flowrate (Feet @ GPM)	Pump Capacity (GPM)
Wells Tap	 ping Waimea Volcanic	 s (Napali F	ormation)									
5429-01	McBryde TH-4	1950	1	372	600	-228		600 (?)	12			None
5529-01	McBryde TH-6	1950	1	511	530	-19	530		64			None
5529-03	McBryde Poeleele	1954	20	464	719	-255	492		59 / 29	24 to 27	Not Known	3500
5530-01	Lawai Cannery	1950	1	499	622	-123	350					None
5530-02	Lawai Cannery	1951	16	440	750	-310	309	168	124	24	0.6 @ 708	1540
5530-03	DOW Lawai 1	1962	12	594	695	-101	568	82	53	27	2.6 @ 580	425
5530-04	DOW Lawai 2	1986	14	662	810	-148	650	60	24	24	0.6 @ 1000	550
5629-01	DOW Piwai 2	2003	16	648	775	-127	595	120	48	20	4.3 @ 1240	1050
5629-02	DOW Piwai 3	2004	16	655	770	-115	595	120	50	21	4.7 @ 1210	1050
5630-01	McBryde TH-2	1950	1	626	625	+1	586	624	64 / 55			None
5631-01	DOW Kalaheo A	1974	14	887	1125	-238	830	65	40	21 to 25	0.8 @ 1000	1000
5631-02	DOW Kalaheo B	1985	14	892	1030	-138	860	60	41	25	1.5 to 1500	1000
5631-03	A&B Brydeswood	In Progress	14	1005	1245	-240	Not De	termined I	40	20	Not Tested Yet	None Yet
Wells Tap	ping the Koloa Volcani	ics										
5430-01	McBryde TH-3	1950	1	386	394	-8	?	?	366			None
5529-02	McBryde TH-5	1951	1	510	533	-23	489	42	11			None
5531-01	DOW Kalaheo	1963	8	630	952	-322	641	40	43	44 to 72	37 @150	None

 $^{^{\}star}$ Information as available from the files of the State Commission on Water Resource Management.

- The driller's log for DOW's Kalaheo Well A (No. 5631-01) suggests that the transition from the Koloa volcanics to the Waimea formation occurred at a depth of 345 feet or about 540 feet above sea level. Perhaps surprisingly, the change in formation was not marked by a soil or sapprolite interface.
- If the selected well site does not begin in the Waimea volcanics, the site must have a reasonable indication that the Waimea volcanics will be reached at a practical depth, defined herein as not more than 300 feet below sea level.

Recommended Well Site

Initially, the project concept was to put the new well on the 1.7-acre Nursery Tank lot (TMK 2-4-4:39) which is across Puuwai Road from the proposed new storage tank on the 0.7-acre Yamada Tank lot (TMK 2-4-3:7). However, the Nursery Tank lot is below the grade of Puuwai Road, slopes downhill precipitously, and most of the lot is covered with tall trees. It would be very expensive to develop a well on this lot. The recommendation herein is to put both the new well and the new tank on the Yamada Tank lot. A preliminary layout by Belt Collins Hawaii demonstrates that there is adequate room from both. Based on the Belt Collins layout, the finished grade at the site would be 1135 feet (MSL).

Well Design Alternatives

The well design is driven by hydro-geologic circumstances, DOW's preference in pump selection (submersible versus line shaft), and the dimensions of pump, motor, column pipe, and sounding tube necessary to provide the desired yield. The impact of these on the well's design is described in the bullet points below.

- Although the groundwater's piezometric head at the Yamada Tank lot is probably about 40 feet above sea level, the well's yield is likely to come from strata more than 100 feet below sea level. For the preliminary design and cost estimates herein, a total depth of 1375 feet (to 240 feet below sea level based on Kalaheo B and A&B's Brydeswood wells) is used.
- To pump 1000 GPM to a new tank adjacent to the well, a (nominal) 400 horsepower motor will be required. If a submersible pump and 4-pole motor is used, the motor will be 17 inches in diameter. Using the solid casing as a shroud for the motor, a 20-inch (OD), 19.25-inch (ID) casing would be the choice.
- For a line shaft turbine pump, column components will have greater size than the pump and will therefore dictate the casing size. Ten-inch column pipe would be used to keep the column friction loss to an acceptable level. Its couplings would be 11.75-inch OD. A 1½-inch, Schedule 80 PVC, flush joint-sounding tube would have an OD of 1.66 inches. To keep the column pipe in the

center of the casing and have an inch clearance for the sounding tube would require a minimum well casing inside diameter of 17.07 inches. An 18-inch OD casing (with 17.25-inch inside diameter) would suffice.

• For either pump choice, the solid casing would be extended to 40 feet below sea level and 100 feet of louvered casing would extend to 140 feet below sea level, leaving 100 feet of open borehole at the bottom. Grouting of the annulus would extend from just above the piezometric head to ground level which, for this well, is assumed to be 1085 feet.

For these casing sizes (20- and 18-inch OD) and depths, Tables 2 and 3 provide estimated construction and pump testing costs based on current pricing. The 20-inch cased well would be approximately six percent less expensive than the 18-inch. The pump choice, submersible versus line shaft, should be left to DOW's preference. A water-lubricated, enclosed tube line shaft pump was a recent choice by DOW to replace the pump in Kalaheo Well A, but the depth of setting would be almost 300 feet greater at the Yamada Tank site. Selecting the 20-inch casing would keep both pump choices open. If the 18-inch casing was selected for a line shaft pump and DOW wanted to switch to a submersible in the future, the 17-inch, 4-pole (1760 RPM) motor would not fit. A 12-inch, 2-pole (3500 RPM) motor would have to be used.

It should be noted that the well costs on Tables 2 and 3 do not include site preparation. If the well drilling is to take place before the Yamada Tank lot is graded for the new tank, approximately 3500 cubic yards of excavation and 1000 square yards of compacted gravel fill would be required to create a construction pad for drilling.

Table 2

Estimated Construction and Pump Testing Cost for a New 20" (OD) Well at the Yamada Tank Site

Item No.	Description	No. of Units	Unit	Unit Price	Amount
1	Mobilization		L.S.		\$ 50,000
2	Drill the 12-inch (min.) diameter pilot borehole	1,375	L.F.	\$ 230	316,250
3	Video log the entire length of the pilot borehole	1	Ea.	\$ 3,500	3,500
4	Optional open hole pump test for up to 8 hours	1	Ea.	<u>\$15,000</u>	15,000
5	Ream the pilot borehole to 26-inch (min.) diameter	1,375	L.F.	\$ 350	481,250
6	Drill a 13-inch borehole below the bottom of the cased well, if desired	20	L.F.	\$ 200	4,000
7	Furnish and install 20-inch (OD), 3/8-inch wall thickness solid casing conforming to ASTM A-53	1,175	L.F.	<u>\$ 160</u>	188,000
8	Furnish and install 20-inch (OD), 5/16-inch wall thickness louvered casing conforming to ASTM A-53 and providing at least 100 square inches per foot of open area	100	L.F.	\$ <u>225</u>	22,500
9	Furnish and install grout in the annular space	1,085	L.F.	\$ 65	70,525
10	Plumbness and alignments tests		L.S.		3,000
11	Furnish, install, and subsequently remove the pump test equipment (1250 GPM line shaft pump)		L.S.		50,000
12	Furnish, install, and subsequently remove pump test equipment after the initial test, if required	1	Ea.	\$10,000	10,000
13	Chlorinate the well		L.S.		2,000
14	Development and test pumping	108	Hrs.	\$ 400	43,200
15	Demobilization		L.S.		25,000
	\$1,284,225				

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Table 3

Estimated Construction and Pump Testing Cost for a New 18" (ID) Well at the Yamada Tank Site

Item No.	Description	No. of Units	Unit	Unit Price	Amount	
1	Mobilization		L.S.		\$ 50,000	
2	Drill the 12-inch (min.) diameter pilot borehole	1,375	L.F.	<u>\$ 230</u>	316,250	
3	Video log the entire length of the pilot borehole	1	Ea.	\$ 3,500	3,500	
4	Optional open hole pump test for up to 8 hours	1	Ea.	\$ 15,000	15,000	
5	Ream the pilot borehole to 24-inch (min.) diameter	1,375	L.F.	\$ 320	440,000	
6	Drill a 13-inch borehole below the bottom of the cased well, if desired	20	L.F.	\$ 200	4,000	
7	Furnish and install 18-inch (ID), 3/8-inch wall thickness solid casing conforming to ASTM A-53	1,175	L.F.	<u>\$ 140</u>	164,500	
8	Furnish and install 18-inch (ID), 5/16-inch wall thickness louvered casing conforming to ASTM A-53 and providing at least 75 square inches per foot of open area	100	L.F.	<u>\$ 200</u>	20,000	
9	Furnish and install grout in the annular space	1,085	L.F.	\$ 60	65,100	
10	Plumbness and alignments tests		L.S.		3,000	
11	Furnish, install, and subsequently remove the pump test equipment (1250 GPM line shaft pump)		L.S.		50,000	
12	Furnish, install, and subsequently remove pump test equipment after the initial test, if required	1	Ea.	<u>\$ 10,000</u>	10,000	
13	Chlorinate the well		L.S.		2,000	
14	Development and test pumping	108	Hrs.	\$ 400	43,200	
15	Demobilization		L.S.		25,000	
	Total for Construction and Pump Testing					

APPENDIX B BOTANICAL SURVEY

BOTANICAL SURVEY OF THE KAUA'I DEPARTMENT OF WATER PROPOSED CONSTRUCTION SITES AT KALAHEO

by

Art Whistler, Ph.D. Isle Botanica Honolulu, Hawaii

Report prepared for

Belt Collins Hawaii Ltd.

May 2011

INTRODUCTION

The County Department of Water (DOW) is proposing to upgrade its water system in upland Kalaheo with replacement waterlines, storage tanks, and possibly a well. To do so, a botanical survey is needed to determine what effect, if any, the proposed construction will have on native plants and vegetation. The study area lies about 2 miles north of Kalaheo near the north end of Pu'ulima Road, and comprises three parcels and some of the roads connecting them together (see Fig. 1). The largest site, called the "Clearwell Parcel" comprises approximately 4 acres of land situated in a clearing in a plantation forest. It is accessed by means of a short unpaved road that leads to it from an unnamed, unpaved road leading off from the north end of Pu'ulima Road.

The second site, called the "Yamada Tank Parcel," is situated about a half mile southeast of the Clearwell Parcel, and comprises approximately 0.7 acres presently occupied by an abandoned house and its associated overgrown vegetation. The third site, called the "Nursery Parcel," is located directly across Pu'uwai Road from the Yamada Tank Parcel. It comprises approximately 1.94 acres and is presently occupied by an abandoned nursery surrounded by a chain-link fence. The roads to be surveyed comprise the unpaved one leading up to Clearwell Parcel, and the paved road leading south from the other two parcels and eventually ending up in front of the gate of a water tank ("908 Tank" in Fig. 1). These roads are shown in blue in Fig. 1. All three sites and the sides of the connecting roads are heavily disturbed, and native vegetation is nowhere to be found in the area.

Previous Studies

Very few studies have been carried out in the area, and only one was located in the library of the Office of Environmental Quality Control, that one for the "Yamada Tank Parcel that was part of its acquisition for the current proposed project. That report (Belt Collins Hawai'i 2010) noted in its brief flora section that "Mature vegetation occupies approximately 65 percent of the property. Introduced species as well as invasive plants are predominant. The notable varieties include bamboo, strawberry guava, Christmas berry, eucalyptus, koa haole, sword fern, pothos, and wedelia. None of these species are rare, threatened, or endangered."

The current status of any endangered species previously reported from the surrounding area was checked using the official database of Threatened and Endangered Plant Species (USFWS 2005). This list is identical to the State of Hawai'i list of Threatened and Endangered species. In addition, the Hawai'i Natural Heritage Program database (Anon. 2005) of federally listed plant species was checked for any possible Threatened and Endangered Plant Species found in the area, but none were found.

METHODOLOGY

After the literature review, a botanical field survey was conducted on the three parcels and the designated roads between them by principal investigator (Art Whistler) on 21 May 2011. A "walk-through survey" was employed, and all plant species encountered were recorded, along with an indication of their frequency. Particular care was taken in looking for any federally listed Threatened or Endangered Plant species. However, their presence on the site would be highly unlikely due to the extensive disturbance, both past and present, that has occurred in the

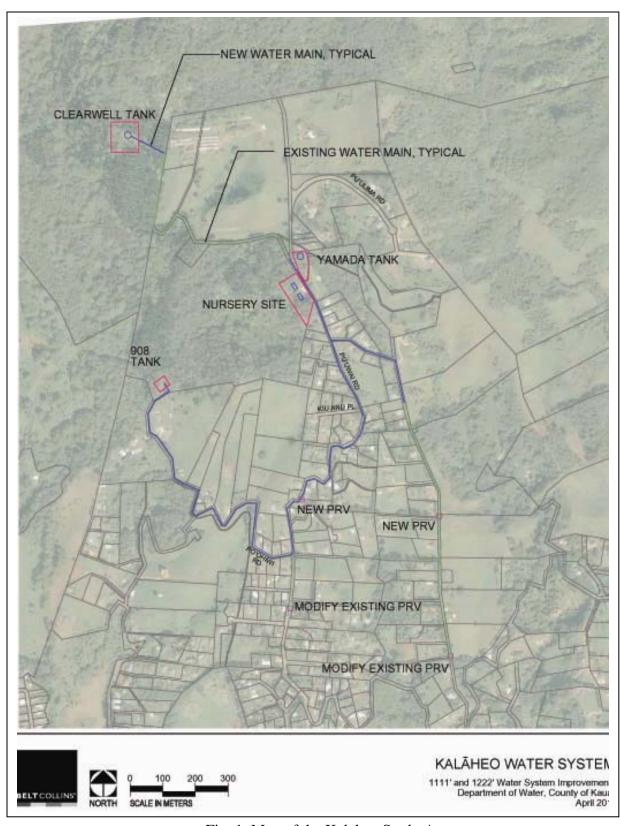


Fig. 1. Map of the Kalaheo Study Area

study area. All of the species encountered during the fieldwork were familiar to the Principal Investigator and were identified in the field. The species encountered on the three parcels were incorporated into a checklist of all plants found at the study site (see Table 1). Notes were taken on vegetation types present on the three parcels, indicating the dominance and frequency of the plant species found there. These notes were written up into the vegetation description below.

After the parcels were studied, the Principal Investigator walked the roads designated in blue in Fig. 1. These roadsides were so disturbed and dominated by hedges, lawns, and other disturbed vegetation that no species lists were made because most of plants found there were ornamentals and lawn grasses. Afterwards a general description of the vegetation types present at the site was written, which included a checklist of all species found during the study.

RESULTS Flora

One hundred eight plant species were recorded in the study area (see Table 1). Only two of these are native, the indigenous fern ally called moa (*Psilotum nudum*) and the grass kukae pua'a (*Digitaria setigera*); no endemic species were found. Endemic plants are species restricted to a single region or area, i.e., in the case of Hawai'i, they are found only in Hawai'i. Indigenous species, however, can be rare in Hawai'i, but may be common elsewhere in the Pacific. Over 90% of the native plants in Hawai'i are endemic, one of the highest rates in the world. In biodiversity terms, the endemic status is the more important of the two categories, since if an endemic species is endangered or threatened in Hawai'i, it would likewise be classified globally. The indigenous species are listed with an "I" in the table.

Four of the 108 species are Polynesian introductions (listed as "P" in Table 1): 'ihi (*Oxalis corniculata*), banana (*Musa Xparadisiaca*), ki (*Cordyline fruticosa*), and popolo (*Solanum americanum*). All are common in Hawai'i. The majority of the 108 species encountered during the surveys are naturalized or weedy "alien" (listed as "XN" in Table 1) plants that were accidentally or intentionally introduced to Hawai'i, but which have now become established in the islands and can spread on their own. The remaining plants are alien species that are restricted to cultivation, i.e., they do not reproduce and spread by themselves. These are mostly ornamentals, and are listed in Table 1 as "XC."

Vegetation

Three types of vegetation can be recognized at the study site: (1) Managed Land Vegetation; (2) Plantation Forest; and (3) Artificial Marsh. All of these are classified as disturbed vegetation, and only two native species was encountered in them. The three types of vegetation are described below.

(1) Managed Land Vegetation

This comprises the vegetation, sometimes referred to as "Ruderal Vegetation," on areas that are under periodic or frequent management, such as roadsides, lawns, and gardens. The Clearwell Parcel comprised a large of area of this vegetation that surrounds the used and abandoned structures present on the site (Fig. 2). It is dominated by a number of alien weedy species such as ageratum (*Ageratum conyzoides*), goosegrass (*Eleusine indica*), wedelia (*Wedelia*

trilobata), and narrow-leafed plantain (*Plantago lanceolata*), as well as lesser amounts of other weedy species. On the edges of the dirt road that runs around much of the perimeter are large patches of the formerly cultivated ornamental plants that have maintained themselves. This includes white ginger (*Hedychium coronarium*), Chinese taro (*Alocasia cucullata*), tannia (*Xanthosoma sagittifolium*), red spiral ginger (*Costus woodsonii*), bougainvillea (*Bougainvillea glabra*), and many other species. In some places the ground is covered with dense patches of wedelia. These ornamentals appear to have been planted for landscaping, and have persisted up until now. No native species were found in this vegetation.

The whole Nursery Parcel is covered with Managed Land Vegetation (Fig. 3). It is dominated by weeds such as beggar's tick (*Bidens pilosa*), wedelia, *Galinsoga parviflora* (no common name), sigesbeckia (*Sigesbeckia orientalis*), ageratum, and buttonweed (*Spermacoce assurgens*), as well as lesser amounts of many other species. The area appears to be maintained by periodic weed-whacking, which prevents them from getting too tall and dense.

The open areas of the Yamada Tank Parcel are covered with Managed Land Vegetation (Fig. 4). This is in the form of lawns dominated by the large crabgrass (*Digitaria ciliaris*), and plantings of hedges and ornamental or fruit trees such as mango and avocado. In some places, there is a dense ground cover of wedelia, particularly along the edge of the forest that covers the west side of the parcel. A large clump of bamboo (*Bambusa vulgaris*) is found on the site, the leaves of which often cover the ground, preventing most herbaceous species from growing there. In areas that are not mown, weeds such as hairy swordfern (*Nephrolepis multiflora*), honohono (*Commelina diffusa*), and Guinea grass (*Panicum maximum*) are sometimes dominant.

Nearly all of the roadsides between the sites are dominated by Managed Land Vegetation dominated by weedy species in open areas and ornamentals and lawn grasses in residential areas. The one exception to this is the road leading to the Clearwell Parcel. It goes through a forest dominated by swamp mahogany (*Eucalyptus robusta*), the canopy of which produces a dense shade that allows little light for herbaceous species to grow, and hence these roadsides are mostly devoid of vegetation (Fig. 5).

(2) Plantation Forest

This is forest that is dominated by trees that have been replanted in a revegetation scheme. It is best represented at the Clearwell Parcel, where it surrounds the clearing in which the buildings and tanks are located (Fig. 6). It is dominated by two species, Norfolk Island pine (*Araucaria heterophylla*) and albizia (*Albizzia chinensis*). In clearings and on the edges of the forest, the smaller moho (*Heliocarpus popayanensis*) is sometimes common, but this light-loving tree is unable to grow in the dense shade of the forest. Very little else grows in the dense shade, and the forest floor is sometimes dominated by seedlings of the Norfolk Island pine. This forest, consequently, has a very low biodiversity, and no native species were found here.

There is a patch of forest on the western portion of the Yamada Tank Parcel. It is dominated by swamp mahogany (*Eucalyptus robusta*), with an understory of smaller strawberry guava (*Psidium cattleanum*), guava (*Psidium guava*), and Christmas berry (*Schinus terebinthifolius*). The shady areas of this forest were largely devoid of ground cover, but large patches of wedelia (*Wedelia trilobata*) are found along the margins. No native species were found here.

(3) Artificial Marsh

This type of vegetation is dominated herbaceous plants that are adapted to constantly wet soil. It was found in only one location in the study area, next to the tank at the Clearwell Parcel (Fig. 7). It seems to be growing in a filled-in tank or water retaining area, and thus cannot be classified as a wetland that would need protecting. It is also very small in extent. The dominant species are watercress (*Nasturtium officinale*), *Pycreus polystachyos* (no common name), and wedelia (*Wedelia trilobata*), and lesser amounts of several other wetland-loving species, none of which are native.

DISCUSSION AND CONCLUSIONS

One hundred eight vascular plant species were recorded at the study site, two of them indigenous and none endemic. Both indigenous species are common in Hawai'i and elsewhere in the Pacific, and neither is classified as Threatened or Endangered by the U.S. Fish and Wildlife Service (2005). No threatened or endangered plant species have ever been recorded in the area, according to the Natural Heritage Program database (Anon. 2005) of Federally Listed plant species. Because of the extensive and pervasive nature of the disturbance to the study area, it is unlikely that any Threatened or Endangered Plant Species would be found there in the future. No undisturbed native vegetation or other sensitive types of vegetation occur in the study area. Because there are no endemic species, native vegetation, or wetlands present in the study area, there are no botanical impediments to carrying out the proposed construction.

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TABLE 1. PLANT SPECIES CHECKLIST

The following is a checklist of the vascular plants inventoried during the field study on the three parcels of the Kalaheo Water System sites. The plants are divided into four groups, Ferns (including fern allies), Gymnosperms, Monocots, and Dicots. Within these groups, the species are presented taxonomically by family, with each family and each species in the family in alphabetical order. The taxonomy and nomenclature of the ferns follow Palmer 2003 and the flowering plants (Monocots and Dicots) follow Wagner *et al.* (1999). In most cases, common English and/or Hawaiian names listed here have been taken from St. John (1973) or Porter (1972).

For each species, the following information is provided:

- 1. Scientific name with author citation.
- 2. Common English and/or Hawaiian name, when known.
- 3. Biogeographic status. The following symbols are used.
 - E = endemic (found only in Hawai'i).
 - I = indigenous (native to Hawai'i as well as other geographic areas).
 - P = Polynesian introduction (introduced to Hawai'i by Polynesians before the advent of the Europeans).
 - X = Introduced or alien (not native, introduced to Hawai'i, either accidentally or intentionally, after the advent of the Europeans).
- 4. Relative frequency (abundant, locally abundant, common, locally common, occasional, uncommon, rare).

Species	Common Names	Status ¹	Dis	stribu	ition ²
FERNS A	AND FERN ALLIES				
NEPHROLEPIDACEAE (Sword Fern	Family)				
Nephrolepis multiflora (Roxb.)	hairy swordfern	XN	1		3
POLYPODIACEAE (Common Fern F	Camily)				
Phlebodium aureum (L.) J. Sm.	laua'e-haole	XN	1		3
PSILOTACEAE (Psilotum Family)					
Psilotum nudum L.	moa	I			3
THELYPTERIDACEAE (Downy Wo	odfern Family)				
Christella parasitica (L.) Leville	oak fern	XN	1	2	
GY	MNOSPERMS				
ARAUCARIACEAE (Araucaria Fami	ly)				
Araucaria heterophylla (Salisb.) Franco	• /	XC	1		

Species	Common Names	Status ¹	Di	strib	ution ²
M	ONOCOTS				
AGAVACEAE (Agave Family)					
Cordyline fruticosa (L.) A. Chev.	ti, ki	P	1	2	
Dracaena fragrans (L.) Ker Gawler	fragrant dracaena	XC		1	
AGAVACEAE (cont'd.)					
Dracaena marginata Lam.	red-edged dracaena	XC			3
Sansevieria fasciata	bowstring hemp	XC	1		
Cornu ex Gérome & Labroy					
AMARYLLIDACEAE (Amaryllis Fan	nily)				
Hemerocallis fulva (L.) L.	orange day-lily	XC			3
ARACEAE (Arum Family)					
Alocasia cucullata (Lour.) G. Don	Chinese taro	XC	1		
Epipremnum pinnatum (L.) Engl.	pothos	XC	1		3
Philodendron lacerum (Jacq.) Schott		XC	1		
Philodendron scandens (Schott) Bunting	heart-leafed philoder	ndron X0	7	1	
Xanthosoma sagittifolium (L.) Schott	tannia	XC	1		
COMMELINACEAE (Spiderwort Fam			_		
Commelina diffusa N. L. Burm.	honohono	XN			3
CYPERACEAE (Sedge Family)	попопопо	111			J
Pycreus polystachyos (Rottb.) P. Beauv.		XN	1	2	
Torulinium odoratum (L.) S. Hooper		XN		2	
MUSACEAE (Banana Family)		2111		_	
Musa xparadisiaca L.	banana	P			3
POACEAE (Grass Family)	oununu	•			J
Bambusa vulgaris Schrader ex Wendl.	bamboo	XC			3
Brachiaria mutica (Forssk.) Stapf	California grass	XN			3
Chloris radiata (L.) Sw.	radiate fingergrass	XN	1	2	
Digitaria cf. ciliaris (Retz.) Koeler	large crabgrass	XN			3
Digitaria setigera Roth	kukaepua'a	I		2	<i>3</i>
Digitaria violascens Link?	violet crabgrass	XN		2	
Eleusine indica (L.) Gaertn.		XN	1	2	
Leptochloa uninervia	goose grass	AIN	1	_	
-		XN	1		3
(K. Presl) Hitchc. & Chase		XN	1		
Oplismenus compositus (L.) P. Beauv.	Cuinas anass		1	2	2
Panicum maximum Jacq.	Guinea grass	XN	1	2	3
Paspalum conjugatum Bergius	t-grass	XN	1	2	
Paspalum fimbriatum Kunth	fimbriate paspalum	XN	1	2	
Paspalum dilatatum Poir.?	dallis grass	XN	1		
Pennisetum purpureum Schumach.	elephant grass	XN	1		3
Sacciolepis indica (L.) Chase	Glenwood grass	XN		2	
Setaria palmifolia (J. Koenig) Stapf	palm grass	XN	1		
Sporobolus diander (Retz.) P. Beauv.	dropseed	XN			3

Species	Common Names	Status ¹	Dis	strib	ution ²
ORCHIDACEAE (Orchid Family) Phaius tankervilleae (Banks ex L'Her.) Bl.	Chinese ground orchid	XN			3
ZINGIBERACEAE (Ginger Family) Costus woodsonii Maas	red spiral ginger	XC	1		
Hedychium cornorarium Koenig	white ginger	XC	1		
	DICOTS				
ACANTHACEAE (Acanthus Family)					
Pseuderanthemum reticulatum	el dorado	XC	1		
(W. Bull) Radlk.					
Acanthaceae sp. indet.		XC	1		
ANACARDIACEAE (Mango Family)					
Mangifera indica L.	mango	XC			3
Schinus terebinthifolius Raddi	Christmas berry	XN	1		3
APIACEAE (Carrot Family)					
Centella asiatica (L.) Urb.	Asiatic pennywort	XN	1		
APOCYNACEAE (Periwinkle Family)					_
Allamanda cathartica L.	allamanda	XC			3
ARALIACEAE		373.1	1		2
Schefflera actinophylla (Endl.) Harms ASTERACEAE (Sunflower Family)	octopus tree	XN	1		3
Ageratum conyzoides L.	ageratum	XN	1	2	
Bidens pilosa L.	beggar's-tick	XN	1	2	
Crassocephalum crepidioides					
(Benth.) S. Moore	crassocephalum	XN	1	2	
Elephantopus mollis Kunth	elephant's-foot	XN	1		
Emilia fosbergii Nicolson	red pualele, emilia	XN		2	
Galinsoga parviflora Cav.		XN	1	2	
Sigesbeckia orientalis L.	sigesbeckia	XN	1	2	
Sonchus oleraceus L.	sow thistle	XN	1		
Synedrella nodiflora (L.) Gaertn.	synedrella	XN	1		
Wedelia trilobata (L.) Hitchc.	wedelia	XN	1	2	3
Youngia japonica (L.) DC.	Oriental hawksbeard	XN	1	2	
BRASSICACEAE (Mustard Family)					
Nasturtium officinale W.T. Aiton CUSCUTACEAE (Dodder Family)	watercress	XC	1		
Cuscuta campestris Yuncker EUPHORBIACEAE (Spurge Family)	dotter	XN			3
Breynia nivosa (W. Bull) Small	snowbush	XC	1		3
Chamaesyce hirta (L.) Millsp.	garden spurge	XN	1	2	<i></i>
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	XN	1	2	
Chamaesyce hypericijona (L.) Milisp.	gracerur spurge	/ X 1 V	1	_	

Species	Common Names		Dis	stribu	ution ²
EUPHORBIACEAE (cont'd.)					
Chamaesyce hyssopifolia (L.) Small		XN		2	
Phyllanthus debilis Klein ex Willd.	phyllanthus weed	XN		2	
Phyllanthus tenellus Roxb.		XN	1		
Ricinus communis L.	castor bean	XN	1		
FABACEAE (Pea Family)					
Acacia confusa Merr.	Formosan koa	XC			3
Albizia chinensis (Osbeck) Merr.	albizzia	XN	1		
Chamaecrista nictitans (L.) Moench	partridge pea, lau-ki	XN	1	2	
Crotalaria incana L.	fuzzy rattlepod	XN	1		
Desmanthus pernambucanus (L.) Thellung	virgate mimosa	XN	1		
Desmodium incanum DC.	Spanish clover	XN			3
Indigofera suffruticosa Mill.	indigo, 'iniko	XN	1		
Leucaena leucocephala (Lam.) de Wit	koa haole	XN	1	2	3
Mimosa pudica L.	sensitive plant	XN	1		3
Trifolium repens L.	white clover	XN			3
LAURACEAE (Laurel Family)					
Persea americana Mill.	avocado	XC			3
LYTHRACEAE (Loosestrife Family)					
Cuphea carthagenensis (Jacq.) Macbr.	tarweed	XN	1	2	
MALVACEAE (Mallow Family)					
Malvastrum coromandelianum (L.) Garcke	false mallow	XN	1		3
Malvaviscus penduliflorus A.P. de Candolle	Turk's cap	XC	1		
Sida rhombifolia L.	Cuba jute	XN	1		3
MORACEAE (Mulberry Family)	U				
Ficus microcarpa L. f.	Chinese banyan	XN	1		3
MYRSINACEAE (Myrsine Family)	•				
Ardisia elliptica Thunb.	shoebutton ardisia	XN	1		3
MYRTACEAE (Myrtle Family)					
Eucalyptus robusta Sm.	swamp mahogany	XC			3
Pimentia dioeca (L.) Merr.	allspice	XI	1	1	
Psidium cattleianum Sabine	strawberry guava	XN	1		3
Psidium guajava L.	guava	XN			3
NYCTAGINACEAE (Four-o'clock Fai	mily)				
Bougainvillea glabra Choisey	bougainvillea	XC	1		
ONAGRACEAE (Evening Primrose Fa	mily)				
Ludwigia octovalvis (Jacq.) Raven	primrose willow	XN		2	
OXALIDACEAE (Wood-Sorrel Family	<i>y</i>)				
Oxalis corniculata L.	wood sorrel	P	1	2	
Oxalis debilis Kunth	pink wood-sorrel	XN	1		
PASSIFLORACEAE (Passionflower Fa	_				
Passiflora edulis Sims	passionfruit, lilikoʻi	XN	1		

Species	Common Names	Status ¹	Dis	stribu	ution ²
PLANTAGINACEAE (Plantain Family	y)				
Plantago lanceolata L.	narrow-leafed plantain	XN	1	2	
Plantago major L.	broad-leafed plantain	XN			3
POLYGALACEAE (Milkwort Family)					
Polygala paniculata L.	bubblegum plant	XN	1		
PRIMULACEAE (Primrose Family)					
Anagallis arvensis L.	scarlet pimpernel	XN	1		
ROSACEAE (Rose Family)					
Rubus rosifolius Sm.	thimbleberry	XN	1		
RUBIACEAE (Coffee Family)	·				
Coffea arabica L.	coffee	XN	1		
Paederia scandens (Lour.) Merr.	maile pilau	XN			3
Spermacoce assurgens Ruiz & Pav.	buttonweed	XN	1	2	
SAPOTACEAE (Sapodilla Family)					
Chrysophyllum oliviforme L.	satinleaf	XN			3
SCROPHULARIACEAE (Snapdragon	Family)				
Castilleja arvensis Cham. & Schlechtend.	Indian paintbrush	XN			3
SOLANACEAE (Nightshade Family)	•				
Physalis peruviana L.	poha	XN	1		
Solanum americanum Mill.	black nightshade, popolo) P	1		
TILIACEAE (Linden Family)					
Heliocarpus popayanensis Kunth	moho	XN	1		
Triumfetta semitrilobata Kunth	burbush	XN	1	2	
URTICACEAE (Nettle Family)					
Pilea microphylla (L.) Liebm.	rockweed	XN	1	2	
VERBENACEAE (Verbena Family)					
Stachytarpheta cayennensis (Rich.) Vahl	blue rat's-tail	XN	1		

 $^{^{1}}XC$ = alien cultivar; XN = alien naturalized (weed); I = indigenous; and P = Polynesian introduction
²1 = Clear Well Site; 2 = Nursery; and 3 = Yamada property.



Fig. 2. Managed land at the Clearwell Parcel.



Fig. 3. Managed Land at the Nursery Parcel.



Fig. 4. Managed Land at the Yamada Tank Parcel.



Fig. 5. Plantation Forest along the road to the Clearwell Parcel.



Fig. 6. Plantation Forest at the Clearwell Parcel.



Fig. 7. Artificial Marsh at the Clearwell Parcel.

APPENDIX C AVIFAUNAL AND MAMMAL SURVEY

AVIFAUNAL AND FERAL MAMMAL SURVEY FOR JOB No K-01, K-12 (NORTH) KALAHEO 1111' AND 1222' WATER SYSTEM IMPROVEMENTS KAUA'I DEPARTMENT OF WATER KALAHEO WATER SYSTEM KALAHEO, KAUA'I, HAWAI'I

Report prepared for:

Belt Collins Hawaii Ltd.

Survey and Report by:

Phillip L. Bruner
Environmental Consultant
Faunal (bird & mammal) Surveys
#1775 BYUH
55-220 Kulanui Street
Laie, HI 96762

18 July 2011

INTRODUCTION

The purposes of this report is to provide the findings of a two day (14, 15 July 2011) field survey of property proposed for the County of Kauai Department of Water Project at Kalaheo, Kauai. In addition to the data obtained from the field survey, relevant published sources are also noted in the report. These resources add insights regarding the wildlife that might be expected in this region of the island. The goals of the survey were:

- 1- Document the species of birds and mammals observed on or near the proposed project.
- 2- Devote special attention to documenting the presence and/or possible use of this area by native and migratory species particularly those that are listed as threatened or endangered.

SITE DESCRIPTION

The property involved in or near this proposed project includes: roads, second growth alien forest, open pasture, grass/weed covered lands and some existing buildings and man-made structures. Residential property occurs along portions of the roads associated with the project.

SURVEY PROTOCOL

The field survey was conducted over two consecutive days (14, 15 July 2011).

Data were collected in the early morning and late in the day when birds and mammals are most active and more easily detected. Visual and auditory observations form the basis of the data. The entire property involved in this proposed project was examined along with adjoining lands. The broader coverage included in this faunal survey permitted a more complete inventory of the potential birds and mammals that could occur in the project area. Observations of mammals were primarily limited to visual sightings and tracks.

The evening of 14 July 2011 was devoted to a search for the presence of the endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*). A Petterson electronic AB Ultrasound Detector D 100 was used to listen for echolocating bats at several sites throughout the property and along the roads.

Weather during the survey was generally clear with some light passing showers in the early morning and evening. Winds were moderate 10-15 mph. Scientific and common vernacular names used in this report follow Honacki et al. (1982) and Pyle (2001).

RESULTS AND DISCUSSION

Native Land Birds:

No native land birds were observed on the survey. The only species that might occur in this area is the Hawaiian Short -eared Owl or Pueo (Asio flammeus sandwichensis) (Pratt et al. 1987, Hawaii Audubon Society 2005). The Pueo is listed by the State of Hawaii as endangered on Oahu but not on Kauai. They forage over an array of habitats including: forests, grasslands, agricultural fields. They nest on the ground in high, dense grass (Hawaii Audubon Society 2005).

Native Waterbirds:

No native waterbirds were observed nor were any expected in this area of the proposed project. Reservoirs and other water features in the greater Kalaheo area provide habitat for native waterbirds.

Migratory Shorebirds:

At this time of year migratory shorebirds are on their breeding grounds in the arctic and subarctic. They winter in Hawaii between August and April. The only species that would potentially occur in the area would the Pacific Golden-Plover or Kolea (*Pluvialis fulva*). Kolea forage for insects on lawns and other open habitats in Hawaii. They can also be seen in agricultural fields and pastures (Pratt et al. 1987, Hawaii Audubon Society 2005). They are not a threatened or endangered species. No other migratory shorebirds would be expected.

Seabirds:

No seabirds would be expected in the area of this proposed project.

Alien (Introduced) Birds:

The property covered by this faunal survey contained the usual array of introduced birds typical of similar habitats elsewhere on Kauai (Pratt et al. 1987, Hawaii Audubon Society 2005). Table One notes the species recorded on this survey. None of these are listed as endangered or threatened.

Mammals:

The only feral mammals recorded on the survey were Rats (*Rattus spp.*), Mice (*Mus muscullus*), feral cats (*Felis catus*) and Pig (*Sus scrofa*). No endangered Hawaiian Hoary Bats were detected by the ultrasound device during an evening search of the area conducted on 14 July 2011. The Hawaiian Hoary Bat roosts solitarily in trees. They forage for flying insects in a wide variety of habitats including forests, agricultural lands, urban areas, as well as over bays and ponds (Tomich 1986, Kepler and Scott 1990, Jacobs 1991, 1993, Reynolds et al. 1998, and Bonaccorso 2008 pers. comm.) They are most abundant on Kauai and the Big Island (Tomich 1986). Although they were not recorded on this survey it does not mean they can't on occasion occur in this area.

EXECUTIVE SUMMARY AND RECOMMENDATIONS

This survey found the typical assemblage of non-native (alien) birds and mammals on and near the proposed project lands. No endangered or threatened avian species were observed nor expected given the elevation and disturbed habitats in this area. I know of no published Hawaiian Hoary Bat sightings for the immediate area involved in this project. However, because they forage over a wide variety of habitats it is possible they could on occasion occur at this location. Bonaccorso (2008 pers. comm.) has conducted extensive research on the Hawaiian Hoary Bat on the island of Hawaii. He recommends that trees in a project area not be cut or disturbed between the months of April and August if there is any current evidence bats occur in the area. At this time of year young flightless bats are left in the tree while their mother forages.

TABLE ONE

Alien (Introduced Birds) found on a 14,15 July 2011 field survey of property and nearby lands involved in the proposed County of Kauai Department of Water Project at Kalaheo, Kauai.

Common Name	Scientific Name	
Red Jungle Fowl	Gallus gallus	
Spotted Dove	Streptopelia chinensis	
Zebra Dove	Geopelia striata	
White-rumped Shama	Copsychus malabaricus	
Hwamei	Garrulax canorus	
Japanese White-eye	Zosterops japonicus	
Common Myna	Acridotheres tristis	
Northern Cardinal	Cardinalis cardinalis	
House Finch	Carpodacus mexicanus	
Nutmeg Mannikin	Lonchura punctulata	

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APPENDIX D ARCHAEOLOGICAL SURVEY

DRAFT

Archaeological Literature Review and Field Inspection for the Kaua'i County Kalaheo Water System Improvements Project, Kalāheo and Wahiawa Ahupua'a, Kōloa District, Island of Kaua'i

TMK [4] 2-4-004:038 por., 2-4-004:999 por., 2-4-009:003

Prepared for Belt Collins Hawaii, Ltd.

Prepared by
Kulani Jones, B.A.
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai'i, Inc. Kailua, Hawai'i (Job Code: KALAHEO 2)

December 2011

Oʻahu Office P.O. Box 1114 Kailua, Hawaiʻi 96734

Ph.: (808) 262-9972 Fax: (808) 262-4950 www.culturalsurveys.com

Maui Office 1860 Main St. Wailuku, Hawai'i 96793 Ph: (808) 242-9882

Fax: (808) 244-1994

Management Summary

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Report Reference	Draft Archaeological Literature Review and Field Inspection for the		
	Kaua'i County Kalaheo Water System Improvements Project, Kalāheo		
	and Wahiawa Ahupua'a, Kōloa District, Island of Kaua'i (TMK [4] 2-		
	4-004:038 por., 2-4-004:999 por., 2-4-009:003) (Jones and Hammatt		
D (2011)		
Date	December 2011		
Project Number	Cultural Surveys Hawai'i (CSH) Job Code: KALAHEO 2		
Investigation	The fieldwork component of the archaeological assessment was		
Permit Number	carried out under archaeological permit number 11-17 issued by the		
	Hawai'i State Historic Preservation Division/Department of Land and		
	Natural Resources (SHPD/DLNR), per Hawai'i Administrative Rules		
	(HAR) Chapter 13-282.		
Project Location	The project area is located in Kalāheo and Wahiawa Ahupua'a (TMK		
	[4] 2-4-004:038 por., 2-4-004:999 por., 2-4-009:003). The project area		
	consists of two parcels, the approximately 4.0-acre Clearwell Site and		
	the approximately 1.1-acre Papapaholahola Tank Site; in addition to a		
	right-of-way corridor connecting the two parcels primarily along		
	Pu'uwai Road. The project area is depicted on the 1998 U.S.		
	Geological Survey 7.5 Minute Series Kōloa Quadrangle map (see		
	Figure 1).		
Land Jurisdiction	County of Kaua'i		
Agencies	Hawai'i State Historic Preservation Division / Department of Land and		
	Natural Resources (SHPD/DLNR); Kaua'i County Department of		
	Water (DOW) The project consists of vector system improvements to the Vector.		
Project Description	The project consists of water system improvements to the Kaua'i		
D • • • •	County Kalaheo Water System.		
Project Area	12 acres		
Acreage			
Area of Potential	The area of potential effect (APE) includes the corridor of existing		
Effect (APE)	right-of-way for a proposed water line and two parcels which are all		
D (D	part of the Kalaheo Water Systems Project.		
Document Purpose	The proposed project is subject to Hawai'i State environmental and		
	historic preservation review legislation [Hawai'i Revised Statutes		
	(HRS) Chapter 343 and HRS 6E-8/HAR Chapter 13-275,		
	respectively]. This archaeological literature review and field inspection		
	does not fulfill the requirements of an archaeological inventory survey		
	investigation (per HAR Chapter 13-276). Rather, it serves as a due-		
	diligence and planning document to facilitate the proposed project's		
	historic preservation review compliance by assessing if there are any		
	major archaeological concerns within the project area by developing		
	data on the general nature, density and distribution of archaeological		

	resources, if applicable.		
Fieldwork Effort	The fieldwork component of the archaeological literature review and		
	field inspection was conducted on April 29, May 2, and May 5, 2011		
	by CSH archaeologists, Missy Kamai, B.A., under the general		
	supervision of Hallett H. Hammatt, Ph.D. (principal investigator). The		
	CSH archaeologist carefully inspected the project area to assess the		
	potential of locating significant archaeological sites in these areas. The		
	fieldwork required nine (9) person-hours to complete.		
Results	Pedestrian inspection identified no archaeological sites within the		
	project area, most of which had already been disturbed with recent		
	activity for transportation, residential and/or commercial purposes.		
	Two recent structures were observed within the surveyed area.		
Recommendations	Because no historic properties were observed within the project area,		
	CSH recommends no further archaeological work for the proposed		
	project. However, in the unlikely event that previously unidentified		
	subsurface historic properties are encountered by project construction,		
	the project proponents should immediately stop work in the vicinity		
	and contact DLNR/SHPD.		

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Section 1 Introduction

1.1 Project Background

At the request of Belt Collins Hawaii, Ltd., Cultural Surveys Hawaii, Inc. (CSH) completed an archaeological field inspection and literature review for the Kauaii County Kalaheo Water System Improvements Project, Kalāheo and Wahiawa Ahupuaia, Kōloa District, Island of Kauaii (Figure 1 through Figure 5). The project area consists of approximately 12 acres. The project area lands are owned by the County of Kauaii.

The project area is located in Kalāheo and Wahiawa Ahupua'a (TMK [4] 2-4-004:038 por., 2-4-004:999 por., 2-4-009:003). The project area consists of two parcels, the approximately 4.0-acre Clearwell Site and the approximately 1.1-acre Papapaholahola Tank Site; in addition to a right-of-way corridor connecting the two parcels primarily along Pu'uwai Road. The project area is depicted on the 1998 U.S. Geological Survey 7.5 Minute Series Kōloa Quadrangle map.

1.2 Scope of Work

The agreed upon scope of work for the archaeological inventory survey was as follows:

- 1. Historical research to include 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. Limited field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. This assessment will identify any sensitive areas that may require further investigation or mitigation before the project proceeds.
- 3. Preparation of a report to include the results of the historical research and the limited fieldwork with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate. It will also provide mitigation recommendations if there are archaeologically sensitive areas that need to be taken into considerations.

1.3 Document Purpose

The proposed project is subject to Hawai'i State environmental and historic preservation review legislation [Hawai'i Revised Statutes (HRS) Chapter 343 and HRS 6E-8/HAR Chapter 13-275, respectively]. This archaeological literature review and field inspection does not fulfill the requirements of an archaeological inventory survey investigation (per HAR Chapter 13-276). Rather, it serves as a due-diligence and planning document to facilitate the proposed project's historic preservation review compliance by assessing if there are any major archaeological concerns within the project area by developing data on the general nature, density and distribution of archaeological resources, if applicable.

1.4 Environmental Setting

1.4.1 Natural Environment

The project area is located in the *mauka* (upland) portion of Kalaheo Homesteads starting approximately 1 km (0.62 miles) north of Kaumuali'i Highway. The project area is primarily bounded on the west by Pu'uwai Road. A detached portion of the project area (the Clearwell Site) is located at the existing Kalaheo Filtration Plant at approximately 1200 ft. (366 m) above mean sea level (AMSL) (see Figure 1). Elevation in most of the project area is between approximately 900–1000 ft. (274–305 m) AMSL.

Much of the project area is forested; vegetation includes bamboo, Christmas berry (Schinus terebinthifolius), eucalyptus (Eucalyptus spp.), exotic palms and guava (Psidium guajava). Vegetation along the right-of-way corridor includes Norfolk pines (Araucaria heterophyllal), mango trees (Mangiferas spp.), Spanish needles (Palafoxia arida), impatiens (Impatiens pritzelii), guava (Psidium guajava), 'ape (Alocasia macrorrhizoss), avocado (Persea Americana), java plum (Sysygium cumini), bougainvillea (Bougenvillea glabra), ti leaf (Cordyline fruticosa), taro (Colocasia esculenda), heliconia (Heliconiaceae spp.), kukui (Alevrite moluccana), and various type of grasses. The project area receives approximately 79 in. (2000 mm) of annual rainfall (Giambelluca et al. 1986:151).

The land in Kalāheo is a result of the Kōloa Volcanic Series consisting of post-erosional lavas less than 1.5 million years old. Numerous vents including cinder and spatter cones and even a small shield volcano are located within Kalāheo Ahupua'a. Rapid soil formation on these lavas is a function of the warm humid climate acting on the volcanic ash as well as the frequent and often long quiet periods between eruptions at any particular place during the Kōloa Series (Macdonald et al. 1983). Numerous young intermittent and perennial streams bisect the Kalāheo hill slopes.

Soils within the Clearwell Site parcel, located on the *mauka* (north) side of the project area, are primarily comprised of Kalapa silty clay, 20-40% slopes (KdE); the Papapaholahola Tank Site parcel, located in the middle of the project area, is primarily composed of Puhi silty clay loam, 25-40% slopes (PnE) (Foote et al. 1972). The right-of-way corridor primarily traverses PnE and Puhi silty clay loam, 15-25% slopes (PnD), while its eastern portion includes Puhi silty clay loam, 3-8% slopes (PnB), Puhi silty clay loam, 8-15% slopes (PnC), and PnE (see Figure 5). Puhi Series soils are described as "well-drained soils on uplands on the island of Kaua'i...developed in material derived from basic igneous rock" (Foote et al. 1972:115). Kalapa Series soils are described as "permeability is moderately rapid. Runoff is very rapid and the erosion hazard is severe to very severe" (Foote et al. 1972:56).

1.4.2 Built Environment

Most of the project area has been previously developed for commercial, residential and infrastructural purposes. The Clearwell Site parcel has been previously developed with a concrete house structure, since abandoned. The Papapaholahola Tank Site parcel has a large nursery building on site with chain link fencing and barbed wire around its perimeter. The right-of-way corridor is primarily the existing Pu'uwai and Po'ohiwi Road.

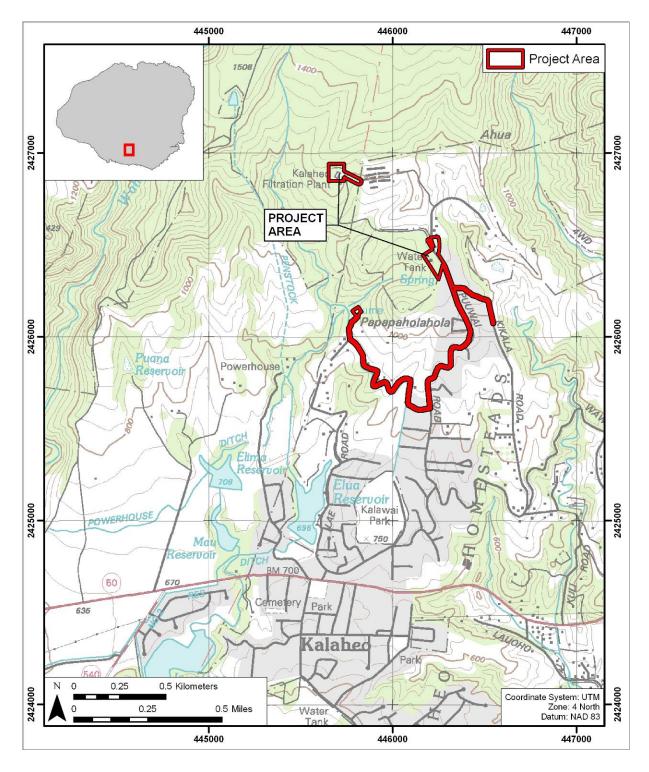


Figure 1. 1998 U.S. Geological Survey 7.5 Minute Series Kōloa Quadrangle Map showing the project area

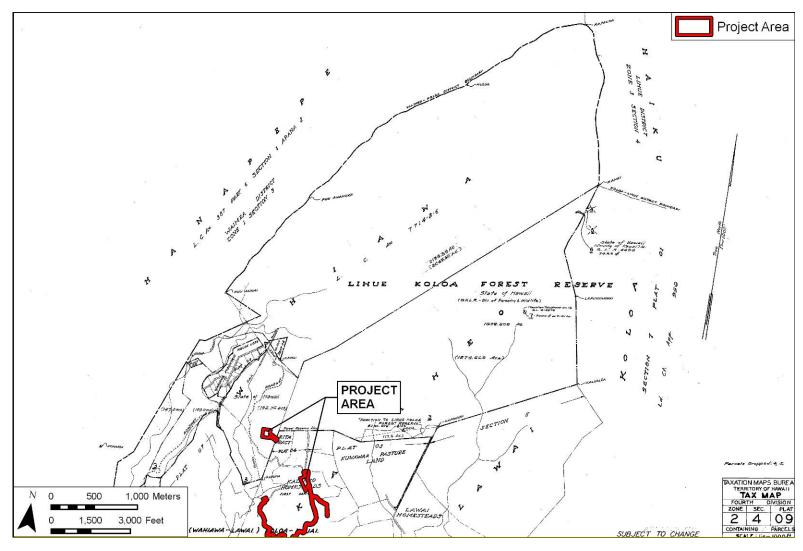


Figure 2. Map Key (TMK) plat 2-4-009, showing the overall project area

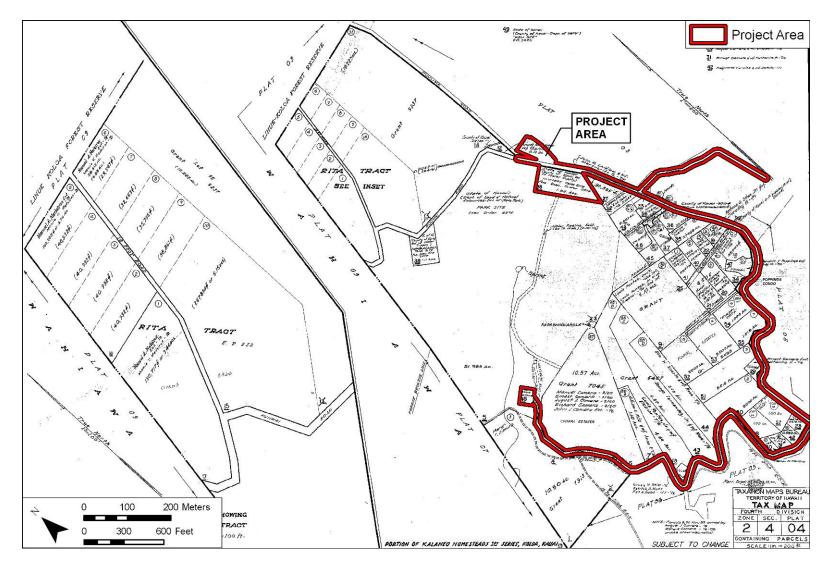


Figure 3. Tax Map Key (TMK) plat 2-4-004, showing the southern detailed portion of the project area

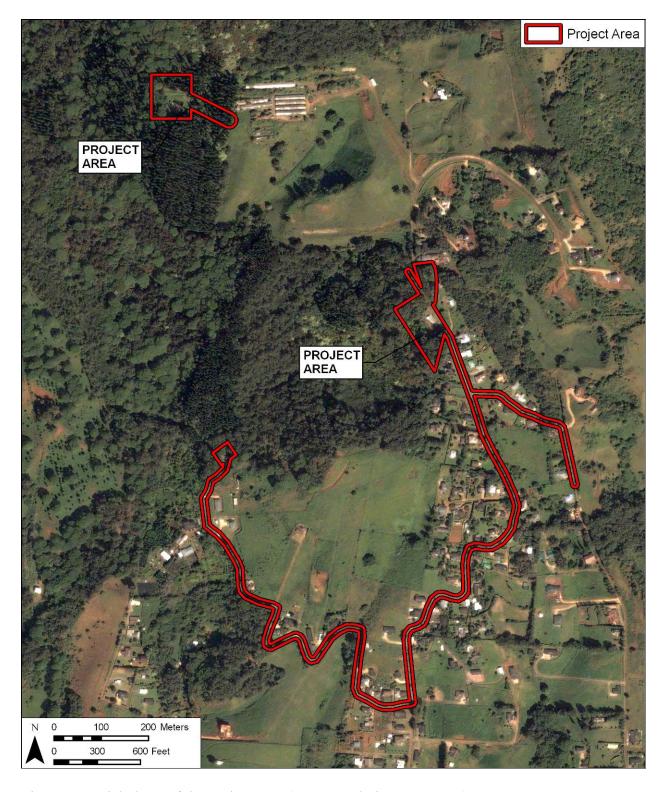


Figure 4. Aerial photo of the project area (USGS Orthoimagery 2005)

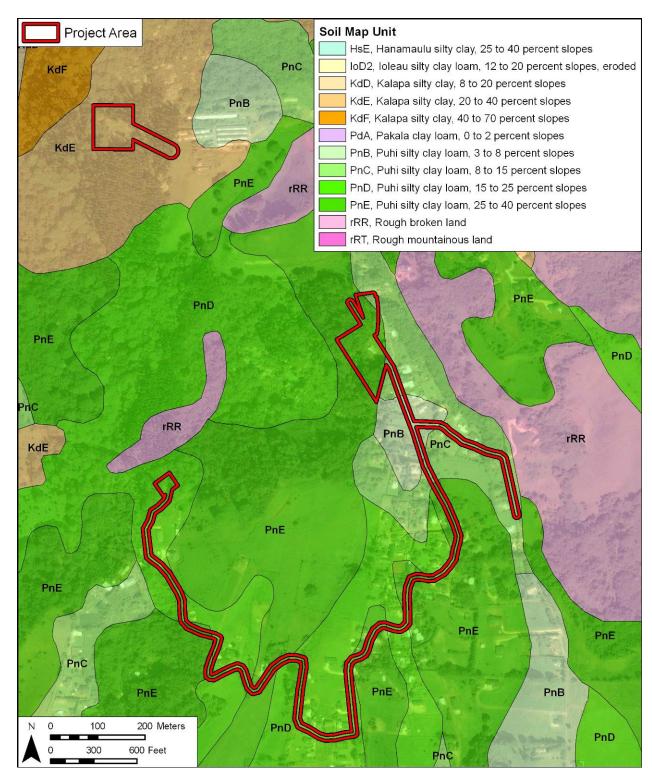


Figure 5. 1998 U.S. Geological Survey 7.5 Minute Series Kōloa Quadrangle Map showing the project area boundary with soil overlay (Foote et al 1972)

Section 2 Methods

2.1 Document Review

Historic and archival research included information obtained from the UH-Mānoa Hamilton Library and the State Historic Preservation Division (SHPD) library. Previous archaeological reports for the area were reviewed, as were historic maps and primary and secondary historical sources. Information on Land Commission documents, including Land Commission Awards (LCA), was obtained through Waihona 'Aina Corporation (Waihona 'Aina 2000).

This research provided the environmental, cultural, historic al and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area (see Section 4.1 below).

2.2 Field Inspection

The fieldwork component of the archaeological literature review and field inspection was conducted on April 29, May 2, and May 5, 2011, by CSH archaeologist, Missy Kamai, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). The CSH archaeologist carefully inspected the project area to assess the potential of locating significant archaeological sites in these areas. The fieldwork required nine (9) person-hours to complete.

Section 3 Historical Background

3.1 Pre-Contact to 1848

Historical references to Kalāheo and Wahiawa are scarce, though they are suggestive of the importance of Kalāheo as both a center for agriculture and for religious activities. Mythical accounts place a Kalāheo pond, "Nōmilu," as the focus of numerous traditional stories. Wichman (1998:35) states:

On one side of the pond is a spring called Ka-Kalua, "sinkhole," where shrimp were caught. These shrimp were a light pink and had a white spot in front of the head and sometimes a white tail. The Menehune were especially fond of these shrimp, which were not always to be found here.

Another account details a meeting between the goddess Pele and her sister Nāmakaokaha'i at Nōmilu:

The site of the fishpond was once a small hill. Pele, before she found her home in the volcano of Mauna Loa on Hawai'i, searched all of Kaua'i for a suitable place to live. When she came here, Nāmakaokaha'i caught up to her. Nāmakaokaha'i was Pele's older sister and greatest enemy. During the battle, Pele kicked up a lot of dirt into a pile, which turned into the hill Kāpeku, "to splash water by kicking the feet." Then Pele caused the hill she and her sister were fighting on to erupt, which covered the plains of Wahiawa with stones the size of coconuts. Nāmakaokaha'i flooded the new crater, forming the pond. Pele fled to O'ahu, followed by Nāmakaokaha'i. The cape at Nōmilu is named Nā-maka-o-Kaha'i, in memory of she who put out the volcano.

Before Pele left, she turned two supernatural eels, Puhi-'ula, "red eel," and Puhi-pakapaka, "scaly eel," into stone as guardians of the pond. They are still there. (Wichman 1998:35-36)

There are few early descriptions of Kalāheo. The Rev. Hiram Bingham gives us one vivid description of the uplands between Hanapēpē and Kilohana in 1824:

...a country of good land, mostly open, unoccupied and covered with grass, sprinkled with trees and watered with lively streams that descend from forest covered mountains, and wind their way along ravines to the sea. It is much finer country than the western part of the island. (Bingham 1847:219)

The earliest documentation of the population of the district of Kōloa (including Kalāheo and Wahiawa) appears in the 1850s when missionary censuses recorded a total population of 1,296 (Schmitt 1977:12). Population totals in the entire island of Kaua'i prior to 1850 had shown rapid decline, suggesting that similar trends likely occurred in Kōloa and Kalāheo. By 1878, the population of Kōloa bottomed out at 1,008, and then began steadily increasing to 1,500 in 1884, 1,835 in 1896, and 4,564 by 1900 (Schmitt 1977:13). Other nearby *ahupua'a* of Kaua'i demonstrate similar trends.

3.2 1848-1851

The Organic acts of 1845 and 1846 initiated the process of the *Māhele* - the division of Hawaiian lands - which introduced private property into Hawaiian society. It is through records for Land Commission Awards (LCAs) generated at the *Māhele* that the first specific documentation of life in Kalāheo Ahupua'a, as it had evolved up to the mid-19th century, come to light (Table 1).

While Kauikeaouli (Kamehameha III) retained ownership of Kalāheo Ahupua'a, as Crown Lands (Indices of Awards 1929) in the *Māhele*, eleven individuals made land claims and were awarded lands within the *ahupua'a*. **Error! Reference source not found.** shows the distribution of the eleven awards (some including multiple parcels) in relation to major land forms - the sea and streams and Nōmilu fishpond - and to major roads and trails.

Land Commission documents recording these awards further clarify our understanding of the 'āina' from the perspective of the Hawaiian planter and fisherman in traditional times. Most of the awards (LCA 3395B to Keoua, LCA 6647 to Una, LCA 6745 to Oluhe, LCA 8044 to Alauka, and LCA 8840 to Kanenehakaoli) include plots of taro *lo'i* (pondfields), *kula* (non-irrigated fields) and house lots located along Kalāheo Stream, clustered around the "Government Road." In addition, one or more plots for sweet potato and salt making were located at the seashore in the vicinity of Nōmilu fishpond. Only one claim of land (LCA 6520 to Waipa) was awarded in the *mauka*-most regions of Kalāheo; Waipa did not claim land elsewhere. Another claimant's land - LCA 6584 to Paele - may have been located only at Nōmilu near the shore, although the Foreign Testimony, Native Register, and maps showing award locations do not agree on this. Three other claimant's awards (LCA 3394B to Kaneiki, LCA 3396B to Kihei, and LCA 6688 to Laa) are located only in the upland (Figure 6).

In describing the conditions of Wahiawa (the adjacent *ahupua* 'a, directly west of Kalāheo) prior to the use of irrigation, Ida Elizabeth Knudsen Von Holt writes of her father's (Valdemar Knudsen's) hardships during the 1850s and 60s:

In those early days, land was very cheap. There was no way of watering or irrigating the fields, and the grass became absolutely parched and dead during the dry months. Cattle often died for want of food and water... (Von Holt 1985:66)

By the 1930s, when E.S. Craighill and Elizabeth Handy were collecting ethnographic and ethnobotanical data for their monumental works on the Hawaiian planter (Handy 1940; Handy and Handy 1972), the character of the *ahupua* 'a of Kalāheo had become an obscure memory. Kalāheo is described in the 20th century as:

...little more than a gulch formed by an insignificant stream which probably never had a constant flow. Kukui-o-Lono (Light of Lono) was a famous place in this section [land division] for sweet potato culture. (Handy and Handy 1972:428)

This description seems hardly adequate for an *ahupua* 'a formerly reserved for the *ali* 'i *nui*. Especially as Lāwa'i and Wahiawa, adjoining *ahupua* 'a to the east and west of Kalāheo, both described glowingly by Handy and Handy (1972), were awarded to the lesser *ali* 'i James Young Kanehoa and Moses Kekuaiwa (respectively). Kalāheo, Lāwa'i, and Wahiawa share essentially

Table 1. Kalāheo Ahupua'a Land Commission Awards Summary

LCA#	Claimant	ʻIli	Land Use	Awarded/Not Awarded
03394B	Kaneiki	Kapaeli	House, Cultivation	1 'āpana, 1 lo 'i,
03395B	Keoua	Puʻuhalulu, Kalaukiela, Omomilu	House, Cultivation	4 'āpana, 30 lo 'i, 1 house lot, 2 salt lands, 1 oranges
03396B	Kihei, Samasona	Punipoi, Waiʻāpuka, Kaʻawa	Cultivation	3 'āpana, 34 lo'i, 1 oranges
06345	Kaneiki	Kalāheo (ahupua 'a)	-	Not awarded
06346	Keoua	Kalāheo (ahupua 'a)	-	Not awarded
06347	Kanenehakuole	Kalāheo (ahupua 'a)	-	Not Awarded
06520	Waipa	Umiumihale	Cultivation	1 <i>ʿāpana</i> , 12 <i>loʻi</i>
06535	Haia, wahine	Lonohale	-	Not Awarded
06584	Paele	Omomilu	House lot, Cultivation	4 'āpana, 1 house lot, 5 salt lands, sweet potatoes
06647	Una	Kolau	House lot, Cultivation	3 'āpana, 1 lo'i, 2 house lots
06688	Laa	Koali	Cultivation	1 'āpana, 17 lo'i, 1 kula
06745	Ohule	Haleopai, Makaʻalaea, Omomilu	House lot, Cultivation	3 'āpana, 17 lo'i, 1 kula, 1 house lot, 5 salt lands, 1 sweet potatoes
08044	Alauka	Paele, Holeikamaina	House lot, cultivation	3 'āpana, 14 lo 'i, 1 kula, 4 salt lands
08840	Kanenehakuole	Ka'awa	Cultivation	2 'āpana, 15 lo 'i, 4 salt lands

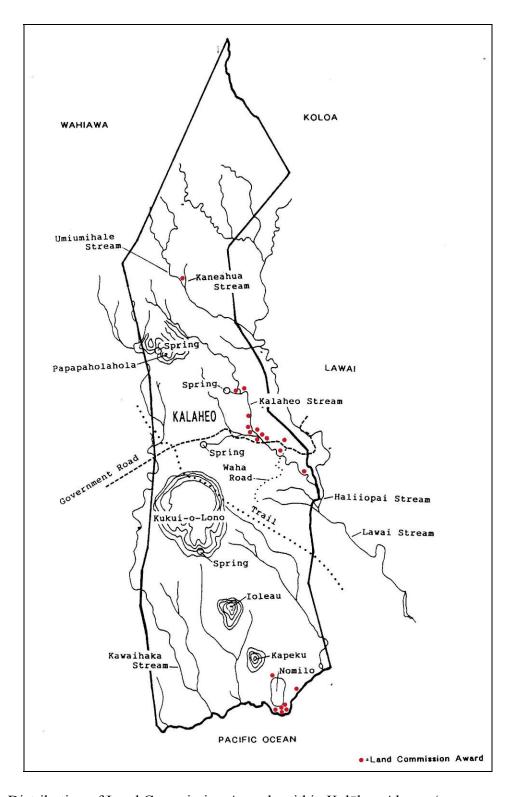


Figure 6. Distribution of Land Commission Awards within Kalāheo Ahupua'a

identical environmental parameters of topography, rainfall, temperature, and abundant spring and stream water in close association with substantial arable land. Thus, we premise that if additional informants from Kalāheo had been available to them, Handy and Handy's description of Kalāheo would be as exuberant as this for Wahiawa:

...the taro terraces extended all the way down the valley to the *muliwai* (inlet). A short distance above the present highway bridge was a spring named Ka'ulupaniau, which watered a small group of terraces. Inland from this was Kawaikapulalo [The-sacred-water-below], and here were terraces and *wauke* (paper mulberry) plantations. Above this was *kula* land named Kawaikapuluna [The-sacred-water-above], on which were the houses and sweet-potato plantations. Continuing upstream to a point opposite Pu'u Aukai there were other terraces in the stream bed, with houses and sweet-potato plantations on *kula* land above...Of this upper area Bennett (1931:115) remarks that "the remains of terraces" were observed to be "remarkable in places for their number on a small area of land." (Handy and Handy 1972:428)

3.3 Post-1850

According to Ethel Damon (1931), the Nōmilu fishpond in coastal Kalāheo was still in use in the 1860s when Judge Duncan McBryde, at the time living in nearby Wahiawa, received fish from:

...the natives...always being ready to stretch their gill net for the weekly catch in the celebrated pond at Nōmilu. This is a deep pool, quite uniformly so, about twenty-four feet in a direct drop after the first narrow ledge near the rim, in structure not unlike a volcanic fire pit. (Damon 1931:552)

Historical documentation of late 19th and early 20th century Kalāheo is scarce. Early in the 20th century land use and the population density changed dramatically in Kalāheo. The uplands were subdivided in homesteads and ranching became the primary land use. At lower elevations sugar cane cultivation became the major activity, with irrigation water collected from the uplands by means of an extensive system of ditches and reservoirs. Plantation camps were scattered around the south of Kalāheo and Wahiawa ahupua`a. A map of the McBryde Sugar Company (Figure 7Error! Reference source not found.) shows the northern extent of sugar train tracks in the Kalāheo Homestead vicinity (Condé and Best 1973:193).

According to long-time Kalāheo residents, Kalāheo was first populated by the Spanish and later Portuguese settlers in the early 1900s. Truck crops, dryland taro, pineapple, sugarcane, and grapes were grown in the project area vicinity. Ranching also became an integral part of the Kalāheo community. During World War II, military personnel constructed a communication structure at the top of Papapaholahola Hill, which still stands today. Today, Kalāheo is a small community with a hotel, restaurants, post office and grocery store. Pasture land is still visible along the surrounding hillsides.

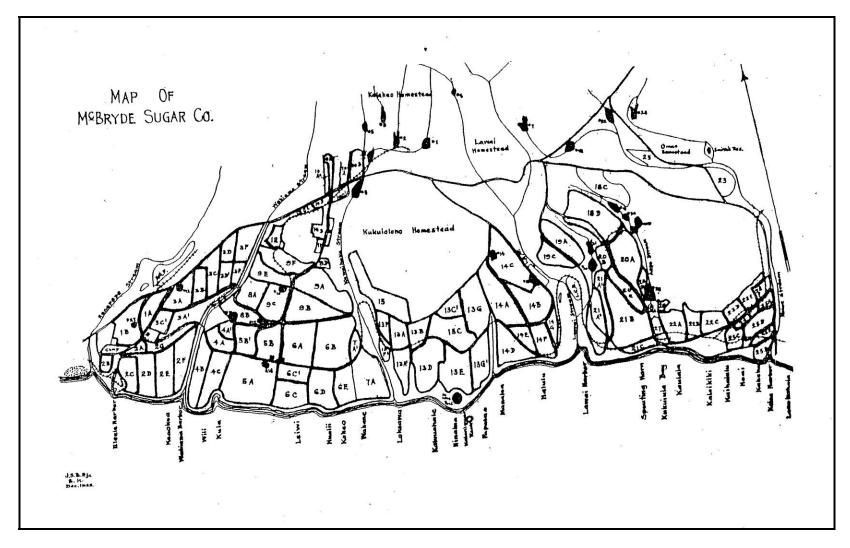


Figure 7. Map of McBryde Sugar Company Lands ca. 1922 (Conde and Best 1973:193)

Section 4 Previous Archaeological Research

This section describes previous archaeological research in Kalāheo Ahupua'a (Table 2).

As part of his fieldwork in the 1920s, Wendell C. Bennett (1931) reviewed and revisited many sites located by early 20th century archaeological studies on Kaua'i, including sites in the *ahupua'a* of Kalāheo. Bennett (1931:115-116) lists five archaeological sites in Kalāheo, numbered 64 to 68. Three of these sites are located at or near the coast and include: "Site 64. House sites, in Kalāheo [Kawaihaka] gulch at the sea"; "Site 67. Fish pond, salt pans, and taro terraces, at Nōmilu"; and "Site 68. Kapoho Heiau, inland from the fish pond at Nōmilu, Kalāheo." The other two sites are located further *mauka* and consist of "Site 66. Kukuiolono Heiau, once located on Kukuiolono hill but now destroyed." and "Site 65. Kahaleki'i Heiau, on the western slope of Kukuiolono hill...now completely destroyed."

The *ahupua* 'a of Kalāheo is dominated by a large cinder cone, "Kukui-o-Lono" (light of Lono), on top of which stood Kukuiolono Heiau. The *heiau* is believed to have been the largest of Kaua'i, though it had been destroyed by the time of Bennett's survey in the 1920s. Thrum (1907 cited in Bennett 1931) described it as:

A large three terraced *heiau*, east section being 95 by 112 feet, mid-section 105 by 83 feet and west division 105 by 51 feet, giving a total length of 246 feet straight on the seaward side. Near east end is a large oven; near the division wall is the *kahua* of the oracle 22 x 30 feet, and on north side of mid-section are foundations of two houses which measure 15 by 42 feet. The sacrifices for this heiau were executed at some distance from it and the bodies then brought and placed on the altar that the temple be not polluted with blood. The place of sacrificing was, "Na pohakuakiiola."

Kahaleki'i Heiau, once located on the western slope of Kukuiolono hill, was destroyed by the time of Bennett's survey. Thrum (1907, cited in Bennett 1931) described it as:

A square three-terraced *heiau* of large size, with several divisions: was high walled and paved: class unknown.

Kikuchi's (1963) survey of the Kona District of Kaua'i, from Hanapēpē to Māhā'ulepū, identified 23 archaeological sites within Kalāheo Ahupua'a including a shelter cave at the shore at Lokoawa, near the western boundary of the *ahupua'a*. Five more sites, including a shelter cave, stone walls, house sites, a spring, and an historic tunnel are recorded by Kikuchi (1963) in the shoreward reaches of Kawaihaka Stream valley. Among these sites, in all probability, is Bennett's Site 64. Five additional, previously unrecorded sites were located at Kalu'uahole (Kaluaahole) and Papapua'a (Paapuaa) along the shore between Kawaihaka and Nōmilu, including a fishing shrine, house sites, and shelter caves. At Nōmilu (Nomilo), Kikuchi recorded seven sites, including Nōmilu (Nomilo) fishpond, walls, salt pans, an historic tunnel and Kapoho (Kapono?) Heiau. Kikuchi's sites include Bennett's sites 67 and 68. Three additional previously unrecorded sites are located in the vicinity of Manoloa (Manuloa), a point on the shore at the eastern *ahupua'a* boundary. These sites include an enclosure, walls, and a fishing shrine.

Table 2. Archaeological Studies in Kalāheo, Kaua'i

Reference	Type of Study	Location of Study	Findings
Thrum 1907	Heiau study	Island wide	For Kalāheo Ahupua'a briefly lists 3 <i>heiau</i> : Kahaleki'i Heiau, on the western slope of Kukuiolono hill; Kapoho Heiau <i>mauka</i> of the fishpond; and Kakainahoa Heiau, location not given, "all destroyed"
Bennett 1931	Site Survey	Island wide	Site 64. House sites, in Kalāheo [Kawaihaka] gulch at the sea Site 65. Kahaleki'i Heiau, western slope of Kukuiolono hill Site 66. Kukuiolono Heiau Site 67. Fish pond, salt pans, and taro terraces, at Nōmilu Site 68. Kapoho Heiau
Kikuchi 1963	Archaeological Survey and Excavations	Kona District, Kauaʻi	Located and assigned field numbers to 23 archaeological sites within Kalāheo Ahupua'a
McMahon 1988	State of Hawaii, DLNR Letter to File Job No. 87-9	Slope of Papapaholahola Hill (TMK 2-4-04:5)	One historic property (SIHP No. 50-30-10-406) consisting of a stonewall associated with terraces and a paved platform; posited to be a remnant of Kakaianahoa or Kahaleki'i Heiau
Folk and Hammatt 1991	Archaeological Survey and Subsurface Testing	Land Commission Award 6647 at Kalāheo	No significant finds; absence of cultural features/deposits resulted from land disturbance from the attempted but never completed construction of an agricultural reservoir feature.
Hibbard 1991	Letter to Keith Nitta, May 30, 1991 (re: archaeological survey by Nancy McMahon)	10-acre lot (TMK 2-4-01:12) in Kalāheo, mauka of Kaumuali'i Highway near Kuli Road	Many earthen terraces were identified and found to be remnants of "pineapple era fields.
Pantaleo and Williams 1991	Archaeological Reconnaissance Survey	Portions of the Port Allen-Wainiha Transmission Line Corridor	No studies in Kalāheo Ahupua'a as the corridor was "located in areas that have been modified by pasture or sugar cane cultivation"

Reference	Type of Study	Location of Study	Findings
Perzinski et al. 2001	Archaeological Inventory Survey	For the Proposed Improvements to the Kalāheo Water System, Kalāheo Well Site	Documents SIHP Nos. 50-30-10-406 and -485
Tulchin et al. 2005	Archaeological Field Check and Literature Review	Kukuiolono Park and Golf Course	Three historic properties (SIHP Nos. 50-30-10-3906, -3907, -3908) (see Jones et al. 2006 for greater detail)
Jones et al. 2006	Archaeological Inventory Survey	Kukuiolono Park and Golf Course	Three sites comprised of 22 features were identified and recorded: 50-30-10-3906, historic artifacts and historic structures, within Kukuiolono Park, attributed to the Estate of Walter D. McBryde and remaining military infrastructure from WWII use; -3907, traditional Hawaiian stones and artifacts collected by Walter D. McBryde; -3908, graves of Walter D. McBryde and John P. Kamanuwai.
Moser et.al 2010	Archaeological Inventory Survey	0.71-acre parcel located in Kalāheo Ahupua'a, Kona District, Island of Kaua'i (TMK 2-4-003:007)	Approximately 50% of the project area was observed to have been disturbed by land modifications associated with development of adjacent residential housing. No historic properties were observed within the project area.

Further upland, within the current project area, Kikuchi (1963), like Bennett, recorded only Kukui-o-Lono Heiau (Kikuchi site 46; Bennett site 66; Bishop Museum site KA-B6-3; SIHP No. 50-30-10-66) and Kahaleki'i (Kahakekii) Heiau (Kikuchi site 47; Bennett site 65; Bishop Museum site KA-B6-4; SIHP No. 50-30-10-65). Kikuchi does not observe any evidence of the sites and notes that both *heiau* had been destroyed.

McMahon (1988), working for the SHPD, conducted a field inspection of a proposed water pipeline through State of Hawaii property (TMK 2-4-04:5) on the slope of Papapaholahola Hill. During the inspection, McMahon identified a historic property consisting of a stonewall associated with terraces and a paved platform. This site was assigned State Site 50-30-10-406, and was posited to be a remnant of Kakaianahoa or Kahaleki'i Heiau, both of which were described by Thomas Thrum in 1907 as having been destroyed.

Pantaleo and Williams (1991) inspected portions of a proposed power line corridor from Port Allen to Wainiha. Although the corridor passes through Kalāheo Ahupua'a, studies were not conducted there because the corridor is "located in areas that have been modified by pasture or sugar cane cultivation" (Pantaleo and Williams 1991:1-2).

In 1991, McMahon conducted an archaeological survey (Hibbard 1991) of an approximately 10-acre lot (TMK 2-4-01:12) in Kalāheo, *mauka* of Kaumuali'i Highway near Kuli Road. Many earthen terraces were identified by McMahon and found to be remnants of "pineapple era fields." No additional work was recommended.

Folk and Hammatt (1991) reported on the archaeological survey and subsurface testing of Land Commission Award 6647 at Kalāheo. No archaeological surface features were located. Subsurface testing found no cultural deposits. This absence of cultural features/deposits resulted from land disturbance from the attempted but never completed construction of an agricultural reservoir feature, to encompass all of L.C.A. 6697, in the early 20th century (Folk and Hammatt 1991).

Perzinski et al. (2001) conducted an archaeological inventory survey for the Kalāheo water system expansion project; this project area was located just west of the current project area, on the other side of Pu'uwai Road. The project area had been previously inspected by McMahon (1988). Two historic sites were identified: SIHP No. 50-30-10-406, previously located by McMahon, was relocated and determined to be of historic origin. Subsurface testing within Site 406 encountered a horse burial, indicating the historic age of the site. Site -406 was posited to be related to historic truck crop or pineapple cultivation. SIHP No. 50-30-10-485 is a dike determined to be a historic water diversion feature. No further work was recommended for these sites.

Tulchin et al. (2005) conducted a field inspection and literature review for improvements to Kukuiolono Park. Five archaeological sites were identified: SIHP No. 50-30-10-3906 consisted of an assemblage of historic properties within Kukuiolono Park, including historic artifacts and historic structures, attributed to the Estate of Walter D. McBryde. Site 50-30-10-3907 consisted of a collection of traditional Hawaiian stones and artifacts assembled by Walter D. McBryde. Site 50-30-10-3908 consisted of the graves of Walter D. McBryde and companion. Site 50-30-10-3909 consisted of a loosely stacked stone retaining wall / terrace (historic), located along the

southern slopes of Kukuiolono. Site 50-30-10-3910 consisted of a remnant stone wall alignment (possibly pre-contact), located along the southern slopes of Kukuiolono.

Jones et al. (2006) conducted an archaeological inventory survey of a portion of Tulchin et al.'s (2005) project area, and documented three sites: SIHP No. 50-30-10-3906 comprised nine features, including twentieth-century historic artifacts and historic structures within Kukuiolono Park attributed to the Estate of Walter D. McBryde, to the military occupation of the park, or to the use of this land by the Kaua'i Pineapple Co. Site 50-30-10-3907 comprised ten features, a collection of traditional pre-contact Hawaiian stones and artifacts assembled by Walter D. McBryde. Site 50-30-10-3908 comprised three features related to the graves of Walter D. McBryde and John P. Kamanuwai and associated stone artifacts.

Recently, Moser et al. (2010) conducted a field inspection and literature review for the Kalāheo water system expansion project. This project area was located adjacent to the Papapaholahola Tank Site, on the west side of Pu'uwai Road. No historic properties were observed within the project area.

4.1 Settlement Pattern Summary and Predictive Model

From previous archaeological studies, historic documents, and cultural documentation, it is apparent that land use in the vicinity of the current project area is long and varied, extending from pre-contact times into the modern era. Based on available background research, it appears that land use within Kalāheo and Wahiawa Ahupua'a during pre-contact and early historic times is in keeping with a thriving and well-populated traditional land unit. Traditional Hawaiian activities in the vicinity of the current project area would have included agriculture, habitation, transportation/pathways, religious activities, and resource gathering.

During the later historic period, extensive commercial agriculture, including ranching and sugar cane and pineapple cultivation, dominated land use in Kalāheo and Wahiawa Ahupua'a. It is possible that historic ditches, flumes, pipelines, and other features related to commercial plantation irrigation may have once existed within the current project area. Physical remnants of historic homesteads and ranching may also have once existed within the current project area. Barbed wire fences, wooden or stacked stone enclosures, water troughs, and historic habitation deposits, including structure foundations, retaining walls, and refuse dumps, could potentially be found within the project area. However, many historic structures within Kalāheo and Wahiawa Ahupua'a are known to have been heavily damaged by hurricanes over the years and may have been previously demolished.

Based on the results of the archaeological inventory survey for the Kalāheo water system expansion project (Perzinski et al. 2001) that took place just west of the current project area, on the other side of Pu'uwai Road, the most likely sites in the project area would be related to historic agriculture.

Section 5 Field Inspection Results

Pedestrian inspection confirmed the findings of the background research and the predictive model. No significant archaeological properties were observed in the surveyed area. A recent abandoned cinder block structure (in the Clearwell Site parcel) and another recent structure that included a perimeter chain link fence (in the Papapaholahola Tank Site parcel) were observed. The right-of-way corridor was graded and generally disturbed on both sides of the shoulder, primarily for the existing Pu'uwai and Po'ohiwi Roads. Error! Reference source not found.

The Clearwell Site parcel had extensive modification and modern development with a concrete structure and access road being constructed within the last 50 years (Figure 8 and Figure 9). Though this parcel was not as well maintained and the vegetation appears to come relatively close to the building and road way, pedestrian inspections confirmed the surface areas had been cleared around the property limits.

The right-of way and access roads have been cleared and leveled to include the buffer areas of each easement out to the edges of the project area (Figure 10, Figure 11 and Figure 12). Some of the roads were modified even further with bulldozing and paving. Pedestrian sweeps of the perimeter and vegetated areas along the edges of the easement confirmed the lack of surface features and historic properties.

Most of the project area has been modified up to the edges of the properties. The Papapaholahola Tank Site parcel shows large soil movement and modification for lot leveling and clearing (Figure 13 and Figure 14). The natural slope of the hill was cut level for the nursery building, and a chain link fence delineates the edges of the property. The vegetation has also been cleared down to the surface creating a buffer zone for the property boundary. Pedestrian sweeps around the area confirmed that no historic properties were present.



Figure 8. Abandoned structure, view to southwest



Figure 9. Detail of abandoned structure, view to southeast



Figure 10. Right-of-way corridor, view to northwest



Figure 11. Right-of-way corridor, view to north



Figure 12. Right-of-way corridor, view to northwest



Figure 13. Nursery structure, Papapaholahola Tank Site parcel, view to southwest



Figure 14. Overview of Papapaholahola Tank Site parcel, view to west

Section 6 Conclusion

At the request of Belt Collins Hawaii, Ltd., Cultural Surveys Hawai'i, Inc. (CSH) completed an archaeological field inspection and literature review for the Kaua'i County Kalaheo Water System Improvements Project, Kalāheo and Wahiawa Ahupua'a, Kōloa District, Island of Kaua'i. The project area consists of approximately 12 acres. The project area lands are owned by the County of Kaua'i.

The project area is located in Kalāheo and Wahiawa Ahupua'a (TMK [4] 2-4-004:038 por., 2-4-004:999 por., 2-4-009:003). The project area consists of two parcels, the approximately 4.0-acre Clearwell Site and the approximately 1.1-acre Papapaholahola Tank Site; in addition to a right-of-way corridor connecting the two parcels primarily along Pu'uwai Road. The project area is depicted on the 1998 U.S. Geological Survey 7.5 Minute Series Kōloa Quadrangle map.

The proposed project is subject to Hawai'i State environmental and historic preservation review legislation [Hawai'i Revised Statutes (HRS) Chapter 343 and HRS 6E-8/HAR Chapter 13-275, respectively]. This archaeological literature review and field inspection does not fulfill the requirements of an archaeological inventory survey investigation (per HAR Chapter 13-276). Rather, it serves as a due-diligence and planning document to facilitate the proposed project's historic preservation review compliance by assessing if there are any major archaeological concerns within the project area by developing data on the general nature, density and distribution of archaeological resources, if applicable.

Pedestrian inspection identified no archaeological sites within the project area, most of which had already been disturbed with recent activity for transportation, residential, or commercial purposes. Two recent (not historic in age) structures were observed in the Clearwell Site and Papapaholahola Tank Site parcels. Large-scale modification in the form of slope cutting and lot leveling for the Papapaholahola Tank Site parcel and to a smaller degree the Clearwell Site parcel virtually eliminate the potential for the presence of subsurface archaeological sites. Subsurface features and deposits could still be a possibility within the road ways and within limited areas of the Clearwell Site parcel based on the lack of previous subsurface disturbance there. However, previous archaeology in the vicinity of the project area suggests such deposits are unlikely to remain.

According to the predictive model for the project area, it was expected that if historic properties were found they would most likely consist of surface remains of historic agricultural activities. No historic properties were observed within the project area during the field inspection. Therefore, CSH recommends no further archaeological work for the proposed project. In the unlikely event that previously unidentified subsurface historic properties are encountered during project construction, the project proponents should immediately stop work in the vicinity and contact DLNR/SHPD.

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APPENDIX E CULTURAL IMPACT ASSESSMENT

Cultural Impact Assessment for the Kaua'i County Kalāheo Water System Improvements Project, Kalāheo and Wahiawa Ahupua'a, Kōloa District, Kaua'i Island

TMK: [4] 2-4-003:007, 2-4-003:999 por., 2-4-004:039, 2-4-004:049, 2-4-004:999 por., 2-4-005:999 por., 2-4-006:999 por., and 2-4-009:003

Prepared for Belt Collins Hawaii, Ltd

Prepared by
Kūhiō Vogeler, Ph.D.
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai'i, Inc. Kailua, Hawai'i (Job Code: KALAHEO 3)

January 2012

Oʻahu Office P.O. Box 1114 Kailua, Hawaiʻi 96734 Ph.: (808) 262-9972

Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office 1860 Main St. Wailuku, Hawai'i 96793

Ph: (808) 242-9882 Fax: (808) 244-1994

Prefatory Remarks on Language and Style

A Note about Hawaiian and other non-English Words:

Cultural Surveys Hawai'i (CSH) recognizes that the Hawaiian language is an official language of the State of Hawai'i, it is important to daily life, and using it is essential to conveying a sense of place and identity. In consideration of a broad range of readers, CSH follows the conventional use of italics to identify and highlight all non-English (i.e., Hawaiian and foreign language) words in this report unless citing from a previous document that does not italicize them. CSH parenthetically translates or defines in the text the non-English words at first mention, and the commonly-used non-English words and their translations are also listed in the *Glossary* (Appendix A) for reference.

A Note about Plant and Animal Names:

When community participants mention specific plants and animals by Hawaiian, other non-English or common names, CSH provides their possible scientific names (Genus and species) in the *Common and Scientific Names of Plants and Animals Mentioned by Community Participants* (Appendix B). CSH derives these possible names from authoritative sources, but since the community participants only name the organisms and do not taxonomically identify them, CSH cannot positively ascertain their scientific identifications. CSH does not attempt in this report to verify the possible scientific names of plants and animals in previously published documents; however, citations of previously published works that include both common and scientific names of plants and animals appear as in the original texts.

Management Summary

Reference	Cultural Impact Assessment (CIA) for the Kaua'i County Kalāheo Water System Improvements Project, Kalāheo and Wahiawa Ahupua'a, Koloa District, Kaua'i Island, Tax map Key (TMK): [4] 2-4-003:007, 2-4-003:999 por., 2-4-004:039, 2-4-004:049, 2-4-004:999 por., 2-4-005:999 por., 2-4-006:999 por., 2-4-009:003 (Vogeler and Hammatt 2011)
Date	January 2012
Project Number (s)	KALAHEO 3
Project Location	The Project area is located in Kalāheo and Wahiawa Ahupua'a on the island of Kaua'i. The two parcels, Clearwell Tank (TMK [4] 2-4-009:003) and the Nursery Site (TMK [4] 2-4-009:039), are west of Pu'uwai Road. The right of way corridor is primarily Pu'uwai and Po'ohiwi Road. These areas are depicted on the 1998 U.S. Geological Survey 7.5 Minute Series Kōloa Quadrangle map (Figure 1).
Land Jurisdiction	Kaua'i County
Agencies	State of Hawai'i Department of Land and Natural Resources / State Historic Preservation Division (DLNR/SHPD); State Office of Environmental Quality Control (OEQC)
Project Description	The Kaua'i County Department of Water is planning to upgrade its aging Kalāheo Water System in upland Kalāheo, Kaua'i. Plans call for replacing two existing water tanks, constructing a new well, constructing new transmission mains, booster pump station, and pressure reducing valve stations, and modifying existing pressure reducing valve stations and booster pump station affected by the proposed upgrades.
	The two existing tanks, known as the Nursery and Clearwell Tanks, will each be replaced with a 0.5 MG water tank. The Nursery Tank replacement will be located on a nearby parcel acquired from the Yamada family and identified as the Yamada Tank. The Clearwell Tank replacement will be located on the same parcel within the grounds of the existing facility.
Project Acreage	Two Kalāheo sites: 2.7 and 10.36 acres totaling 13.06 and an additional 8,000 linear feet of water transmission main in Pu'uwai Road, Po'ohiwi Road and Kīkala Road

Area of Potential Effect (APE) and Survey Acreage	For the purposes of this Cultural Impact Assessment (CIA), the APE is defined as the approximately 13.06-acre Project area. While this investigation focuses on the Project APE, the study area includes the entire area of Kalāheo and Wahiawa Ahupua'a.	
Document Purpose	The Project requires compliance with the State of Hawai'i environmental review process (Hawai'i Revised Statutes [HRS] Chapter 343), which requires consideration of a proposed project's effect on cultural practices and resources. Belt Collins Hawaii, Ltd. requested CSH conduct this CIA. Through document research and ongoing cultural consultation efforts, this report provides information pertinent to the assessment of the proposed Project's impacts to cultural practices and resources (per the <i>Office of Environmental Quality Control's Guidelines for Assessing Cultural Impacts</i>) which may include Traditional Cultural Properties of ongoing cultural significance that may be eligible for inclusion on the State Register of Historic Places, in accordance with Hawai'i State Historic Preservation Statute (Chapter 6E) guidelines for significance criteria according to Hawai'i Administrative Rules (HAR) §13-275 under Criterion E. The document is intended to support the Project's environmental review and may also serve to support the Project's historic preservation review under HRS Chapter 6E-42 and HAR Chapter 13-275.	
Community Consultation	Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the Project area and the vicinity. The organizations consulted included the State Historic Preservation Division, the Office of Hawaiian Affairs, the Kaua'i/Ni'ihau Island Burial Council, and community members of Kalāheo and Wahiawa Ahupua'a.	
Results of Background Research	Background research for this Project yielded the following results: 1. The <i>ahupua'a</i> (land division generally running from the mountains to the sea) of Kalāheo is dominated by a large cinder cone, Kukuiolono (Lono's light), where signal fires were built that could be seen by fishermen and navigators (Wichman 1998:33–34).	
	2. <i>Moʻolelo</i> (story, tale, myth) of <i>wahi pana</i> (storied places) in the <i>ahupuaʻa</i> of Kalāheo indicate that the goddess Pele created the depression of Nōmilu when she explosively left Kauaʻi for Oʻahu and caused a volcano to erupt, and that <i>menehune</i> (legendary race of small people) gathered the fallen rocks and passed them to one other in order to construct Ale Koko	

Fishpond in Niumalu (Knudsen 1946:250–252).

3. Fourteen culturally significant *pōhaku* (stones), collected from Kalāheo Ahupua'a, have been recently relocated along the paths of Kukuiolono Park, located one mile south of the Project area. A bowl-shaped stone, Pōhakuawa, was used by travelers on a trail toward the *mauka* (upland) lands of Wahiawa Ahupua'a to store their catch of *awa* (milkfish) (Donohugh 2001:233), and the stone may refer to Wahiawa, or the "place [where] milkfish [were stored]" (Clark 1990:61). Other stones were formerly associated with a hiding place for a chiefly feathered cloak (Pōhakuhunaahula), connected to a *ko'a* (fishing shrine) at the junction of two trails (Pōhakuloa), and reported to have resembled the island of Kaua'i (Kaua'i Iki) (Donohugh 2001:234).

In 1873, two *pōhaku* called Waipapaaina and Kupuna were located in the vicinity of the Project area, as well as a tree called Kapiliwahine (Hawai'i Commission of Boundaries 1873:44).

- 4. The largest *heiau* (temple, religious site) on Kaua'i was Kukuiolono Heiau, a large, square three-terraced platform that was located on top of the dominant cinder cone in Kalāheo (Site 66, Bennett 1931; Site 46, Kikuchi 1963). This *heiau* was connected to three smaller *heiau* called Kahaleki'i (Site 65, Bennett 1931; Site 47, Kikuchi 1963), Nāpōhakuaki'iloa, and Ipuolono (Wichman 1998:34).
- 5. Other cultural sites farther *makai* (seaward) toward the coast include house sites (Site 64, Bennett 1931; Kikuchi 1963), a fishpond, salt pans and taro terraces at Nōmilu (Site 67, Bennett 1931; Kikuchi 1963), Kapoho Heiau (Site 68, Bennett 1931; Kikuchi 1963), shelter caves, stone walls, a spring, fishing shrines, an enclosure, and walls (Kikuchi 1963).
- 6. A stone wall associated with terraces and a paved platform, located just west of the Project area, was previously considered a remnant of either Kahaleki'i or Kakaianahoa Heiau (State Inventory of Historic Properties [SIHP] #50-30-10-406, McMahon 1988), until more recent work determined it to be related to the plantation era (Perzinski et al. 2001). Five archaeological sites were uncovered within Kukuiolono Park, including an assemblage of historic properties associate with the estate of Walter D. McBryde, including artifacts and structures (SIHP50-30-10-3906), a collection of traditional stones and artifacts (SIHP #50-30-10-3907), and graves (SIHP

- #50-30-10-3908), as well as a retaining wall (SIHP #50-30-10-3909) and stone wall alignment (SIHP #50-30-10-3910) (Jones et al. 2006; Tulchin et al. 2005).
- 7. Land Commission Awards (LCAs) from the Māhale (division of Hawaiian lands) of 1848 indicate that the coastal region of Kalāheo was used as *loʻi kalo* (irrigated taro fields), *kula* (dryland agriculture) lands for sweet potato cultivation, and salt pans, and that the uplands of Kalāheo was also used for the cultivation of *kalo* (Waihona 'Aina 2000). Testimonies in the early twentieth century indicated that the *kula* lands of Kukuiolono were famous for the cultivation of sweet potatoes (Handy and Handy 1972:428).
- 8. The companion archaeological literature review and field inspection study for the Project did not identify any archaeological sites within the Project area, which had been previously disturbed for transportation, residential, or commercial purposes (Yamauchi and Hammatt 2011).

Results of Community Consultation

CSH attempted to contact 30 community members and government agency and community organization representatives. Of the 10 people that responded, three $k\bar{u}puna$ (elders) and/or kama ' $\bar{a}ina$ (Native-born) participated in formal interviews for more in-depth contributions to the CIA. This community consultation indicates:

- 1. The *ahupua* 'a of Kalāheo is associated with a male *mo* 'o (lizard, water spirit), one of five *mo* 'o that govern the districts of Kaua'i, according to Ms. Anne Punohu. The *mo* 'o are connected to the pure fresh water streams, waterfalls, and springs in the *mauka* lands, as well as the ocean waters, creating a *mauka-makai* relationship. The shapes of these *mo* 'o are connected to the entire geography of Kaua'i, with the heads in the mountainous center of the island, the backs forming the ridges, the bodies containing *manu* (birds) such as 'io (hawks), *pueo* (owls), and *koa* 'e (tropic birds), and the tails extending into the ocean waters. The ocean itself is governed by the god Kawelo, but the *mo* 'o and Kawelo are intertwined: "They cannot be separated on Kaua'i, because Kawelo rules in the ocean and *mo* 'o rules in the mountain, and it is the *manu* that grew in the middle."
- 2. The Project area is located primarily along Pu'uwai Road, which Ms. Punohu translates as "sacred water" in reference to nearby Papapaholahola Spring. Since a *kahuna* (priest) would have once guarded the sanctity of the spring, Ms. Punohu believes

- that a *heiau*, a *lele* (sacrificial altar), and a small house platform are located near the spring. In addition, a *heiau* is located at the southern end of the plateau of Kukuiolono, according to Mr. Ferreira, and a *hōlua* (sledding) course with unique grass-filled stones may exist near the Project area, according Ms. Punohu.
- 3. Mount Kahili was a place that Mr. John Brune, Jr. visited to hunt pigs and gather 'aloe (aloe) and noni for medicinal purposes. Mr. Brune also caught koi (carp), tilapia, catfish, and bass in two Kalāheo reservoirs and caught akule (big-eyed scad), lobsters, crabs and 'opihi (limpets) in the ocean during his youth. Mr. Ferreira observes that feral pigs continue to enter Kukuiolono Park looking for food. A swamp or lake at the summit of Mount Kahili is known as "Black Lake" to Mr. Ferreira and Mr. Brune.
- 4. Community participants and respondents state two recommendations:
 - i. Ms. Punohu recommends that a buffer zone be established around Papapaholahola Spring so as to not compromise its purity as a source of water for the district's *mo'o*.
 - ii. Ms. Coochie Cayan of SHPD identifies cultural practices for access and gathering, spirituality at sacred sites, and protecting ancient burials as potential issues should the Project expose or degrade such cultural resources or sites.

Impacts and Recommendations

The information gathered for the cultural and historic background and community consultation detailed in this CIA report indicate that although unlikely, the proposed Project may potentially impact Native Hawaiian cultural resources and burials. CSH identifies these potential impacts and makes the following recommendations:

1. The companion archaeological literature review and field inspection did not identify any archaeological sites within the Project area (Yamauchi and Hammatt 2011), but there is a possibility that land-disturbing activities during construction may uncover presently undetected burials or other cultural finds. In addition, historic-era terraces, rock mounds, platforms, and walls were previously identified just west of the Project area (SIHP #50-30-10-406, Perzinski et al. 2001). Personnel involved in the construction activities of the Project should be informed of the possibility of inadvertent cultural finds, including human remains. Should burials or other cultural finds be identified during ground disturbance, the construction contractor should immediately cease all work and the

- appropriate agencies notified pursuant to applicable law.
- 2. Land-disturbing activities during construction may disturb cultural sites outside of the Project area, such as Papapaholahola Spring. Best management policies should be implemented to avoid disturbing such cultural sites.

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Section 1 Introduction

1.1 Project Background

At the request of Belt Collins Hawaii, Ltd., Cultural Surveys Hawai'i, Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed Kaua'i County Kalāheo Water System Improvements Project, Kalāheo and Wahiawa Ahupua'a, Koloa District, Kaua'i Island, TMK: [4] 2-4-003:007, 2-4-003:999 por., 2-4-004:039, 2-4-004:049, 2-4-004:999 por., 2-4-005:999 por., 2-4-009:003. The Project area is depicted on a U.S. Geological Survey (USGS) quadrangle (Figure 1), an aerial image (Figure 2), and a Tax Map Key (TMK) map (Figure 3 and Figure 4).

The Kaua'i County Department of Water is planning to upgrade its aging Kalāheo Water System in upland Kalāheo, Kaua'i. Plans call for replacing two existing water tanks, constructing a new well, constructing new transmission mains, booster pump station, and pressure reducing valve stations, and modifying existing pressure reducing valve stations and booster pump station affected by the proposed upgrades.

The two existing tanks, known as the Nursery and Clearwell Tanks, will each be replaced with a 0.5 MG water tank. The Nursery Tank replacement will be located on a nearby parcel acquired from the Yamada family and identified as the Yamada Tank. The Clearwell Tank replacement will be located on the same parcel within the grounds of the existing facility.

The new well and booster pump station will be located at the Yamada Tank site. Modifications will be made to the existing booster pump station at the existing 908 Tank site. A new transmission main will be constructed along Poʻohiwi and Puʻuwai Roads from the 908 Tank site to the Yamada Tank site. An additional extension of transmission main is planned for Kīkala Road. Finally, modifications to and additions of pressure reducing valve stations are planned within the Puʻuwai and Kīkala Road rights-of-way.

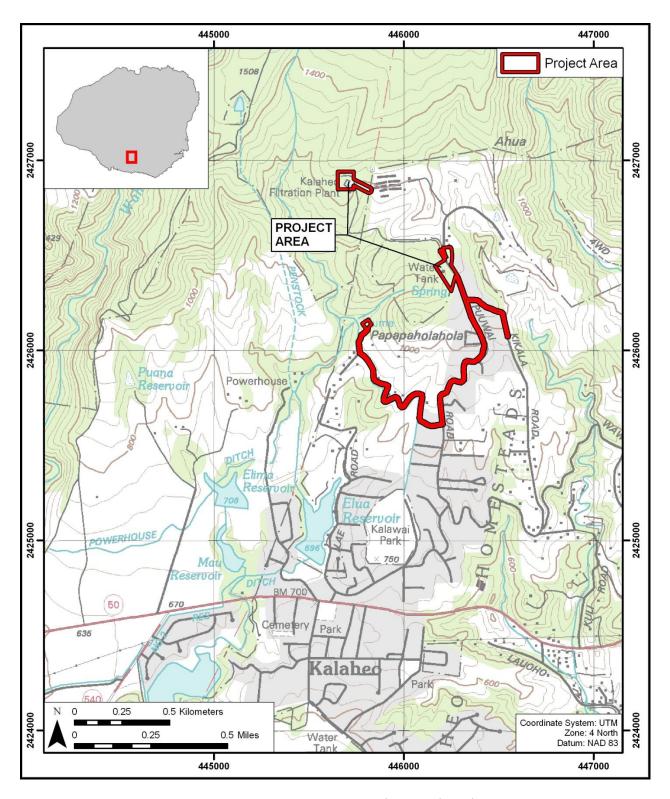


Figure 1. 1996 USGS 7.5-minute topographical map, Kōloa Quadrangle, showing Project area

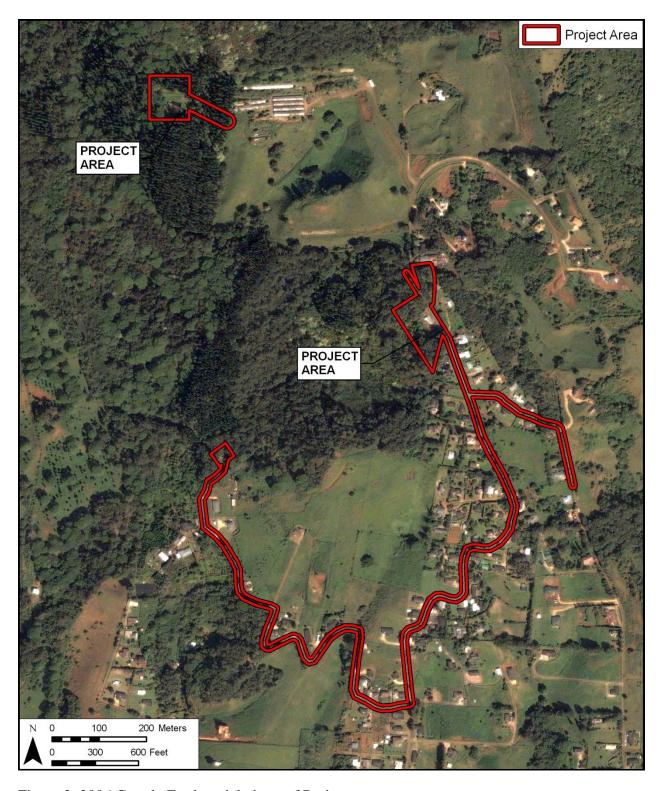


Figure 2. 2006 Google Earth aerial photo of Project area

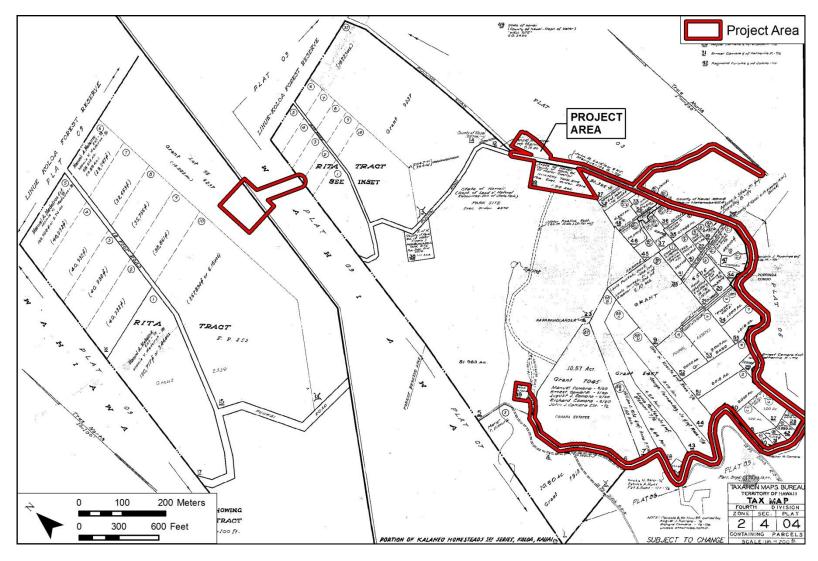


Figure 3. TMK plat 2-4-004 depicting the Project area (Hawai'i Tax Map Key Service 2011)

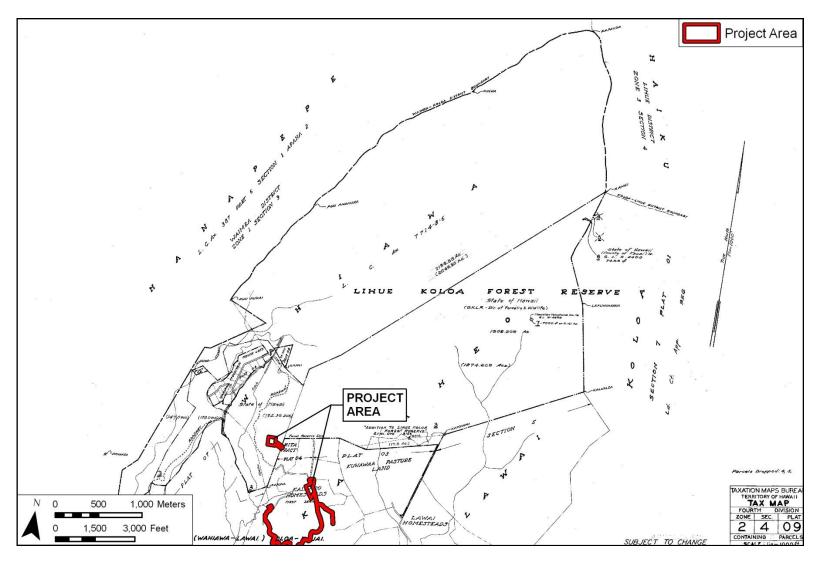


Figure 4. Tax Map Key plat 2-4-009 depicting overall Project area (Hawai'i Tax Map Key Service 2011)

1.2 Scope of Work

The Project requires compliance with the State of Hawai'i environmental review process (Hawai'i Revised Statutes [HRS] Chapter 343), which requires consideration of a proposed project's effect on cultural practices. CSH is conducting this CIA at the request of Belt Collins Hawaii, Ltd. Through document research and ongoing cultural consultation efforts, this report provides information pertinent to the assessment of the proposed Project's impacts to cultural practices and resources (per the *Office of Environmental Quality Control's Guidelines for Assessing Cultural Impacts*). The impacts may include Traditional Cultural Properties (TCPs) of ongoing cultural significance that may be eligible for inclusion on the State Register of Historic Places. In accordance with Hawai'i State Historic Preservation Statute (Chapter 6E) guidelines for significance criteria in the Hawai'i Administrative Rules (HAR) §13–275 under Criterion E, an historic property determined to be significant shall:

Have an important value to the Native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The document is intended to support the Project's environmental review and may also serve to support the Project's historic preservation review under HRS Chapter 6E and HAR Chapter 13-275.

1.3 Scope of Work

The scope of work for this CIA includes:

- 1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, 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.
- 2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
- 3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
- 4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Environmental Setting

1.4.1 Natural Environment

The Project area is located approximately 6,000 feet (1828 meters) *mauka* (toward the mountain) of Kaumuali'i Highway, near the intersection of Pu'uwai Road and Pu'ulima Road.

The Project area is primarily bounded on the west by Pu'uwai Road. Elevations within the Project area range from approximately 850–1250 ft. (259–381 m) above mean sea level. Much of the Project area is forested; vegetation within the project area includes bamboo, Christmas berry, eucalyptus, exotic palms, and guava. Along the right of way corridor, primarily the existing Pu'uwai and Po'ohiwi Roads, vegetation includes Norfolk pines, mango trees, Spanish needles, impatiens, guava, 'ape (large taro-like plants), avocado, java plum, bougainvillea, ti leaf, taro, heliconia, kukui (candle nut), and various type of grasses. The Project area receives approximately 79 in. (2000 mm) of annual rainfall (Giambelluca et al. 1986:151).

Soils within the Clearwell Tank parcel (TMK [4] 2-4-009:003), located on the *mauka* side of the Project area, is primarily comprised of Kalapa silty clay, 20–40% slopes (KdE) and the Nursery Site parcel (TMK [4] 2-4-009:039), located on the west side, is primarily composed of Puhi silty clay loam, 25–40% slopes (PnE) (Foote et al. 1972) (Figure 5). The right-of-way corridor traverses mainly through the PnE and Puhi silt silty clay loam, 15–25% slopes. (PnD), while its eastern portion includes Puhi silty clay loam, 3-8% slopes (PnB), Puhi silty clay loam, 8–15% slopes (PnC), and PnE (Figure 5). Puhi Series soils are described as "well-drained soils on uplands on the island of Kaua'i...developed in material derived from basic igneous rock" (Foote et al. 1972:115). Kalapa Series soils are described as "permeability is moderately rapid. Runoff is very rapid and the erosion hazard is severe to very severe" (Foote et al. 1972:56).

1.4.2 Built Environment

The majority of the Project area has been improved and or modified for commercial, residential, or transportation purposes. The Clearwell Tank parcel (TMK [4] 2-4-009:003) had been developed with a concrete house structure, and the Nursery Site parcel (TMK [4] 2-4-009:039) has a large nursery building on site with chain link fencing and barb wire around its perimeter. The right-of-way corridor is primarily the existing Pu'uwai and Po'ohiwi Road.

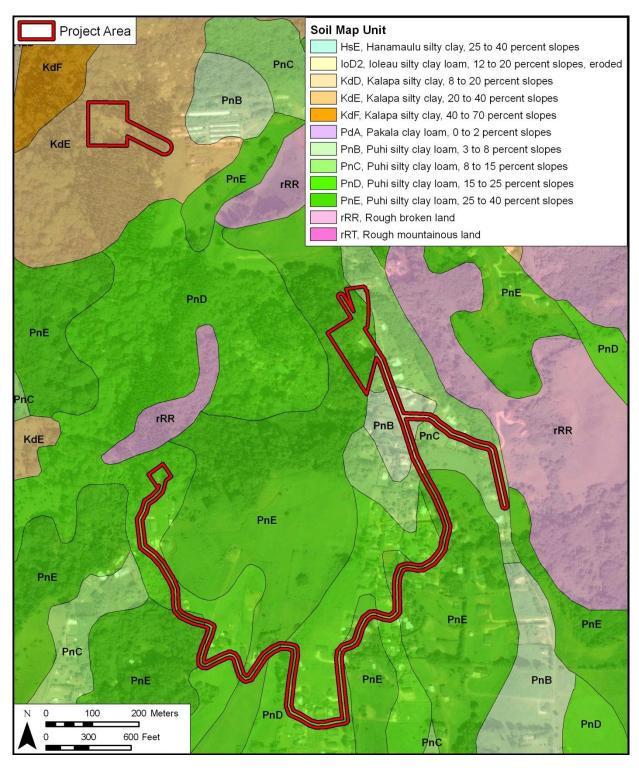


Figure 5. Soils within and surrounding the Project area over 1996 USGS Orthoimagery (soil type boundaries from Foote et al. 1972)

Section 2 Methods

2.1 Archival Research

Historical documents, maps and existing archaeological information pertaining to the Project area were researched at the CSH library and other archives including the University of Hawai'i at Mānoa's Hamilton Library, the State Historic Preservation Division (SHPD) library, the Hawai'i State Archives, the State Land Survey Division, and the archives of the Bishop Museum. Previous archaeological reports for the area were reviewed, as were historic maps and photographs and primary and secondary historical sources. Information on Land Commission Awards (LCAs) was accessed through Waihona 'Aina Corporation's Māhele Data Base (www.waihona.com) as well as a selection of CSH library references.

For cultural studies, research for the Traditional Background section centers on Hawaiian activities, including religious and ceremonial knowledge and practices, traditional subsistence land use and settlement patterns, gathering practices and agricultural pursuits, as well as Hawaiian place names and *mo'olelo* (oral traditions), *mele* (songs), *oli* (chants), *'ōlelo no'eau* (proverbs) and more. For the Historic Background section, research focuses on land transformation, development and population changes beginning in the early post–European Contact era to the present day (see Scope of Work in Section 1.3).

2.2 Community Consultation

2.2.1 Sampling and Recruitment

A combination of qualitative methods, including purposive, snowball, and expert (or judgment) sampling, were used to identify and invite potential participants to the study. These methods are used for intensive case studies, such as CIAs, to recruit people that are hard to identify, or are members of elite groups (Bernard 2006:190). Our purpose is not to establish a representative or random sample. It is to "identify specific groups of people who either possess characteristics or live in circumstances relevant to the social phenomenon being studied. . . . This approach to sampling allows the researcher deliberately to include a wide range of types of informants and also to select key informants with access to important sources of knowledge" (Mays and Pope 1995:110).

We began with purposive sampling informed by referrals from known specialists and relevant agencies. For example, we contacted SHPD, Office of Hawaiian Affairs (OHA), Kaua'i/Ni'ihau Island Burial Council (KNIBC), and community and cultural organizations for their brief response/review of the Project and to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the Project area and vicinity. Based on their in-depth knowledge and experiences, these key respondents then referred CSH to additional potential participants who were added to the pool of invited participants. This is snowball sampling, a chain referral method that entails asking a few key individuals (including agency and organization representatives) to provide their comments and referrals to other locally recognized experts or stakeholders who would be likely candidates for the study (Bernard 2006:192). CSH also employs expert or judgment sampling which involves assembling a group of people with

recognized experience and expertise in a specific area (Bernard 2006:189–191). CSH maintains a database that draws on over two decades of established relationships with community consultants: cultural practitioners and specialists, community representatives and cultural and lineal descendants. The names of new potential contacts were also provided by colleagues at CSH and from the researchers' familiarity with people who live in or around the study area. Researchers often attend public forums (e.g., Neighborhood Board, Burial Council and Civic Club meetings) in (or near) the study area to scope for participants. Please refer to Table 3 in Section 6, for a complete list of individuals and organizations contacted for this CIA.

CSH focuses on obtaining in-depth information with a high level of validity from a targeted group of relevant stakeholders and local experts. Our qualitative methods do not aim to survey an entire population or subgroup. A depth of understanding about complex issues cannot be gained through comprehensive surveying. Our qualitative methodologies do not include quantitative (statistical) analyses, yet they are recognized as rigorous and thorough. Bernard (2006:25) describes the qualitative methods as "a kind of measurement, an integral part of the complex whole that comprises scientific research." Depending on the size and complexity of the project, CSH reports include in-depth contributions from about one-third of all participating respondents. Typically this means three to twelve interviews.

2.2.2 Informed Consent Protocol

An informed consent process was conducted as follows: (1) before beginning the interview the CSH researcher explained to the participant how the consent process works, the Project purpose, the intent of the study and how his/her information will be used; (2) the researcher gave him/her a copy of the Authorization and Release Form to read and sign (Appendix C); (3) if the person agreed to participate by way of signing the consent form or providing oral consent, the researcher started the interview; (4) the interviewee received a copy of the Authorization and Release Form for his/her records, while the original is stored at CSH; (5) after the interview was summarized at CSH (and possibly transcribed in full), the study participant was afforded an opportunity to review the interview notes (or transcription) and summary and to make any corrections, deletions or additions to the substance of their testimony/oral history interview; this was accomplished either via phone, post or email or through a follow-up visit with the participant; (6) the participant received the final approved interview and a copy of any photographs taken for the study. If the participant was interested in receiving a copy of the full transcript of the interview (if there is one as not all interviews are audio-recorded and transcribed), a copy was provided. Participants were also given information on how to view the report on the OEQC website and offered a hardcopy of the report once the report is a public document.

2.2.3 Interview Techniques

To assist in discussion of natural and cultural resources and cultural practices specific to the study area, CSH initiated semi-structured interviews (as described by Bernard 2006) asking questions from the following broad categories: gathering practices and *mauka* and *makai* (toward the ocean) resources, burials, trails, historic properties and *wahi pana* (storied places). The interview protocol is tailored to the specific natural and cultural features of the landscape in the study area identified through archival research and community consultation. For example, in this

study, *mauka* freshwater resources and *wahi pana* are emphasized over other categories less salient to Project participants. These interviews and oral histories supplement and provide depth to consultations from government agencies and community organizations that may provide brief responses, reviews and/or referrals gathered via phone, email and occasionally face-to-face commentary.

2.2.3.1 In-depth Interviews and Oral Histories

Interviews were conducted initially at a place of the study participant's choosing (usually at the participant's home or at a public meeting place) and/or—whenever feasible—during site visits to the Project area. Generally, CSH's preference is to interview a participant individually or in small groups (two–four); occasionally participants are interviewed in focus groups (six–eight). Following the consent protocol outlined above, interviews may be recorded on tape and in handwritten notes, and the participant photographed. The interview typically lasts one to four hours, and records the who, what, when and where of the interview. In addition to questions outlined above, the interviewee is asked to provide biographical information (e.g., connection to the study area, genealogy, professional and volunteer affiliations, etc.).

2.3 Compensation and Contributions to Community

Many individuals and communities have generously worked with CSH over the years to identify and document the rich natural and cultural resources of these islands for cultural impact, ethno-historical and, more recently, TCP studies. CSH makes every effort to provide some form of compensation to individuals and communities who contribute to cultural studies. This is done in a variety of ways: individual interview participants are compensated for their time in the form of a small honorarium and/or other makana (gift); community organization representatives (who may not be allowed to receive a gift) are asked if they would like a donation to a Hawaiian charter school or nonprofit of their choice to be made anonymously or in the name of the individual or organization participating in the study; contributors are provided their transcripts, interview summaries, photographs and—when possible—a copy of the CIA report; CSH is working to identify a public repository for all cultural studies that will allow easy access to current and past reports; CSH staff do volunteer work for community initiatives that serve to preserve and protect historic and cultural resources (for example in, Lāna'i and Kaho'olawe). Generally our goal is to provide educational opportunities to students through internships, share our knowledge of historic preservation and cultural resources and the State and Federal laws that guide the historic preservation process, and through involvement in an ongoing working group of public and private stakeholders collaborating to improve and strengthen the Chapter 343 environmental review process.

Section 3 Traditional Background

Though the much of the Project area falls within Kalāheo Ahupua'a, it is important to consider Wahiawa Ahupua'a as well when depicting the traditions of the area. Kalāheo and Wahiawa are two of the seven *ahupua'a* (land division generally running from the mountains to the sea) that comprise Kōloa District. The other *ahupua'a* of Kōloa District fall to the east of Kalāheo, including Lāwa'i, Kōloa, Weliweli, Pā'ā, and Māhā'ulepū Ahupua'a (Donohugh 2001:23). This section of the traditional background of the area will focus on Kalāheo and Wahiawa Ahupua'a, as well as any other nearby places pertinent to the Project area.

3.1 Wahi Pana

A Hawaiian *wahi pana*, also referred to as a place name (or lit. "storied place"), "physically and poetically describes an area while revealing its historical or legendary significance" (Landgraf 1994:v). *Wahi pana* can refer to natural geographic locations, such as streams, peaks, rock formations, ridges, and offshore islands and reefs, or they can refer to Hawaiian divisions, such as *ahupua'a* and *'ili* (land divisions smaller than an *ahupua'a*), and man-made structures, such as fishponds. In this way, the *wahi pana* of Kalāheo and Wahiawa link the *kama'āina* (Native-born) to their past. *Wahi pana* meanings are cited primarily from Pukui et al. (1974) and Wichman (1998). For clarity, the place names have been bolded (and if from Wichman, were bolded in the original as well).

3.1.1 Kalāheo

Kalāheo, according to Pukui et al. (1974), denotes a "land section, gulch, elementary school, and town, Kōloa district, Kaua'i. (Today, commonly pronounced Kalaheo.) *Lit.*, the proud day." Wichman (1998) also describes Kalāheo, which "begins at Kāhili peak and extends across the plains between Wahiawa on the west and Lāwa'i on the east" (33). According to Wichman, Kalāheo Ahupua'a is "dominated by a huge cinder cone, Kukui-o-Lono, 'light of Lono,' and descends from there through a gulch to the sea at Ka-wai-haka, a name that refers to a shelf of water that gushes down the talus slopes into the sea" (33). Kukuiolono, visible from Māhā'ulepū to Kekaha, was the site of a bonfire that served as a beacon for fishermen and travelers of the south-side ocean (33–34). According to Donohugh (2001), "an agreement between agricultural Hawaiians in the area and fishermen who lived along the shore was that a fire would be maintained on the hill every night to guide seafarers" (227).

Nakuina, in *The Wind Gourd of La'amaumau*, names the wind of Kalāheo Ahupua'a as **Kiuanu** (Nakuina 1992:53). Wichman, Fornander, as well as Pukui and Elbert, spell the wind for Kalāheo slightly differently: "**Ku'u-anu**, 'releasing coldness'" (Wichman 1998:33, Fornander 1918, Vol V:96, Pukui and Elbert 1986:187). According to Wichman, Kalāheo has "heavier rainfall than Wahiawa" (33).

Near the coast of Kalāheo Ahupua'a is **Kalāheo Gulch**. Clark explains that, "Some authorities believe that Kalāheo applies only to the upper reaches of the gulch near the town of Kalāheo and that the lower reaches were known Kawaihaka. They have also identified the bay fronting the gulch as Lokoawa Bay" (Clark 1990:62).

Along the coast is **Pālama Beach**, with "the most unusual fishpond in the Hawaiian Islands, Nōmilu Fishpond" (Clark 1990:62). According to Donohugh (2001), **Pālama Beach** was named **Papako'o**, but is now called Pālama Beach, "because it is next to the Palama [family] property" (225). The name for the fishpond, **Nō-milu**, refers to the "seepage whirls" of the brackish water (Wichman 1998:35). Monsarrat's 1896 map shows Nōmilu fishpond (spelled Nomilo), as well as many other nearby place names. Pukui et al. describes **Nō-milu** thus:

Cone and fishponds. Kō-loa, Kaua'i, said to have been made by Pele and guarded by Puhi-'ula (red eel) and Puhi-pakapaka (scaly eel), both supernatural eels. During volcanic activity on Hawai'i, sulfur is smelled in these ponds. Hawaiians gathering salt there placed salt offering on leaves for Pele. (Pukui et al. 1974)

Wichman recounts a more detailed version of the Pele story:

The site of the fishpond was once a small hill. Pele, before she found her home in the volcano of Mauna Loa on Hawai'i, searched all of Kaua'i for a suitable place to live. When she came here, Nāmakaokaha'i caught up to her. Nāmakaokaha'i was Pele's older sister and greatest enemy. During the battle, Pele kicked up a lot of dirt into a pile, which turned into the hill **Kāpeku**, "to splash water by kicking the feet." Then Pele caused the hill she and her sister were fighting on to erupt, which covered the plains of Wahiawa with stones the size of coconuts. Nāmakaokaha'i flooded the new crater, forming the pond. Pele fled to O'ahu, followed by Nāmakaokaha'i. The cape at Nōmilu is named **Nā-maka-o-Kaha'i**, in memory of she who put out the volcano.

Before Pele left, she turned two supernatural eels, **Puhi-'ula**, "red eel," and **Puhi-pakapaka**, "scaly ell," into stone as guardians of the pond. They are still there. (Wichman 1998:36–37, bold in original)

Wichman also describes how salt pans of **Nō-milu** "produced the finest and most desired salt of Kaua'i" (34–35):

People came in the summer to gather salt when the winds blew the salt across the surface of the pond to the edge of the pond, where it was carefully scooped out with the hands or with pieces of gourd shell and dried. The pond itself is about three hundred yards long by two hundred yards wide. There is a submarine connection with the sea, for the level of the pond rises and falls with the tide. Its depth varies from five to eleven fathoms. The name refers to water seeping away in the form of eddies or whirlpools.

On one side of the pond is a spring called **Ka-kalua**, "sinkhole," where shrimp were caught. These shrimp were a light pink and had a white spot in front of the head and sometimes a white tail. The Menehune were especially fond of these shrimp, which are not always to be found here. (Wichman 1998:34–35, bold in original)

Donohugh further explains that, "Hawaiians brought mullet and other fingerlings from Lāwa'i Kai (fish would not breed at Nōmilu) and they thrived feeding off bottom growth" (Donohugh 2001: 224–225).

Fourteen significant stones have been placed along the paths at **Kukuiolono Park**. Clark explains that, "[Walter] McBryde, a member of an old Kaua'i family, feared that these culturally important stones would be lost as lands were cleared for development, so he gathered those he could find and placed them in his garden" (Clark 1990:61). Walter McBride's estate eventually became **Kukuiolono Park**. Some of these stones have been named.

One of these fourteen stones is named **Pōhakuawa** ("the awa-fish stone") (Figure 6). Donohugh explains that this roughly spherical, bowl-shaped stone:

... was located about a mile west of "Brideswood" on the trail to upper Wahiawa lands. Fishermen caught *awa* (milkfish) fingerlings by net at the shore, stopped off near this stone for the night, and kept their catch alive in the bowl. It was covered with vines to keep the water cool and the fish from jumping out. The next day the *awa* were taken to the mountains to replenish the stock maintained in a pool in Wahiawa stream. (Donohugh 2001:233)

Clark, in his explanation for the name for the Wahiawa Ahupua'a (see Section 3.1.2 below), refers specifically to this stone, indicating that the stone itself is Wahiawa, or the "place [where] milkfish [were stored]" (61). (Here, it deserves mentioning that within Kalāheo Ahupua'a, there is an 'ili named Wahiawa: this 'ili does not fit the description of where the stone was found).

Another stone is named **Pōhakuhunaahula** (Figure 7). A bronze plaque beneath the stone bears the inscription, "Pōhakuhunaahula: hiding place for chief's feather cloak" (Donohugh 2001:234). **Pōhakuhunaahula** is a stone, under which the red cape (*ahu 'ula*) of a chief named Ola was once hidden during a time of war, and the chief later secreted from that spot, to deprive his enemy of such a precious item (Keaweamahi 7, September 1876, see also Donohugh 2001:234).

Yet another stone at Kukuiolono Park is **Pōhakuloa**, or "tall rock," a stone with a flat southern face (Figure 8). "The Fish Stone," **as Pōhakuloa** is also known, "was found at the junction of two trails leading to the beach near the McBryde mill" (Donohugh 2001:234) Wichman clarifies the significance of this stone:

This tall, erect stone was once one of three in line. Pōhakuloa on the plain, one on the seacoast that is now gone, and one out in the sea where the deep-sea fishing grounds were. These stones together were a *koʻa* (fishing shrine) where a fisherman prayed for success on his way to fish and where he left an offering of the first catch of the day on his way home. Pōhakuloa was surrounded by a twelve-foot-wide pavement of smooth, flat, water-polished stones. (Wichman 1998:32–33)

Thirteenth in order is "Lono's Spoon," located 40 feet to the north. Donohugh (2001) describes this stone as "somewhat like spoon with a truncated handle," and adds, "Hawaiians did not have spoons except for sections of coconut shell or gourd, which were used like scoops."

Among the famous stones at Kukuiolono Park, perhaps the most famous is **Kaua'i Iki** ("little Kaua'i"), a flat stone known for its resemblance to Kaua'i Island (Figure 9). Kaua'i Iki, which came from Wahiawa Ahupua'a, was moved to Kukukuiolono Park for preservation. It is said that "Visitors who did not have time to make it around the island came here and walked around the

stone. Then they could go home and boast, truthfully, that they had indeed walked around Kaua'i" (Wichman 1998:32; see also Keaweamahi 1876). According to Donohugh, the story regarding Kaua'i Iki is that, "a Hawaiian family clearing their land of rocks to plant taro came across this stone. Because it resembled Kaua'i, they left it in place and named it. However, the story does not explain how they knew what Kaua'i looked like on a map from the air" (Donohugh 2001:234).

3.1.2 Wahiawa

Wahiawa refers to a "stream and *heiau* [temple, religious site]. Kōloa district. Kaua'i.... *Lit.* milkfish place" (Pukui et al. 1974). The reason for this name, according to Wichman, is that "awa, the milkfish, was easily grown in taro fields, needing no other sustenance than the algae that grew among the taro corms. Awa was a source of protein and could be obtained whenever desired" (32). Clack offers another explanation for the name:

One traditional story says that the Kauai name comes from a large stone basin where *awa* or milkfish, were placed temporarily to keep them alive after they were caught. The site in the valley where the stone basin was located was called Wahiawa, "place [where] milkfish [were stored]." This stone and other legendary Hawaiian stones are located in nearby Kalāheo in Kukuiolono Park, the former home of Walter McBryde. (Brackets in original: Clark 1990:61)

The wind for Wahiawa is **Unulau** (Nakuina 1992:53). Pukui and Elbert (1986) describe this wind as "famous in song noted on Kaua'i, West Maui, and Ni'ihau (372). **Unulau** is also the name of a star (372). In Fornander's *Hawaiian Antiquities and Folklore*, this wind is listed as **Naula** (1918, Vol. V:96).

As with Kalāheo Ahupua'a, Wahiawa Ahupua'a begins at Kāhili peak. In the following long quote, Wichman describes the significance of **Kāhili Peak**, the apex of four *ahupua'a*:

Situated between Hanapēpē and Kalāheo, Wahi-awa *ahupua* 'a begins at **Kahili**, "feather standard," a 3,089-foot peak halfway up the ridge leading to Kawaikini and Wai'ale'ale. From its western side, the peak looks something like the tall feather standard for which it is named. The *kahili* was a cylinder covered with feathers and attached to a long pole that always accompanied a chief or chiefess of high rank wherever they went.

At Kahili, the boundaries of Kōloa, Hā'iku, Wahiawa, and Kalāheo *ahupua'a* all meet. Such a common boarder needed to be something recognizable, especially as this was birdcatching country. Like the laws that regulated the use of water, the laws concerning the *kia manu* (bird-catchers) were very strict. Each *ahupua'a* had to pay as tax a certain amount of feathers taken from the bright honeycreepers—the yellow of the 'anianiau, the green of the ' \bar{o} ' \bar{u} , the red of the olokele. The kia manu always made sure that the birds were left for breeding purposes. Some, like the black ' \bar{o} ' \bar{o} ' ' \bar{a} ' that had only a few yellow feathers under its wings, were plucked and released to grow new ones. Many of the $k\bar{a}hili$ were decorated with the feathers of moa (jungle fowl). The roosters have multicolored feathers, and the long tall plumes were ideal to display on a $k\bar{a}hili$.

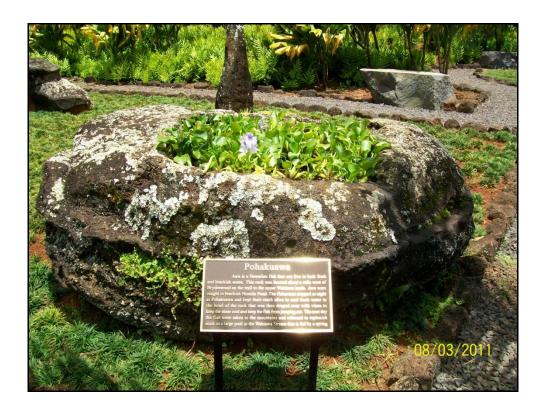
The ancients leveled off the top of Kāhili—an area twelve feet wide and twenty-seven feet long. Within this rectangle, several large tree trunks of the native *kauila* were set upright, each about twelve feet high. Notches were cut into each tree trunk as footholds. A remnant of a legend says that these posts are part of a fort built by a chief who, on bad terms with his neighbors, decided to live there. The approaches to the fort are along narrow ridges, and these paths are easily defended. During the night the chief and his warriors would descend to the plains and bring back pigs, chickens, taro, and sweet potatoes for their sustenance. Neither the chief's name or his fate have survived. (Wichman 1998:30–31, bold in original)

Wahiawa Bay, which is sometime used by small boats as an anchorage, "is a large, sand-bottomed bay that is lined on both sides with low sea cliffs" (Clark 1990:61). Clark offers another name for the bay: "Wahiawa Bay is also identified as Ahulua Bay in some of the archaeological literature that documents sites in the area. The word *ahulua* means "two altars" and may indicate the number of temples that were once located in the bay" (61). **Kani-mo'o-lae** (headland of the singing dragon") sits atop the cliff overlooking the ocean (Clark 1998:33).

Wichman offers a few more place names suggesting "the richness of life in Wahiawa": **'uki-hōlua** ("sledge for a sled race course"), referring to the sledge, similar to bulrush, grown in Wahiawa and used for *hōlua* sled courses; **Nupa** ("deep cave"), an *'ili*, meaning "a particularly deep cave suitable for living and a ceremony to insure growth or to clean contaminated persons"; **Ke-kualele** ("flying god"), denoting "a poison god who was sent to destroy an enemy.... Usually travelling in the form of a fireball" (Wichman 1998:33).

3.1.3 Wahi Pana near the Project Area

In 1873, the Boundary Commission identifies some sites near the Project area, on the border between Kalāheo Ahupua'a and Wahiawa Ahupua'a. These survey notes describe coming to "a stone with a split in it called <u>Waipapaaina</u>," then "crossing a gulley several times to a large rock, about 10 feet high with a split in it [the text has a drawing, like an <u>M</u>] thus and called <u>Kupuna</u>... to the North is a large tree on top of the ridge and called <u>Kapiliwahine</u>" (underscore in original, Hawai'i Commission on Boundaries 1873:44).



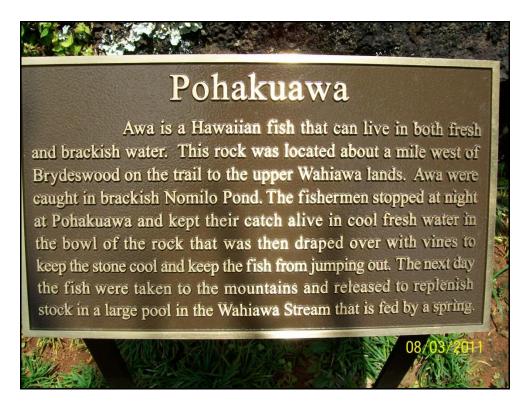
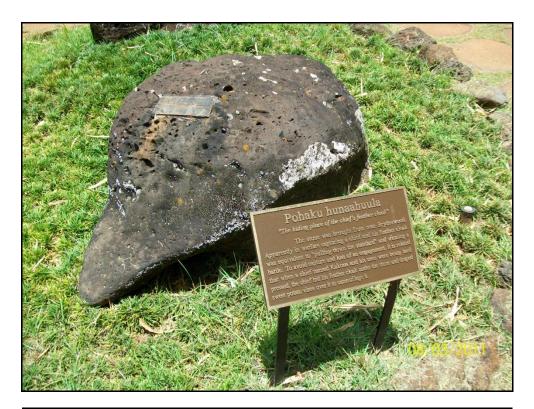


Figure 6. Pāhakuoawa and bronze plaque at Kukuiolono Park (CSH August 3, 2011)



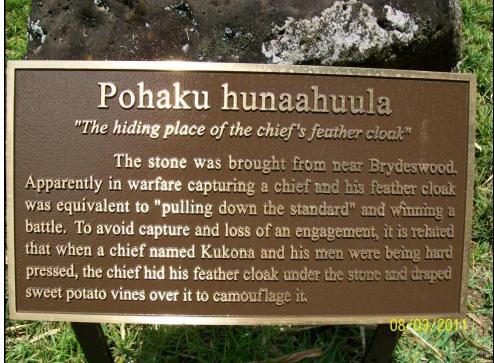


Figure 7. Pōhakuhunaahuula and plaque at Kukuiolono Park (CSH August 3, 2011)



Figure 8. Pōhakuloa at Kukuiolono Park (CSH August 3, 2011)



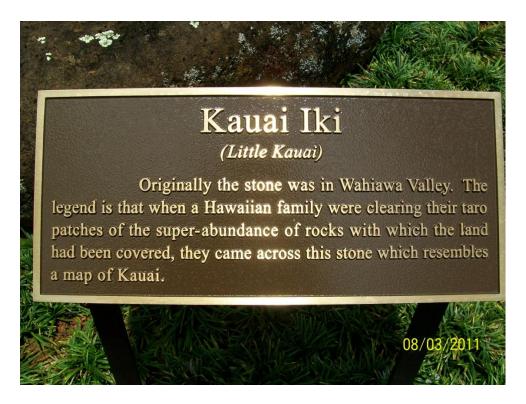


Figure 9. Kaua'i Iki at Kukuiolono Park (CSH August 3, 2011)

3.2 'Ōlelo No'eau

The only 'ōlelo no'eau related to the two ahupua'a surrounding the Project area is the following, referring to Kaua'i Iki, now in Kukuiolono Park:

I 'ike 'oe ia Kaua'i a puni a 'ike 'ole ia Kaua-iki,, 'a'ole no 'oe i 'ike ia Kaua'i.

If you have seen all of the places on the island of Kaua'i and have not seen Little Kaua'i, you have not seen the whole of Kaua'i.

Kaua'i-iki (little Kaua'i) is a stone that stood in a taro patch at Wahiawa, Kaua'i. When it was threatened with demolition by the building of a road, it was rescued by Walter McBryde and taken to Mai'aloa and later to Kukuiolono Park, where it stands today. (Pukui 1983:128)

3.3 Mo'olelo

Eric Knudsen, in his *Teller of Tales*, narrates a story of *menehune* who built the fishpond pond Ale Koko, along the Huleia River in Niumalu. The stones for this fishpond came from Nōmilu on the coast of Kalāheo Ahupua'a. As Knudsen describes it, "an aged Hawaiian woman with her snow-white head bent over her weaving" told of the human chain that reached from Nōmilu Fishpond to Huleia River, the spot of Ale Koko fishpond:

Here my old Hawaiian lady paused a moment, and then asked, "Elika, you know about the Nomilo Fishpond [Nōmilu Fishpond] that lies near the ocean on the south side of Kauai half-way between Koloa and Eleele, don't you?"

I nodded. "Well, that was once a small hill, she went on. "But when Pele, our fire goddess, made up her mind to leave Kauai for Oahu, she had one last great exhibition. She caused the hill to erupt, and it threw up rocks and molten lava thousands of feet into the air. It must have been a glorious farewell party! Then the south wind came up from the sea and carried the rocks far inland and covered the lands of Wahiawa and Kalaheo with thousands and thousands of small black rocks about the size of cocoanuts. Then the volcano sank down into the earth, leaving a large crater from which all the lava had been ejected. That big hole filled with water and made Nomilo Fishpond."

"In their search, the Menehune found these rocks ideal for building the king's fishpond, but alas! Many miles of rough country between Wahiawa and the chosen spot in the Huleia stream. Nothing daunted, the little King of the Menehune decided to use them. He lined up his men—and he had plenty of manpower! They stood facing one another but in staggered fashion, so that when a man received a rock he passed it to the man in the other line. In that way, each stone zigzagged the many miles on the long trip to the wall, where other little men waited to receive it and place it in the wall.

"The night the King of the Menehune chose to build the wall was clear and beautiful. Thousands of tiny figures standing in the zigzagging line were moving silhouettes against the blue moonlit sky. When the king had given the signal, the rocks began to pass from Menehune to Menehune and without interruption down the long, long line.

"All night long the rocks raced along from hand to hand. It was a tremendous job, and the little men worked at breakneck speed, for the wall must be completed by dawn. The Menehune always had to finish any job undertaken in one night, but if not finished then they never returned to go on with it.

"How they worked! But too soon the sky paled and the sun crept over the horizon. There was only ten feet or so left to go. Over two thousand feet had been completed that night. But the king told them to stop work at once and to wash their hands. The sharp lava rocks had taken their toll. Not a man in all the lines had escaped. All had lacerate, bleeding hands. They washed them in the water of the lagoon and the surface of the water turned blood-red.

"The king of Kauai was very pleased with his fishpond, and soon had the wall finished and the pond well stocked with fish. In memory of the heroic little Menehune he named it Ala Koko, the Rippling Blood." (Knudsen 1946:250–252)

For Wahiawa Ahupua'a, Fornander, in his "Legend of Kawelo," describes Kawelo's conflict with Kaeleha and Aikanaka, leading to Kawelo's stoning in Wahiawa prior to his reawakening:

When he [Kawelo] arrived at Wahiawa, he saw several war canoes belonging to Kaeleha and Aikanaka, just back of the great mounds of stones. On the sides of the mounds of stones, he saw women and children with stones in their hands, and all were apparently ready for conflict. All Kawelo had in his hands were his war club, Kuikaa, and his wife's pikoi, two weapons to defend himself....

When the people saw that Kawelo was entirely covered over with stones, they believed that they had killed him, for they were sure that none could live in such a hail of stones as was cast at Kawelo. The people then ceased throwing and they took the stones from off of Kawelo. After a while he was found all bruised from head to feet and, to all appearances, lifeless. They then took up his body and began to beat it with clubs, after which they leaned over him and listened to see if he was alive or dead. After a while they made sure that Kawelo was indeed dead, and they proclaimed that Aikanaka was king of Kaua'i.

In this battle and the subsequent beating with clubs, it turned out strange that after all Kawelo was not really killed. It seemed that he still had a little spark of life within him, and in the course of time he came to life again. But this was not known; consequently, his enemies were prevented from killing him outright. Kawelo was aware that, if he showed any signs of life when they examined him, he would be killed, so he pretended to be dead. (Fornander 1959:104–108)

Eventually, Kewalo defeated his enemies and became chief of Kaua'i once again (Fornander 1959: 110–113).

Another aspect of the Kawelo story is the association with sharks and shark-gods. Westervelt describes this association thus:

Many Kawelos are named in the legends of the islands of O'ahu and Kaua'i, but one only was the strong, the mighty warrior who destroyed a gigantic enemy who used trees as spears. He was known as Kawelo-lei-makua when mentioned in the genealogies.

Kawelo's great-uncle, Kawelo-mahamahaia was King of Kauai. The land prospered and was quiet under him. When he died, the people worshipped him as a god. They said he had become a divine shark, watching over the seacoats of his island. (Westervelt 1968:173)

In Pukui and Elbert's (1984) *Hawaiian Dictionary*, in the "Glossary to Hawaiian Gods" (381–398), there is the following description:

Ka-welo-mahamaha-i'a. An older brother of Ka-welo who turned into a shark and was worshipped. *Lit.*, Ka-welo [with] fish gills.

In Wailua, Kaua'i, there is also a story of Kawalo associated with a shark. The name is variously spelled as "Kawelu" (Knudsen 1946:83), "Kawalo" (Smith 1955:67) and "Kauela" (Wichman 1998:72). Because of the similarity in spelling, and because of the family association with sharks, the distinction between the different Kawelos (brothers, or uncle and nephew) and Kawalo (also a shark-spirit) may become intentionally blurred (as will be seen in the Anne Punohu interview below).

3.4 Heiau

Pukui et al. describes **Kukuiolono** as a "hill and site of a *heiau* in a private park near Port Allen, Kō-loa district, Kaua'i." Wichman explains that the *heiau*, "now destroyed," was built upon three terraces, the east portion being "95 by 122 feet in dimension," the midsection "105 by 83 feet, and the west part 105 by 51 feet (1998:34). With the *makai* boarder of the *heiau* at 246 feet, when it still existed, **Kukuiolono** was the largest *heiau* on Kaua'i (34). The 'anu'u (tower), with a base of 22 by 30 feet, indicating an unusually large tower, "was three stories tall and covered with *kapa* (tapa, bark cloth). It was the most sacred part of the temple" (34).

Wichman (1998) describes other closely related *heiau* in the area:

Lono was one of the four major gods of the Hawaiians. He was god of clouds, winds, sea, fertility, and agriculture. Therefore, any sacrifices of animals were done in nearby *heiau*. **Ka-hale-ki'i**, "image house." It was a three-terraced *heiau* of large size. The sacrificial altar on which the victims were killed was named **Nā-pōhaku-a-ki'i-ola**, "rocks of the living images." The offerings were brought dead to Kukuiolono so that Lono's altar would not be polluted with blood. Lono listened to prayers for rain, for abundant crops, and for escape from sickness and trouble.

Nearby was **Ipuolono**, "gourd of Lono," a small *heiau* that embodied the spiritual value of daily prayers. Each family owned an *ipuolono*, a food gourd covered with wickerwork and hung with strings from a notched stick. Vegetable food, fish, meat, and kava were kept in the gourd. Twice a day the family head took the gourd down and laid it at the door of the house. Facing the sun, he prayed for his

chief, his extended family, and for his own immediate family. Then he ate some of the food and sucked on the kava root. Afterward the *ipuolono* was washed, the food was replaced, and the gourd stored away again. (34)

Thrum (1907) listed four *heiau* in Wahiawa Ahupua'a and two others in Kalāheo Ahupua'a:

Huhuakai Wahulua Bay, Wahiawa.—A medium sized heiau: portion of its

walls may yet be seen. Class unknown.

Waopili Wahiawa.—An oblong heiau of good size, walls still standing.

Kaumuolono Wahiawa.—A large heiau of square shape: part of its walls still

standing. Class unknown.

Wahiawa-uka Wahiawa.—A walled heiau of large size, long since destroyed

Kapoho Nomili, Kalaheo.—A walled heiau of large size, long since

destroyed.

Kakainahoa Kalaheo.—A paved oblong heiau of large size [sic.] All destroyed.

(Thrum 1907:37)

Bennett (1931) offers a further description of **Huhuakai Heiau**: "It is mostly destroyed. A platform of irregular shape is left, the front part of which is paved with small stones and the rest roughly paved. Nothing that would identify it as a heiau now remains." Donohugh (2001) describes **Waopili Heiau**:

Wai-o-pili heiau is near the Gillin house on the east side of Wai-o-pili (water of pili grass spring). The quarry covers most of it. It had a rectangular wall 50 by 90 feet high and almost as thick. It was the largest of four major heiau on the south shore. Though only the southeast corner can be seen, the massive slabs of volcanic rock are impressive. According to an archaeological survey in 1974, the heiau was the focus of a large Hawaiian community in the area. (bold in original, Donohugh 2001:257)

3.5 Burials

Though Hawaiians have historically been known to bury family members near their residence, no evidence exists of human burials near the Project area. The former Walter D. McBryde estate within Kukuiolono Park contained graves (SIHP #50-30-10-3908; Jones et al. 2006; Tulchin et al. 2005) (see Section 5.1)

3.6 Water Resources

Gay's 1872 map of the area shows streams near the Project area (Figure 10 and Figure 11). Monsarrat's 1896 map similarly shows many streams near the Project area. The Project area also surrounds a spring and hill, both of which are named **Papapaholahola** (Soehren 2010). Ulukau's listing of "Hawaiian Place Names" offers the following added information: "Elev. 1160+ ft. A hill and a spring are included in 'Gov't Spring Reserve' (TM 2400) of 54.4 acres. Coordinates given for spring" (Soehren 2010).

3.7 Ala Hele (Trail)

Monsarrat's 1896 map shows a road half a mile west of the Project area (Figure 12 and Figure 13). This road leads down to Government Road, to the south of the Project area, with a trail extending farther *makai*. Closer examination reveals a trail, which appears to extend from Kapuna Rock to Pu'umaiahale, then to Pu'uiki and finally Kahela. Moreover, in Section 4.3 a composite map of Kalāheo Ahupua'a, drawn from several sources, reveals a trail crossing Government Road near Kukuiolono Heiau (Figure 14).

3.8 'Ōpe'ape'a (Hawaiian Hoary Bat)

The 'ōpe'ape'a (Hawaiian hoary bat) is Hawai'i's only endemic terrestrial mammal. It is featured in several *mo'olelo* of Kaua'i and offers a special sight: "Hawaiian hoary bats have an uncommon combination of rarity and conspicuousness which make them a special and entertaining sight, swooping in solitude over the Hawaiian sunset" (Gerum 2011, citing the Haleakala National Park website).

The 'ōpe'ape'a is endangered, as stated in *Hawai'i's Comprehensive Wildlife Conservation Strategy* (Mitchell et al. 2005):

The 'ōpe'ape'a (Hawaiian hoary bat) is the only land mammal native to the Hawaiian archipelago and is an endemic subspecies of a bat found throughout North and South America. Historically, it is known from all of the MHI [Main Hawaiian Islands] but Ni'ihau. It is federally listed as endangered due to apparent population declines and a lack of information on its distribution, abundance, and habitat needs. Bats are affected by habitat loss, roost disturbance, and pesticides. The Hawaiian Bat Research Cooperative, a partnership composed of government agencies, non-profit organizations, and private landowners, was formed to prioritize and fund needed bat research. (Mitchell et al. 2005)

This Wildlife Comprehensive Strategy report indicates that 'ōpe 'ape 'a are within the lands that comprise the McBryde Sugar Company, Ltd., and thus would contain Kalāheo Ahupua'a (Mitchell et al. 2005). For this area (within Kaua'i Watershed Alliance), "planned management includes fencing, ungulate control through variety of methods suppression, containment, eradication of priority and secondary weeds, monitoring (ungulate activity, weed distribution, vegetation cover, stream turbidity" (Mitchell et al. 2005).

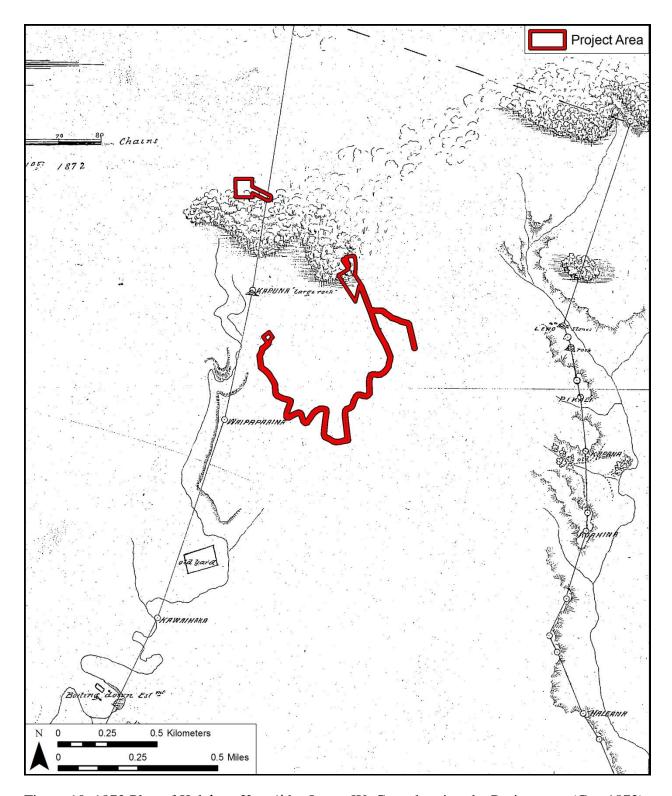


Figure 10. 1872 Plan of Kalāheo, Kaua'i by James W. Gay, showing the Project area (Gay 1872)

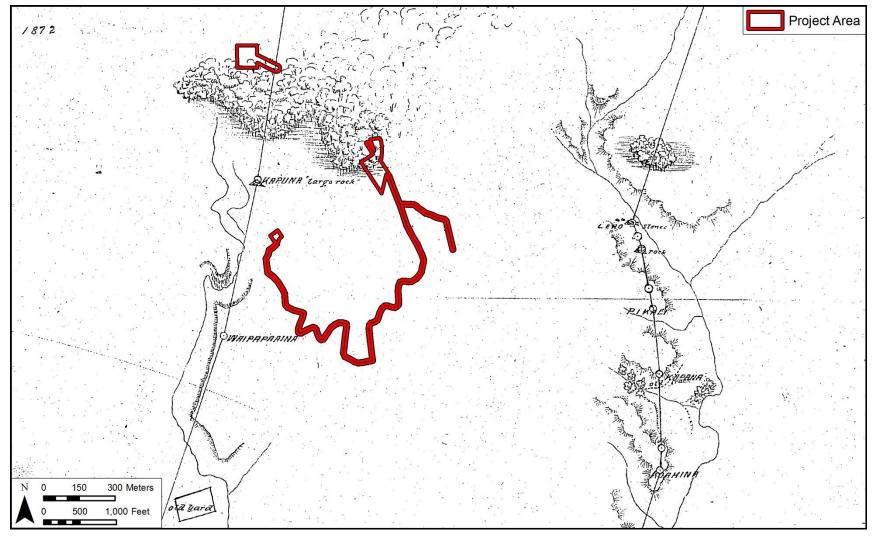


Figure 11. 1872 Plan of Kalāheo, Kaua'i, by James W. Gay, focusing on Project area (Gay 1872)

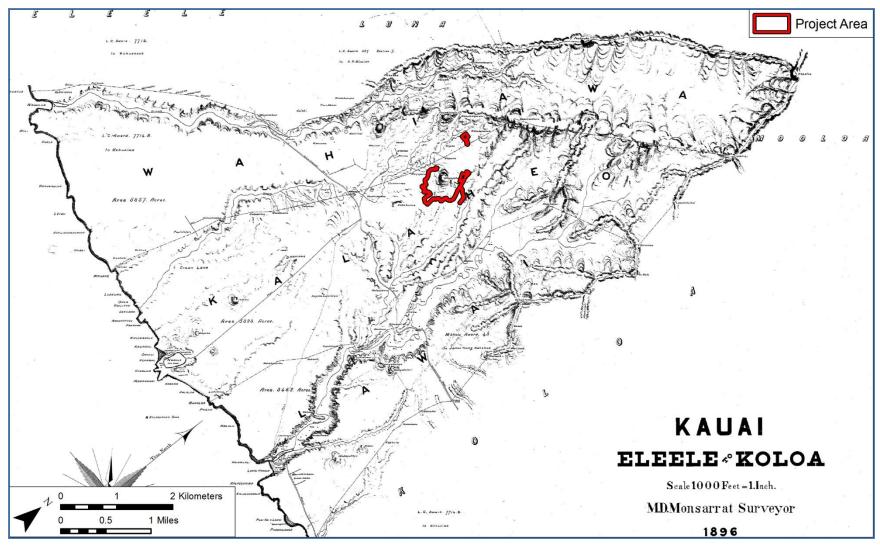


Figure 12. 1896 Monsarrat Map, 'Ele'ele to Kōloa Ahupua'a, showing the Project area (Monsarrat 1896)

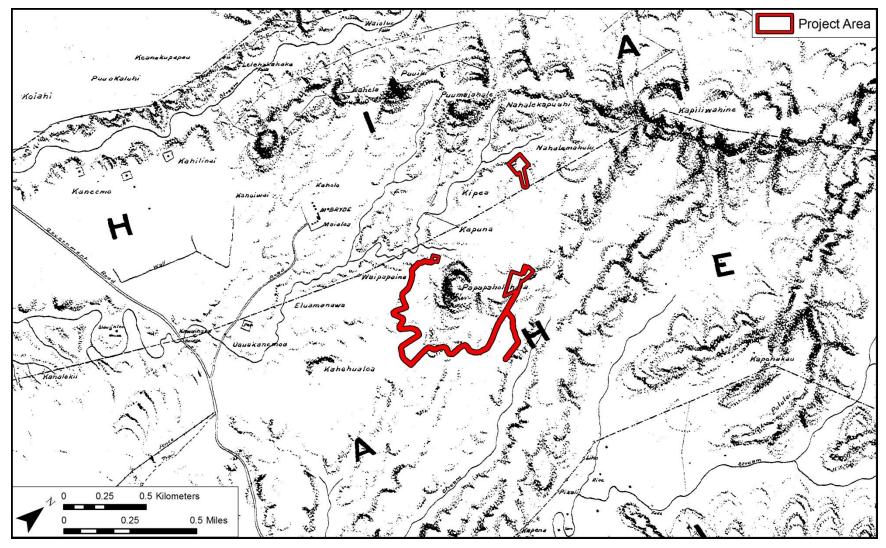


Figure 13. 1896 Monsarrat map of 'Ele'ele and Koloa Ahupua'a, focusing on project area (Monsarrat 1896)

Section 4 Historical Background

4.1 Early Historic Period

Though historical references to Kalāheo and Wahiawa are scarce, they are suggestive of the importance of Kalāheo as a center for agriculture and religious activities. Oral and traditional accounts place the pond Nōmilu as the foci for numerous stories. There are few early descriptions of Kalāheo. The Rev. Hiram Bingham gives us one vivid description of the uplands between Hanapēpē and Kilohana in 1824:

A country of good land, mostly open, unoccupied and covered with grass, sprinkled with trees and watered with lively streams, which descend from forest covered mountains, and wind their way along ravines to the sea. It is much finer country than the western part of the island. (Bingham 1847:219)

In 1849, while circling Kaua'i, beginning at Waimea, William DeWitt Alexander offered this description of Kahili peak, and the vicinity:

Mauna Kahili [Kahili Mountain] was close to the left, & on the right a beautiful range of hills extending towards the northeast, and terminating in an abrupt peak which goes by the name of "Hoary Head" [Hā'upu Ridge]. We rode over a beautiful undulating table land, dotted with groves of lauhala [pandanus] and kukui. After riding about five miles, we crossed a stream fitly called Stoney Brook. We afterwards crossed many other streams on our way. (Alexander 1991:122)

William T. Brigham provides a brief account of Kalāheo and Wahiawa. He writes the following in his journal on July 10, 1865:

Monday morning I left Koloa for Waimea. As soon as the mud craters or hills on the south of Koloa were passed, a series of valleys commenced, ending in Wahiawa, Mr. McBryde's place, where I did not stop as I was anxious to get on as fast as possible. Beyond Wahiawa the road was barren over red soil and stones. (Lydgate 1991:144)

The earliest documentation of the population of the district of Kōloa (including Kalāheo and Wahiawa) appears in the 1850s when missionaries recorded a total population of 1,296 (Schmitt 1977:12). Population totals in the entire island of Kaua'i prior to 1850 had shown rapid decline, suggesting that similar trends likely occurred in Kōloa and Kalāheo. By 1878, the population of Kōloa bottomed out at 1,008, and then began steadily increasing to 1,500 in 1884, 1,835 in 1896, and 4,564 by 1900 (Schmitt 1977:13). Other nearby *ahupua'a* of Kaua'i demonstrate similar trends.

4.2 Mid-Nineteenth Century and the Māhele

The Organic Acts of 1845 and 1846 initiated the process of the Māhele—the division of Hawaiian lands—that introduced private property into Hawaiian society. In 1848, the Crown and the *ali'i* (chief) received their land titles as *Konohiki* (land manager) Awards. *Kuleana* (Native

land rights) awards to commoners for individual parcels within the *ahupua'a* were subsequently granted in 1850, and thereafter. In 1850 the Privy Council passed resolutions that would affirm the rights of the commoners or native tenants. To apply for fee simple title to their lands, native tenants were required to file their claim with the Land Commission within the specified time period of February 1846 and February 14, 1848. The Kuleana Act of 1850 confirmed and protected the rights of native tenants. Under this act, the claimant was required to have two witnesses who could testify they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land for a minimum of two years, and knew that no one had challenged the claim. The land also had to be surveyed (Chinen 1958:31). The LCA documentation provides insights into the life of Kalāheo residents at and just prior to the Māhele (Table 1).

While Kauikeaouli (Kamehameha III) retained ownership of Kalāheo Ahupua'a, as Crown Lands in the Māhele, eleven individuals made land claims and were awarded lands within the *ahupua'a*. Figure 14 shows the distribution of the eleven awards (some including multiple parcels) in relation to major land forms—the sea and streams and Nōmilu fishpond—and to major roads and trails. Folk and Hammatt (1991:11) explain that Figure 14 is a composite map, derived from several sources, including the following:

- Nineteenth century maps of the *ahupua* 'a boundary survey, as well as field notes
- native testimony presented to the Boundary Commission
- Hawaii Territory Survey map of the crown lands of Kalāheo showing Rights of Way for constructed and proposed irrigation and transportation systems of McBryde Sugar Co. Ltd.
- A map of Kalāheo homestead grants and modern Kaua'i County property tax maps for locating awards
- Native Register and native and Foreign Testimony associated with LCAs.

Land Commission documents recording these awards further clarify our understanding of the 'āina' (land) from the perspective of the Hawaiian planter and fisherman in traditional times. Most of the awards (LCA 3395B to Keoua, LCA 6647 to Una, LCA 6745 to Oluhe, LCA 8044 to Alauka, and LCA 8840 to Kanenehakaoli) include plots of *lo'i kalo* (irrigated taro terrace), *kula* (plains, open country), and house lots located along Kalāheo Stream, clustered around the "Government Road." In addition, one or more plots for sweet potato and salt making were located at the seashore in the vicinity of Nōmilu fishpond. Only one claim of land (LCA 6520 to Waipa) was awarded in the farthest *mauka* regions of Kalāheo; Waipa did not claim land elsewhere. Another claimant's land—LCA 6584 to Paele—may have been located only at Nōmilu near the shore, although the Foreign Testimony, Native Register, and maps showing award locations do not agree on this. Three other claimant's awards are located only in the upland (LCA 3394B to Kaneiki, LCA 3396B to Kihei, and LCA 6688 to Laa).

Though LCAs indicate that Kalāheo had *lo'i* and sweet potato farms, Wahiawa was not amenable during this same time period. In describing the conditions of Wahiawa prior to the use of irrigation, Ida Elizabeth Knudsen Von Holt writes of hardships experienced by Valdemar Knudsen, her father, during the 1850s and 1860s: "In those early days, land was very cheap. There was no way of watering or irrigating the fields, and the grass became absolutely parched

and dead during the dry months. Cattle often died for want of food and water" (Von Holt 1985:66).

By the 1930s, when E. S. Craighill and Elizabeth Handy were collecting ethnographic and ethnobotanical data for their monumental works on Hawaiian planters, the character of the *ahupua'a* of Kalāheo had become an obscure memory (Handy 1940; Handy and Handy 1972). Kalāheo is described in the twentieth century as "little more than a gulch formed by an insignificant stream which probably never had a constant flow. Kukui-o-Lono (Light of Lono) was a famous place in this section [land division] for sweet potato culture" (Handy and Handy 1972:428).

This description seems hardly adequate for an *ahupua* 'a formerly reserved for the *ali* 'i *nui* (paramount chief). Especially as adjoining Lāwa 'i and Wahiawa were awarded to the lesser *ali* 'i James Young Kanehoa and Moses Kekuaiwa, respectively, with rich descriptions by Handy Handy (1972). Kalāheo, Lāwa 'i, and Wahiawa share essentially identical environmental parameters of topography, rainfall, temperature, and abundant spring and stream water in close association with substantial arable land. Thus, if additional informants from Kalāheo had been available to them, Handy and Handy's description of Kalāheo would be as exuberant as this for Wahiawa:

...the taro terraces extended all the way down the valley to the *muliwai* (inlet). A short distance above the present highway bridge was a spring named Ka'ulupaniau, which watered a small group of terraces. Inland from this was Kawaikapulalo [The-sacred-water-below], and here were terraces and *wauke* (paper mulberry) plantations. Above this was *kula* land named Kawaikapuluna [The-sacred-water-above], on which were the houses and sweet-potato plantations. Continuing upstream to a point opposite Pu'u Aukai there were other terraces in the stream bed, with houses and sweet-potato plantations on *kula* land above. (Handy and Handy 1972:428)

In 1931, Bennett notes that:

The remains of terraces remarkable in places for their number on a small area of land. Walls that extend quite a way [sic.] along the sides of the valley seem to have no purpose though they may be the result of clearing the fields for agriculture. These are platform house sites in the valley; burial caves and petroglyphs are also reported. (Bennett 1931:115)

Table 1. Kalāheo Ahupua'a LCAs Summary

LCA#	Claimant	Ili	Land Use	Awarded/Not Awarded
03394B	Kaneiki	Kapaeli	House, Cultivation	One 'āpana (lot), one lo 'i,
03395B	Keoua	Puʻuhalulu, Kalaukiela, Omomilu	House, Cultivation	Four 'āpana, 30 lo 'i, one house lot, two salt lands, one orange grove
03396В	Kihei, Samasona	Punipoi, Waiʻāpuka, Kaʻawa	Cultivation	Three 'āpana, 34 lo 'i, one orange grove
06345	Kaneiki	Kalāheo (ahupuaʻa)		Not awarded
06346	Keoua	Kalāheo (ahupuaʻa)		Not awarded
06347	Kanenehakuole	Kalāheo (ahupuaʻa)		Not Awarded
06520	Waipa	Umiumihale	Cultivation	One 'āpana, 12 lo 'i
06535	Haia, wahine	Lonohale		Not Awarded
06584	Paele	Omomilu	House lot, Cultivation	Four 'āpana, one house lot, five salt lands, sweet potatoes
06647	Una	Kolau	House lot, Cultivation	Three 'āpana, one lo 'i, two house lots
06688	Laa	Koali	Cultivation	One 'āpana, 17 lo 'i, one kula

LCA#	Claimant	Ili	Land Use	Awarded/Not Awarded
06745	Ohule	Haleopai, Makaʻalaea, Omomilu	House lot, Cultivation	Three 'āpana, 17 lo 'i, one kula, one house lot, five salt lands, one sweet potato field
08044	Alauka	Paele, Holeikamaina	House lot, cultivation	Three 'āpana, 14 lo 'i, one kula, four salt lands
08840	Kanenehakuole	Ka'awa	Cultivation	Two 'āpana, 15 lo 'i, four salt lands

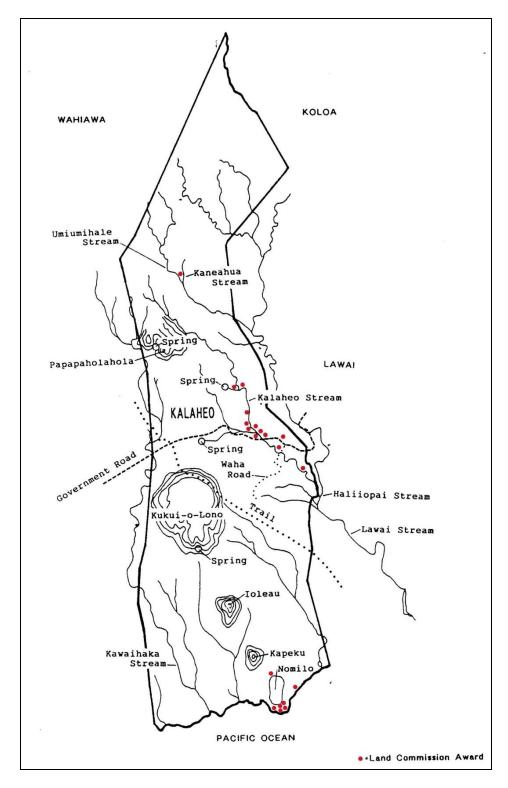


Figure 14. A composite map derived from many sources, showing distribution of LCAs within Kalāheo Ahupua'a (Folk and Hammatt 1991)

4.3 Post-1850

According to Ethel Damon (1931), the Nōmilu fishpond in coastal Kalāheo was still in use in the 1860s when Judge Duncan McBryde, at the time living in Wahiawa, received fish from the local population. McBryde explains:

The natives ... stretch their gill net for the weekly catch in the celebrated pond at Nōmilu. This is a deep pool, quite uniformly so, about twenty-four feet in a direct drop after the first narrow ledge near the rim, in structure not unlike a volcanic fire pit. (Damon 1931:552)

Donohugh (2001) explains the agricultural development of Kalāheo and Wahiawa in the mid-1800s:

Duncan McBryde, originally from Argyleshire in Scottland, settled on Kaua'i in 1856 and had two sons who would form McBryde Sugar Company. The elder McBryde raised cattle on land purchased in Wahiawa, eventually expanding the operation to include the entire *ahupua'a* of Wahiawa and a crown lease of Kalāheo. He married Elizabeth Moxley in 1860 and built a home, "Brydeswood," in upper Wahiawa District. The couple had six children before Duncan died in 1878, at age 52. I 1886, his widow acquired the *ahupua'a* of Lāwa'i from the estate of Queen Emma. Elizabeth McBride moved to California a few years later but two of their sons, Alexander and Walter, remained on Kaua'i. In 1899, with financial assistance B. F. Dillingham of Honolulu, they formed the McBryde Sugar Company. It was comprised initially of their cattle ranch, small Ele'ele Plantation with its old mill, and some cane land in Kōloa. (Donohugh 2001:99–100)

In 1931, Damon further describes how some of the parcels belonging to McBryde Sugar Company became lands set aside for Kukuiolono Heiau:

Walter Duncan McBryde, by exchange of lands for the Kalaheo homestead project there and by dint of development in the pineapple industry, built a park for the island. Kukui-o-lono it is called. Torch-of-God-Lono, an ancient place-name from times when a beacon nightly shone on the hill there to direct fisher folk and travelers far out at sea. Today park and forest lands cover seventy acres immediately surrounding and in part sustained by five times that area in fields planted to pineapples, and all this fair use of the island whence it originally came into private lands. (Damon 1931:220–221)

Early in the twentieth century, land use and the population density changed dramatically in Kalāheo. The uplands were subdivided into homesteads and ranching became the primary land use. At lower elevations sugar cane cultivation became the major activity, with irrigation water collected from the uplands by means of an extensive system of ditches and reservoirs. Plantation camps were scattered around the south of Kalāheo and Wahiawa Ahupua'a. A map of the McBryde Sugar Company (Figure 15) shows the northern extent of sugar train tracks in the Kalāheo Homestead vicinity (Condé and Best 1973:193).

Kalāheo was populated by the Spanish and later Portuguese settlers in the latter early 1900s. Truck crops, dryland taro, pineapple, sugarcane, and grapes were grown in the Project area vicinity. Ranching also became an integral part of the Kalāheo community. During World War II, military personnel constructed a communication structure at the top of Papapaholahola Hill, which still stands today. Today, Kalāheo is a small community with a hotel, restaurants, post office and grocery store. Pasture land is still visible along the surrounding hillsides. Remnants of the *lo'i* still remain. Donohugh (2001) explains:

A rough hike west through the brush would bring you to a place from which you could look down on Kalāheo Gulch. The taro terraces there look as if they had been left only yesterday. Many Hawaiian house sites and a *heiau* also are in the gulch. The most fascinating finding, never reported by archeologists, is a vertical bas-relief about 2 by 3 feet with contoured human forms, not the usual stick figures Hawaiians were wont to carve. The carving is so weatherworn it is difficult to tell exactly what it portrays. (Donohugh 2001:235)

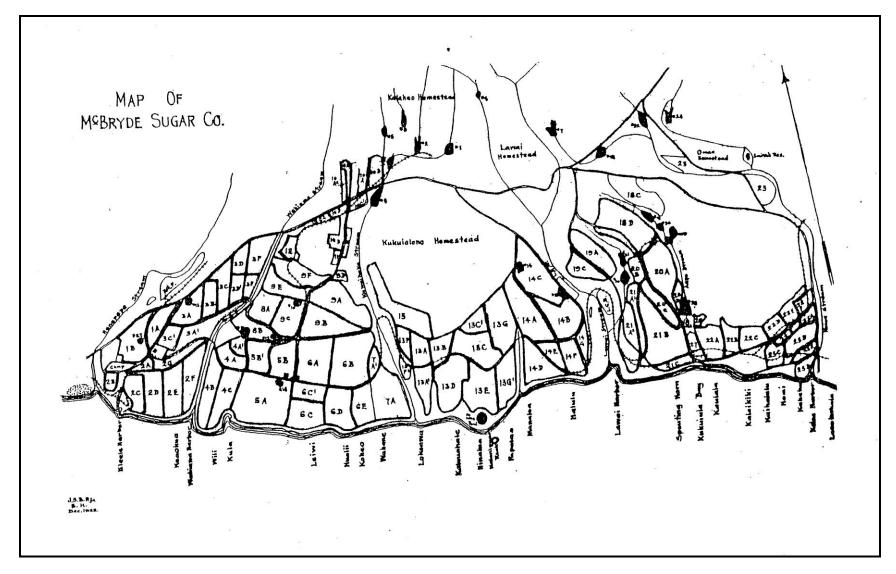


Figure 15. Map of McBryde Sugar Company Lands c. 1922 (Conde and Best 1973:193)

Section 5 Archaeological Research

5.1 Previous Archaeology

Previous archaeological research in Kalāheo Ahupua'a is summarized in Table 2, shown in Figure 16, and discussed below. As part of his fieldwork in the 1920s, Wendell C. Bennett (1931) reviewed and revisited many sites located by early twentieth century archaeological studies on Kaua'i, including sites in the *ahupua'a* of Kalāheo. Bennett (1931:115–116) lists five archaeological sites in Kalāheo, numbered 64 to 68. Three of these are located at or near the coast and include: "Site 64. House sites, in Kalāheo [Kawaihaka] gulch at the sea"; "Site 67. Fish pond, salt pans, and taro terraces, at Nōmilu"; and "Site 68. Kapoho Heiau, inland from the fish pond at Nōmilu, Kalāheo." The other two sites are located further *mauka* and consist of "Site 66. Kukuiolono Heiau, once located on Kukuiolono hill but now destroyed" and "Site 65. Kahaleki'i Heiau, on the western slope of Kukuiolono hill...now completely destroyed."

The *ahupua'a* of Kalāheo is dominated by a large cinder cone, "Kukui-o-Lono" (light of Lono), on top of which stood Kukuiolono Heiau. The *heiau* is believed to have been the largest of Kaua'i, though it had been destroyed by the time of Bennett's survey in the 1920s. Thrum (1907 cited in Bennett 1931) described it as:

A large three terraced *heiau*, east section being 95 by 112 feet, mid-section 105 by 83 feet and west division 105 by 51 feet, giving a total length of 246 feet straight on the seaward side. Near east end is a large oven; near the division wall is the *kahua* [platform]of the oracle 22 x 30 feet, and on north side of mid-section are foundations of two houses which measure 15 by 42 feet. The sacrifices for this heiau were executed at some distance from it and the bodies then brought and placed on the altar that the temple be not polluted with blood. The place of sacrificing was, "Na pohakuakiiola."

Located on the western slope of Kukuiolono hill was Kahaleki'i Heiau. Kahaleki'i Heiau was also destroyed by the time of Bennett's survey. Thrum (1907, cited in Bennett 1931) described it as: "A square three-terraced *heiau* of large size, with several divisions: was high walled and paved: class unknown."

In 1961, Kalāheo again became the subject of archaeological study during a survey by William K. Kikuchi (1963). The survey of the Kona District of Kaua'i, from Hanapēpē to Māhā'ulepū, located 23 archaeological sites within Kalāheo Ahupua'a and field numbers were assigned to them. In coastal Kalāheo, the archaeological sites begin with No. 25, a shelter cave at the shore at Lokoawa near the western boundary of the *ahupua'a*. Five more sites (No. 26–30), including a shelter cave, stone walls, house sites, a spring, and an historic tunnel are recorded by Kikuchi (1963) in the shoreward reaches of Kawaihaka Stream valley. Among these sites, in all probability, is Bennett's Site 64. Five additional previously unrecorded sites (No. 31-35) were located at Kalu'uahole (Kaluaahole) and Papapua'a (Paapuaa) along the shore between Kawaihaka and Nōmilu, including a fishing shrine, house sites, and shelter caves. At Nōmilu (Nomilo) Kikuchi records seven sites (Nos. 36–42), including Nōmilu (Nomilo) fishpond, walls salt pans, and historic tunnel, and Kapoho (Kapono?) Heiau. Kikuchi's sites include Bennett's sites 67 and 68. Three additional previously unrecorded sites (No. 43-45) are located in the

vicinity of Manoloa (Manuloa), a point on the shore at the eastern *ahupua* 'a boundary. These sites include an enclosure, walls, and a fishing shrine.

Further upland, within the current Project area, Kikuchi (1963), like Bennett, records only Kukui-o-Lono Heiau (Kikuchi site 46; Bennett site 66) and Kahaleki'i (Kahakekii) Heiau (Kikuchi site 47; Bennett site 65). Kikuchi does not observe any evidence of the sites and notes that both *heiau* had been destroyed.

In 1988, Nancy McMahon (1988), a State Historic Preservation Division staff archaeologist, conducted a field inspection of a proposed water pipeline through State of Hawai'i property (TMK [4] 2-4-004:005) on the slope of Papapaholahola Hill. During the inspection, McMahon identified a historic property consisting of a stone wall associated with terraces and a paved platform. This site was assigned SIHP #50-30-10-406, and was posited to be a remnant of Kakaianahoa or Kahaleki'i Heiau, both of which were described by Thomas Thrum in 1907 as having been destroyed.

An archaeological study conducted by Jeffrey Pantaleo and Scott Williams (1991) involved inspection of portions of a proposed power line corridor from Port Allen to Wainiha. Although the corridor passes through Kalāheo Ahupua'a, studies were not conducted there because the corridor is "located in areas that have been modified by pasture or sugar cane cultivation" (Pantaleo and Williams 1991:1–2).

In May 1991, Nancy McMahon conducted an archaeological survey (Hibbard 1991) of an approximately 10-acre lot (TMK 2-4-001:012) located in Kalāheo, *mauka* of Kaumuali'i Highway near Kuli Road. Many earthen terraces were identified by McMahon and found to be remnants of "pineapple era fields." No additional work was recommended.

In December 1991, Folk and Hammatt (1991) reported on the archaeological survey and subsurface testing of LCA 6647 at Kalāheo. No archaeological surface features were located. Subsurface testing found no cultural deposits. This absence of cultural features/deposits may be due to land disturbance from the attempted but never completed construction of an agricultural reservoir feature, to encompass all of LCA 6697, in the early twentieth century (Folk and Hammatt 1991).

In December 2000, Perzinski et al. (2001) conducted an archaeological inventory survey for the Kalāheo water system expansion project. This study area was located just west of the current Project area, on the other side of Pu'uwai Road. The study area had been previously inspected by McMahon (1988). Two historic sites were identified. SIHP #50-30-10-406, previously located by McMahon, was relocated and determined to be of historic origin. Subsurface testing within Site -406 encountered a horse burial, indicating the historic age of the site. Site -406 was posited to be related to historic truck crop or pineapple cultivation. SIHP #50-30-10-485 is a dike determined to be a historic water diversion feature. No further work was recommended for these sites.

In March 2005 Tulchin, Jones and Hammatt conducted a field inspection and literature review for improvements to Kukuiolono Park. A total of five archaeological sites were located within the Project area. SIHP #50-30-10-3906 consisted of an assemblage of historic properties within Kukuiolono Park, including historic artifacts and historic structures, attributed to the Estate of Walter D. McBryde. SIHP #50-30-10-3907 consisted of a collection of traditional Hawaiian stones and artifacts assembled by Walter D. McBryde. SIHP #50-30-10-3908 consisted of the

graves of Walter D. McBryde and a companion. SIHP Site #50-30-10-3909 consisted of a loosely stacked stone retaining wall or terrace (historic), located along the southern slopes of Kukuiolono. SIHP Site #50-30-10-3910 consisted of a remnant stone wall alignment (possibly pre-Contact), located along the southern slopes of Kukuiolono.

The SHPD review letter of that study (dated April 7, 2005; Log No 2005.0676, Doc No. 0504NM09) called for the study to be upgraded to an archaeological inventory survey report. This Archaeological Inventory Survey (Jones et al. 2006) covered a significantly smaller area than that of the previous field inspection and literature review study and focused on those areas for which improvements were under consideration. Three sites were documented. SIHP #50-30-10-3906 comprised nine features, twentieth-century historic artifacts, and historic structures within Kukuiolono Park attributed to the Estate of Walter D. McBryde, to the military occupation of the park, or to the use of this land by the Kaua'i Pineapple Co. SIHP #50-30-10-3907 comprised ten features, a collection of traditional pre-Contact Hawaiian stones and artifacts assembled by Walter D. McBryde. SIHP #50-30-10-3908 comprised three features related to the graves of Walter D. McBryde and John P. Kamanuwai and associated stone artifacts.

In May 2010, Moser et al. (2010) conducted a field inspection and literature review for the Kalāheo water system expansion project. This study area was located adjacent to the Nursery Site parcel, on the west side of Pu'uwai Road. No historic properties were observed within the survey area.

5.2 Literature Review and Field Inspection

The companion archaeological literature review and field inspection study for the Project did not identify any archaeological sites within the Project area, which had been previously disturbed for transportation, residential, or commercial purposes (Yamauchi and Hammatt 2011).

Table 2. Previous archaeology in Kalāheo

Reference	Type of Study	Location	Findings
Thrum 1907	Heiau study	Island wide	For Kalāheo Ahupua'a, Thrum briefly lists three <i>heiau</i> : Kahaleki'i Heiau, on the western slope of Kukuiolono hill; Kapoho Heiau <i>mauka</i> of the fishpond; and Kakainahoa Heiau, location not given, "all destroyed"
Bennett 1931	Site Survey	Island wide	Site 64. House sites, in Kalāheo [Kawaihaka] gulch at the sea Site 65. Kahaleki'i Heiau, on the western slope of Kukuiolono hill, now completely destroyed Site 66. Kukuiolono Heiau Site 67. Fish pond, salt pans, and taro terraces, at Nōmilu Site 68. Kapoho Heiau
Kikuchi 1963	Archaeological Survey and Excavations	Kona District, Kauaʻi	Located and assigned field numbers to 23 archaeological sites within Kalāheo Ahupua'a
McMahon 1988	State of Hawai'i, Department of Land and Natural Resources Letter to File from Nancy McMahon Job No. 87-9	A proposed water pipeline corridor through State of Hawai'i property (TMK [4] 2-4-004:005) on the slope of Papapaholahola Hill	Identified a historic property consisting of a stone wall associated with terraces and a paved platform. This site was assigned SIHP #50-30-10-406, and was posited to be a remnant of Kakaianahoa or Kahaleki'i Heiau
Folk and Hammatt 1991	Archaeological Survey and Subsurface Testing	LCA 6647 at Kalāheo	No significant finds; his absence of cultural features/deposits resulted from land disturbance from the attempted but never completed construction of an agricultural reservoir feature
Hibbard 1991	Letter from Don Hibbard to	An approximately	Many earthen terraces were identified and found to be remnants of pineapple era fields

Reference	Type of Study	Location	Findings
	Keith Nitta, May 30, 1991 (archaeological survey by Nancy McMahon)	10-acre lot (TMK [4] 2- 4-001:012) located in Kalāheo, mauka of Kaumuali'i Highway near Kuli Road	
Pantaleo and Williams 1991	Archaeological Reconnaissance Survey	Portions of the Port Allen- Wainiha Transmission Line Corridor	No studies in Kalāheo Ahupua'a, as the corridor was "located in areas that have been modified by pasture or sugar cane cultivation"
Perzinski et al. 2001	Archaeological Inventory Survey	For the Proposed Improvements to the Kalāheo Water System, Kalāheo Well Site	Documented SIHP #50-30-10-406 and -485
Tulchin et al. 2005	Archaeological Field Check and Literature Review	Kukuiolono Park and Golf Course	Three historic sites were identified: SIHP #50-30-10-3906, -3907, -3908 (see Jones et al. 2006 for greater detail)
Jones et al. 2006	Archaeological Inventory Survey	Kukuiolono Park and Golf Course	Three sites comprised of 22 features were identified and recorded: SIHP #50-30-10-3906 consists of an assemblage including historic artifacts and historic structures, within Kukuiolono Park attributed to the Estate of Walter D. McBryde and remaining military infrastructure from WWII use; SIHP #50-30-10-3907 consists of a collection of traditional Hawaiian stones and artifacts assembled by Walter D. McBryde; SIHP #50-30-10-3908 designates the graves of Walter D. McBryde

Reference	Type of Study	Location	Findings
			and companion John P. Kamanuwai
Moser et.al 2010	Archaeological Inventory Survey	0.71-acre parcel located in Kalāheo Ahupua'a, Kona District, Island of Kaua'i (TMK [4] 2-4-003:007)	Approximately 50% of the survey area was observed to have been disturbed by land modifications associated with development of adjacent residential housing; no historic properties were observed within the survey area

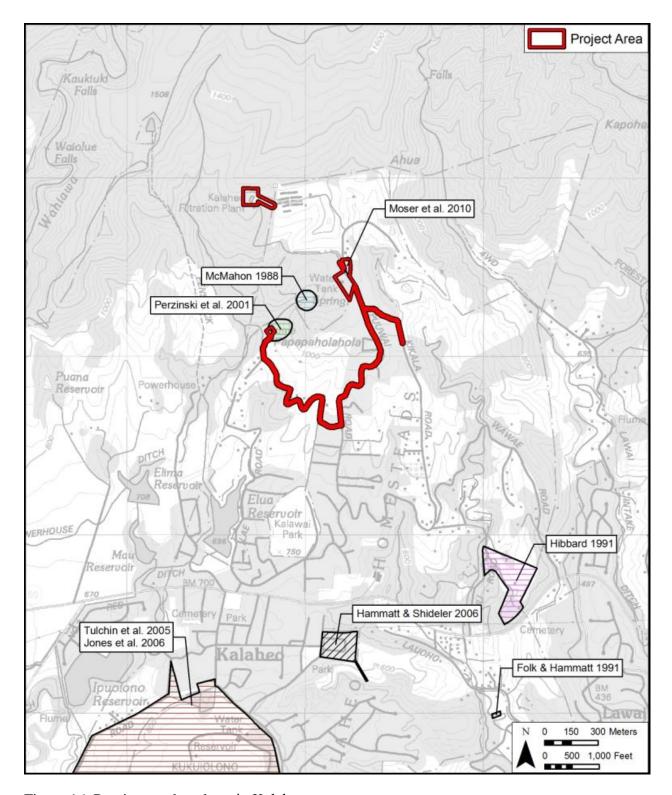


Figure 16. Previous archaeology in Kalāheo

Section 6 Community Consultation

Throughout the course of this assessment, 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 in the ahupua'a of Kalāheo and Wahiawa. This effort was made by letter, email, telephone and in-person contact. The initial outreach effort began in June 2011 and completed in October 2011. In the majority of cases, a letter (Appendix D), a USGS map (see Figure 1), and an aerial photograph of the Project area (Figure 2) were mailed to community participants.

Usually two to three attempts were made to contact individuals, organizations, and agencies apposite to the CIA for this Project. The results of the community consultation process are presented in Table 3. Written statements from organizations, agencies, and community members are presented below, and summaries of interviews with individuals are in Section 7.

Table 3. Summary of Community Consultation Efforts

Name	Affiliation	Comments
Ako, Val	Kapa'a Resident	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011
		On July 27, 2011, Mr. Ako contacted CSH and recommended Joe Manini
		On August 8, 2011, Mr. Ako recommended Warren Perry, the Palama brothers (Arthur and Hartword), Anne Punohu and Joe Manini
Ayau, Edward Halealoha	Hui Malāma I Nā Kūpuna O Hawai'i Nei	CSH sent community outreach letter and figures on July 26, 2011
Brune, Jr., John	Kama 'āina, Uncle of Debie Pulawa	CSH sent community outreach letter and figures on July 26, 2011. See complete interview in Section 7 below
Burgess, Stella	Hyatt Hotels and Resorts	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011
Cayan, Phyllis "Coochie"	SHPD, Former History and Culture Branch Chief	CSH sent community outreach letter and figures on June 14, 2011. See SHPD response below in Section 6.2

Name	Affiliation	Comments
Carney, Mary	SHPD Burials Facilitator	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011
Chenin, Melanie	SHPD Burial Facilitator	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011
Ferreira, Ernest	Historian of Kukuiolono Park and Kalāheo district	CSH sent community outreach letter and figures on June 14, 2011. See complete interview in Section 7 below
Hanna, Rick	Kamaʻāina of west Kauaʻi	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011
Helder, David	Current Chairman of Kaua'i County Historic Preservation Commission	August 4, 2011, CSH attended Kaua'i County Historic Preservation Commission meeting; the Commission recommended that CSH include information on the Native Hawaiian bat and on the early Hawaiians prior to Portuguese settlement; the Commission also planned to send a contact list for the Kalāheo area.
Higa, Nani	Halau Hula O Nani	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011
Holi, Wilma	Former Kaua'i Representative for Hui Malāma I Na Kupūna O Hawai'i Nei	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011
Kahalekomo, Janet	Kupuna in Kalāheo, Educator at 'Ele'ele Elementary School	CSH sent community outreach letter and figures on June 14, 2011
Kauka, Sabra	Kama ʻāina	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011

Name	Affiliation	Comments	
Kekua, Kehaulani	Kaua'i Heritage Center of Hawaiian Culture & Arts	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
Kruse, John	Kaua'i Island Burial Council	CSH sent community outreach letter ar figures on June 14, 2011 and on July 2 2011	
Lauretta, Mike	DLNR-Kaua'i Land Division	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
Mayfield, Janet	National Botanical Tropical Gardens	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
McMahon, Nancy	SHPD-Kaua'i Archaeologist	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
Nāmu'o, Clyde	ОНА	CSH sent community outreach letter and figures on June 14, 2011. See OHA response below in Section 6.2	
Napōka, Nathan	SHPD History & Culture	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
Oi, Tommy	DNLR-Kaua'i Land Division	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
O'Keefe, Shawn	Land Manager, Alexander and Baldwin	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
Pavao, Patrick	Kama ʻāina	CSH sent community outreach letter and figures on June 14, 2011 and on July 22, 2011	
		July 25, 2011, Mr. Pavao, who worked at a chicken farm in Kalāheo for many years, contacted CSH to explain that Kalāheo was	

Name	Affiliation	Comments	
		mostly pasture land	
Perry, Warren	Royal Order of Kamehameha, Kaumuali'i Royal Order of figures on June 14, 2011 a 2011		
Pulawa, Debbie	Daughter of Richard Brune, and current Kukuiolono Park Manager	CSH sent community outreach letter a figures on June 14, 2011 and on July 2 2011	
Punohu, Anne	Kama 'āina of Kalāheo	CSH sent community outreach letter and figures on June 14, 2011. See complete interview in Section 7 below	
Smith, Earl	Hawai'i Forestry Association	CSH sent community outreach letter and figures on June 14, 2011. See complete interview in Section 7 below	
Kaleialoha Duarte Snowden, Betty	Descendant of 'ohana (family) from Lawai Valley	CSH sent community outreach letter and figures on June 14, 2011. See complete interview in Section 7 below	
Tsuchiya, Rick	Kaua'i Preservation Review Commission Kaua'i County Planning	CSH sent community outreach letter and figures on June 14, 2011. See complete interview in Section 7 below	

6.1 SHPD

On June 14, 2011, CSH contacted Phyllis "Coochie" Cayan, History and Culture Branch Chief of SHPD. In her written response letter, dated July 28, 2011, Ms. Cayan explains that, "The wide range of projects for road, sewer and water improvements on Kaua'i has many supporters and non-supporters who have concerns that range from cultural practices for access and gathering to spirituality at sacred sites to protecting ancient burials—all potential issues should the project expose or degrade such cultural resources and/or sites" (Figure 17). The letter stresses that, "It is critical that you all reach out to as many folks and/or groups as possible to keep them informed on the project for best outreach discussions." The letter also offers a long list of "strategic" ideas for the Project, including "talk story sessions with the business and community groups on Kaua'i especially in the project area," discussions with the "University of Manoa's Oral History department," and consultation with "senior citizen groups in the Kalāheo area." Ms. Cayan also recommends that CSH contact Michael Loo, Kunane Aipoalani, Keith

Yap, John Kruse, Barabara Say, Nathan Kalama, Jimmy Fujita, Debra Uilani Ruiz, Sandra Quinsaat, and Kaliko Santos.

6.2 OHA Response Letter

On June 14, 2011, CSH sent Clyde Nāmu'o, Chief Executive Officer of OHA, the consultation letter and figures of the Project area. In a letter dated July 5, 2011, Mr. Nāmu'o's response included the following (Figure 18):

OHA seeks clarification whether an archaeological inventory survey will be done for the project area. Since it appears the project requires extensive ground disturbance, consideration should be afforded to the potential for encountering iwi kūpuna [ancestral remains]. The amount of water which the new well will draw from and its impacts to the maximum sustainable yield of Lihu'e Aquifer System should be discussed. The CIA should also discuss whether the project will result in certain areas becoming inaccessible for access or gathering.

OHA did not have "referrals to individuals and organizations for consultation at this time."

NEIL ABERCROMBIE





STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION KAHUHIHEWA BUILDING 601 KAMOKILA BLVD, KAPOLEI HI 96706 July 28, 2011

Kuhio Vogeler, Ph.D. Cultural Surveys Hawaii, Inc. P.O. Box 1114 Kailua, Hawaii 96734

DOC NO: 1107PC003

LOG NO: 2011.1700

WILLIAM J. AILA, JR. CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES MMISSION ON WATER RESOURCE MANAGEMENT

> GUY H. KAULUKUKUI WILLIAM M. TAM DEPUTY DIRECTOR - WATER

> > LAND STATE PARKS

Dear Kuhio Vogeler:

Subject:

KALAHEO 3: A Cultural Impact Assessment (CIA) for the Proposed Kaua'i county Kalaheo Water System Improvements Project, Kalaheo and Wahiawa Ahupua'a, Koloa District, Kaua'i. TMK: (4) 2-4-003:007, 2-4-003:999 por., 2-4-004:039, 2-4-004:049, 2-4-004:999 por., 2-4-005:999 por., 2-4-009:003.

Mahalo for the opportunity to comment on the above CIA for the proposed Kaua'i County Kalaheo Water System Improvements Project in the aforementioned TMKs. The wide range of projects for road, sewer and water improvements on Kaua'i has many supporters and non-supporters who have concerns that range from cultural practices for access and gathering to spirituality at sacred sites to protecting ancient burials - all potential issues should the project expose or degrade such cultural resources and/or sites. It is critical that you all reach out to as many folks and/or groups as possible to keep them informed on the project for best outreach discussions.

The SHPD recommends some strategic ideas as follows and referral to community folks:

- Talk story sessions with the business and/or community groups on Kaua'i especially in the project area.
- 2. Speak with the University of Manoa's Oral History department for archival interviews and other information that they may have for this proposed project area.
- Speak with senior citizen groups in the Kalaheo area for possible leads to folks who may know of such traditional cultural practices in this general area.
- Mr. Michael Loo, Kauai-Niihau Island Burial Council (KNIBC)
- Mr. Kunane Aipoalani, Chairman, KNIBC
- Mr. Keith Yap, Vice-chairman, KNIBC
- Mr. John Kruse, county planner, former KNIBC
- 8. Ms. Barbara Say, former KNIBC/Kupuna
- Mr. Nathan Kalama, Kumu Hula/Kupuna
- 10. Jimmy Fujita, KNIBC rep for Kalaheo District
- 11. Debra Uilani Ruiz, KNIBC rep
- 12. Sandra Quinsaat, KNIBC rep
- 13. Ms. Kaliko Santos, Office of Hawaiian Affairs Kauai manager

mloo@princeville.com ckaipoalani@hawaiiantel.net kyap@grovefarm.com

jkruse@kauaigov.com 296 Makani Road, Kapaa, HI 96746 5034 Haleilio Road, Kapaa, HI 96746

James.Fuiita@hawaiiantel.net vboyz@hawaii.rr.com

squinsaa@hyatt.com kalikos@oha.org

Please call 808-692-8025 or email me at Phyllis.L.Cayan@hawaii.gov should you have any further questions on our comments above.

Phyllis L. Cayan
Phyllis L. Cayan

SHPD History & Culture Branch Chief

Figure 17. SHPD Response Letter

PHONE (808) 594-1888



FAX (808) 594-1865

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

HRD11/5058D

July 5, 2011

Kūhiō Vogeler, Cultural Researcher Cultural Surveys Hawai'i, Inc. P.O. Box 1114 Kailua, Hawai'i 96734

Re: Pre- Cultural Impact Assessment Consultation Kalaheo Water System Improvements Project Koloa, Island of Kaua'i

Aloha e Kühiō Vogeler,

The Office of Hawaiian Affairs (OHA) is in receipt of your June 14, 2011 request for comments ahead of a cultural impact assessment (CIA) for the Kalaheo Water System Improvements Project (project) proposed by the County of Kaua'i Department of Water. We anticipate that this CIA will be prepared as a part of this project's compliance with Chapter 343, Hawaii Revised Statutes. The project will replace two existing water tanks and construct a new well, transmission mains, booster pump stations and pressure reducing valve stations.

OHA seeks clarification whether an archaeological inventory survey will be conducted for the project area. Since it appears the project requires extensive ground disturbance, consideration should be afforded to the potential for encountering iwi kūpuna. The amount of water which the new well will draw from and its impacts to the maximum sustainable yield of the Lihu'e Aquifer System should be discussed. The CIA should also discuss whether the project will result in certain areas becoming inaccessible for access or gathering.

OHA has no referrals to individuals and organizations for consultation to recommend at this time. Thank you for initiating consultation at this early stage and we look forward to reviewing the CIA and providing additional comments at that time. Should you have any questions, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o Chief Executive Officer

C: OHA- Kaua'i Island COC

Figure 18. OHA Response Letter

Section 7 Interviews

Kama 'āina and kūpuna (elders) with knowledge of the proposed Project and study area participated in semi-structured interviews for this CIA from June to October 2011. CSH attempted to contact 30 individuals for this CIA report, of which 10 responded, two provided written statements, and three participated in formal interviews. CSH initiated the interviews with questions from broad categories such as wahi pana and mo 'olelo, cultivation and gathering practices (on the land and in the water), trails, cultural and historic properties, and burials. Participants' biographical information, comments, and concerns about the proposed development, the Project area and the environs are presented below.

7.1 Acknowledgements

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their *mana* 'o (thought, idea, opinion) with CSH whether in interviews or brief consultations. We request that if these interviews are used in future documents, the words of contributors are reproduced accurately and not in any way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

7.2 John Brune, Jr.

CSH interviewed Ernie Ferreira and John "Uncle Junior" Brune on August 3, 2011, at the Kukuiolono Park Club House in Kalāheo on the island of Kaua'i (Figure 19).

Mr. Brune is first cousins with Mr. Ferreira, as their mothers are sisters. Mr. Brune's maternal and paternal grandparents came from Portugal. When his paternal grandfather passed away, Mr. Brune's father and his two eldest brothers quit school to support the family, which was composed of ten brothers and sisters, including themselves (two sisters, eight brothers). Mr. Brune's father began working for a pineapple company when he was 14 years old, and eventually retired from the pineapple industry. Mr. Brune recalls his father wondering why his parents moved to Kalāheo. His father would have preferred living in Wailua or somewhere more "green."

Mr. Brune was born in 1933. He moved to Kalāheo in 1949 where his family purchased a home and pasture land for horses. Though he recalls there was no golf course in the Kalāheo area, there was a race track where he would race.

Mr. Brune recalls military bunkers, tanks, and a helicopter landing pad in Kalāheo during World War II. He remembers soldiers being stationed in a radio station that was located on the hillside in what he describes as a cave/tunnel. A truck would drive on the hillside and the soldiers would climb up the hill to get their food and then return to the tunnel. Kalāheo School was being used by the military as an Army Red Cross until the war was over. During this time, Mr. Brune traveled five to six miles to attend school in Lāwa'i. During the war years, Mr. Brune's father leased land from the military for one dollar a year near Mount Kahili. Mr. Brune's father partnered with his two brothers to ranch 450 heads of cattle and horses.

Mr. Brune frequented Mount Kahili to ride horses and hunt for pigs. He recalls looking down into Kōloa from the top of the mountain. He also knows of people gathering Mokihana from Mount Kahili. 'Aloe (aloe) and noni (Indian mulberry) were also gathered. Mr. Brune's father would pick the fruit of the noni and leave it in a bottle to ferment. The juices from the noni plant were ingested to control Mr. Brune's father's blood pressure. In the past, the ahupua'a of Kalāheo had nine reservoirs. Today there are only two left. Growing up, Mr. Brune would catch koi (carp, i'a 'ula'ula uli), tilapia, catfish, and bass in the reservoirs. Salt water fish and wildlife caught in Kalāheo include akule (big-eyed scad), lobster, and crabs. He also gathered 'opihi (limpits).

Almost to the top of Mount Kahili lies a swamp or lake, known as "Black Lake" to Mr. Ferreira and Mr. Brune. The swamp or lake is located above the dam.

Mr. Brune recalls a sacrificial rock located in Maha'ulepu. He describes the sacrificial procedure:

The way the story goes, they would bash the head and then the blood used to run down through the ditch, and go into something. And there was—What you that? Where they carved stuff on rock, human beings—there was about three of them on the side of the rock, you know come to think of it, I haven't seen that rock lately.

Mr. Brune recalls this rock being on private property and later his brother owned the land for pasture until he sold it to David Palama. Mr. Brune recalls earlier landowners attempting to move the stone and bulldozers would break down.

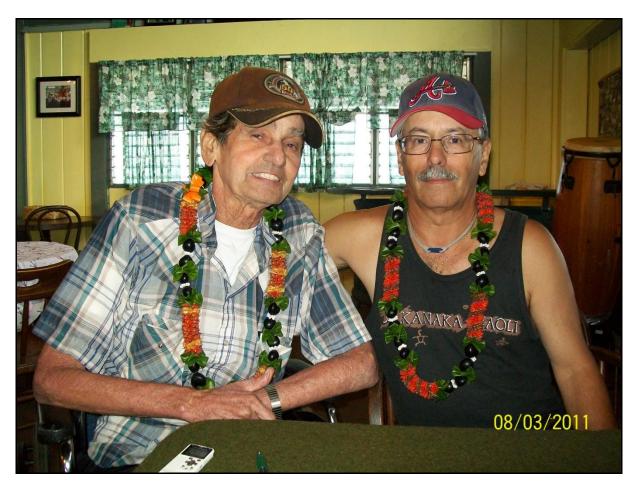


Figure 19. Uncle Junior (left) and Ernie Ferrreira (right) at the clubhouse of Kukuiolono Park (CSH August 3, 2011)

7.3 Mr. Ernie Ferreira

CSH interviewed Ernie Ferreira and John "Uncle Junior" Brune on August 3, 2011, at the Kukuiolono Park Club House in Kalāheo on the island of Kaua'i.

Mr. Ferreira's family is originally from the *ahupua'a* of 'Ele'ele. His mother's family migrated from Portugal on the ship *Ravenscrag* in 1898, and his father's family migrated from Portugal on the ship *Priscilla* in 1878. Mr. Ferreira's mother was born in 1918 and is the youngest of ten children. She attended Kalāheo Elementary School located in Kalāheo Ahupua'a. Mr. Ferreira is first cousins with Mr. Brune, as their mothers are sisters.

Growing up, Mr. Ferreira recalls learning a lot of world history and American history, but not much of Hawaiian or local history. He feels that during this era, it was unfortunate that the school system did not teach Hawaiian and local history.

According to Mr. Ferreira, a local historian, Walter McBryde, started the town of Kalāheo. Mr. McBryde had no beneficiaries and turned over his estate, originally a cattle ranch, to the public. He created homestead land available to anyone who would live on the land, with a requirement to plant a certain amount of trees. Most homesteaders planted trees along the perimeter for fence line and as a wind break. The barren land was filled with eucalyptus trees, Norfolk pines, and various plants. A nursery was operated on the hillside (Papapaholahola Reserve) in upper Kalāheo, and a Japanese garden was also created near the Kukuiolono Golf Course and Club House.

The town of Kalāheo was mostly composed of Portuguese and Spanish families. Later, Japanese and Filipino families settled in the *ahupua* 'a. Mr. Ferreira recalls a camp at the base of the hillside in Kalāheo for Filipino workers who worked in the pineapple fields during the 1930s and 1940s. He knows of three or four Hawaiian families who originally settled in Kalāheo.

During the war years, Mr. Ferreira recalls that the town of Kalāheo changing dramatically when the Army was stationed there (Figure 20). He recalls that the school served as a hospital, engineers worked on the hillside, and the general of the Army lived on the hillside near the pineapple manager's home. Mr. Ferreira recently made contact with the Army general's chauffeur, who recalls driving at night with the general to do inspections. During World War II, homes were to have tape on their windows. The chauffeur recalls driving very slowly on the hillside of Kalāheo with no streetlights, very narrow dirt roads, and irrigation ditches along its sides.

Mr. Ferreira recalls people hunting pigs in the Kōke'e area and goats on the Nā Pali coast, as well as deer hunting. Hunters still use access trails to hunt for pigs. Mr. Ferreira notes that there are pigs that come down to the Kukuiolono Park looking for food and digging up grass from the Kukuiolono Golf Course.

Mr. Ferreira mentions there was a *heiau* in Kalāheo that is located on the south end of the Kukuiolono plateau. He did not offer a name or details of the *heiau*. He also speaks of Palama Pond, currently for sale at \$60 million dollars. A unique feature of the pond is a lava tube tunnel that fills with water when the tide rises and drops with the low tide. A gate was installed to control the fish that were trapped with the ebb and flow of the tides and to gather what was

needed. Mr. Ferreira also states that the shoreline of the pond had clams. Today, debris has clogged the lava tube, and the lack of water circulation is affecting the survival of the fish.

Mr. Ferreira recalls a stream known as Zig-Zag located in Wahiawa Valley. To get to Zig-Zag, you had to follow a road that led to a reservoir, which also served as a popular swimming place. Off to the side of the road, Mr. Ferreira would go down a cliff to follow the stream known as Zig-Zag. Zig-Zag was comprised of numerous swimming holes, ropes, and ladders. Near the entrance down to Zig-Zag was a tunnel that was used for a radio room during the war. Other tunnels were used to store ammunition for the military. Workers from the pineapple plantation filled the radio room with boulders.

Mr. Ferreira heard that Waita may be the largest reservoir in the state of Hawai'i. The reservoir is located in Kōloa. He also notes that Alexander Dam is a popular dam; however, you would need a four-wheeler to gain access there. Past the dam is a radio and television antenna station (Mount Kahili). The road once required constant grading to do maintenance work at the antennas. Now, helicopters are used to maintain the antennas and the road is "really beat up."

Alexander Dam was built in the 1930s. There was a rock barrier that held back the water and it broke. The water came down through the valley and eventually drained into the ocean below Wahiawa. Before reaching the ocean, the water flowed through a plantation camp, called Camp One, which killed a number of people. Eventually the dam was fixed and is still in use today.

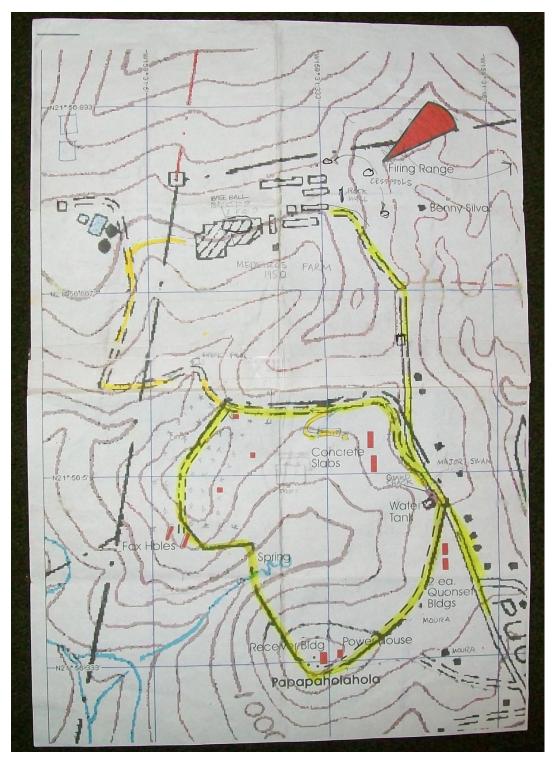


Figure 20. Photo of map provided by Ernie Ferreira, with the Project area in lower center near Papapaholahola; the map shows firing range in upper right corner (red wedge), as well as a rock wall and cesspools, the river and spring above Papapaholahola, and fox holes to the west

7.4 Ms. Anne Punohu

CSH interviewed Anne Punohu at her home in Kalāheo Ahupua'a on August 3, 2011. Some of the information incorporated into this interview summary is also drawn from a previous interview on July 27, 2011.

The walls of Ms. Punohu's modest home are lined with pictures of her two daughters, and bookshelves hold Hawaiian cultural artifacts, given to her over the years (see Figure 21 and Figure 22). Ms. Punohu explains that she is not ethnically Hawaiian, but married into the Punohu 'ohana. The ideas expressed in Ms. Punohu's interview derive from her religious beliefs based on the cultural concepts taught to her by many $k\bar{u}puna$. She clarifies that, "The main part of my religious belief comes from Uncle Palu Hanohano." Ms. Punohu further shares that she had many $h\bar{a}nai$ (adopted) families and teachers who taught her, to whom she owes so much. The following is a partial list, but she remembers many others:

In the old way of *hānai* in the North Shore, all the families *hānai*, and they were related. I was *hānai*-ed by Maka, Pi'ilani, Pu'ulei, Chandler, Mahuiki, Honey Girl Ho'omanawanui, Auntie Marilyn "Inoa" Goo, the Fu 'Ohana, Uncle Jack and Auntie Jenny Saffrey and the Mersberg 'Ohana, the Ham-Young 'Ohana, and Auntie Helena Maka Santos. Those who taught me were Pila Kikuchi, Uncle George Kaleiohi, Uncle Richard Lapilio, Poni Kama'u, Uncle Palu Hanohano Pa, Uncle Barry Yap, Auntie Nani Rogers, and my *kumu* [teacher] Jean Ileialoha Keale Beniamina from Ni'ihau...

My job in the old $h\bar{a}nai$ way, everybody would go from house-to-house. I worked very hard. What I did was take care of the children and the $k\bar{u}puna$, and I did a lot of chores and worked very hard. In time, I learned a lot and was taught a lot, sometimes more than the blood children, because I was there more and I would spend more time with the $k\bar{u}puna...$ So I would go and I would talk and I would learn and I would watch and they would teach me. The one thing they liked about me is my ability to remember in the old way, so I remembered almost everything that has ever been taught to me, completely verbally. I [have] never written anything down, so it really helped to chant because it taught me to remember things that I was told verbally. So when I remember things ... it is completely remembered from memory and not written, only because that is how I know how to do everything, is just by remembering.

Ms. Punohu describes the metaphysics of Kaua'i through layers of understanding and multiple connections from *mauka* to *makai* through the *mo* 'o (lizard, reptile, water spirit) and the *wai*, or water systems, of Kaua'i. To grasp the intricacies expressed in this metaphysical system, it helps to offer an explanation of the *mo* 'o and *wai*, beginning with the mountain peaks. This connection of *wai* to *mo* 'o is a fundamental concept of her metaphysical depiction of Kaua'i's geography.

As Ms. Punohu describes it, the *mo'o* is a god-like, elusive, water spirit who "never takes human form with legs" and dwells in fresh-water. According to Ms. Punohu, the *mo'o* is primarily a *mauka* creature and "is 100% associated with water and caves." Caves indicate that the *mo'o* is present: "I cannot think of any cave associated with any other being, other than a

mo 'o." The mo 'o may be described as a "demi-god," but there is also a hierarchy of mo 'o, with the mauka mo 'o holding a higher status. Ms. Punohu explains that minor mo 'o live in caves, in streams, near wailele (waterfalls), and near the ocean: "when you're talking about minor mo 'os, the ones that live in caves, the ones that live in springs, the ones that live by the wailele, all these the ones that live in the streams. Kay? The ones that live by the ocean, these are minor mo 'os. Kay?" (Figure 23).

The mo'o may be male or female, each gender indicating a different religious treatment for the waters associated with that mo'o. Ms. Punohu further clarifies that many streams in Kaua'i are associated with female mo'o, but not all streams: "The fresh water streams were not always associated with females, a lot of them were associated with men, male mo'o I mean. And so a lot of those stories happen to be that the female was never a mo'o ... she was always a human who then fell in love with the mo'o and became a mo'o, as always happens in the story."

According to Ms. Punohu, the wai associated with the *mo'o* is the "sacred" fresh water that is "clear and pure." This water is located in springs and streams, high up in the mountains. Ms. Punohu explains that for a chief or a god, one would need the purest source of water. According to Ms. Punohu, this water would not be "the *lepo* [dirty] water in the middle stream," but "the purest water for the gods." She adds that, "Height was associated with the *ali'i*, as was depth in the water by the way.... Anything extreme was considered sacred, anything extreme. Extremely pure water, extremely deep cave, extremely deep lava tube, extremely high mountain ... the extremes are considered sacred." Any high mountainous area where this pure water is located is considered sacred, and the *mo'o* associated with this water are highly sacred as well. According to Ms Punohu, a *kahuna* [priest] protected these sacred areas: "a spring, a natural spring, would be the purest water, okay? This would have been protected.... usually by one *kahuna*, whose job was just to do that all the time."

Ms. Punohu describes a link between the *moʻo*, which lives primarily in the mountains, and Kawelo (or Kawalo), the shark demi-god in many Kauaʻi stories. According to Ms. Punohu, "The Kawelo and the *moʻo* are absolutely intertwined with each other. They cannot be separated on Kauaʻi, because Kawelo rules in the ocean and *moʻo* rules in the mountain, and it is the *manu* [birds] that grew in the middle." At another point in the interview, she explains this relationship in greater detail, adding the role of humans somewhere between these two demi-gods:

Kawelo was a *kai* [ocean] god. He's completely connected to the ocean and not to the *uka* [mountains], only through this direction, what he ate, what he needed, and the fact that you got *wai* and *kai*. And if you do, if you do look at the Kumulipo you can see that connection very clearly ... and you can see the insinuation for *ali'i* right there. You always have to connect up to down, down to up, there's always both directions constantly and around the middle was everything else. The people, the rest of the gods, all of that.

Wai serves as the nourishment for Kawelo. According to Ms. Punohu, "I would say the connection [between Kawelo and the mo 'o] would be the purest water for the gods."

Ms. Punohu does not distinguish between Kawelo, the historical figure, and Kawelo (or Kawalo) the shark demi-god of Kaua'i. In addition, Ms. Punohu speculates about the connection between Kawelo (a shark demi-god), Manōkalanipō (an early chief of Kaua'i) and the *mo'o*:

Kawelo and Manōkalanipō are intrinsically tied to the south and the west side of this island, which means in order to provide them with the drinks that they needed, you would need to have a fresh source of water, a pure source for the gods. That's the connection how I would make it. I'm speculating though. I cannot tell you guaranteed any 100% surety, I can only speculate.

The damp, wet places where the *mo'o* lives are also linked to fertility and abundance. Ms. Punohu connects the *mo'o* to *wai* and abundance through the concept of "*pu'uwai*." Often translated as the "heart," *pu'uwai* is comprised of two words: *pu'u* (mound, peak, or sacred place) and *wai* (water). Ms. Punohu explains that although she knows of the common definition of pu'uwai as "heart," there is a *kaona* (hidden meaning) with regard to the geography of Kaua'i. Ms. Punohu sees the *pu'uwai* as a sacred place associated with water: "the title *pu'uwai* is clearly to say it's a *pu'u* of water, so it makes it sacred." Ms. Punohu explains that *pu'uwai* describes the mountain peaks of Kaua'i Island as well as a metaphysical relationship with the *mo'o*. Looking at a topographical map of Kaua'i, Ms. Punohu uses the concept of *pu'uwai* to link the *mo'o* to the *wai* and to describe the many springs found in upland Kaua'i:

If you look at this map and you look at elevation and you look at names and you look at what we have here, you can see the geological formation of the pu'u ... pu'uwai, it doesn't mean heart, it has to do with the pu'u... the poking in the ground, the pu'u, right? So, there would have a connotation of two mo'o together making.... [laughs] more mo'o's.

As with the many Kāne stories, in which the god Kāne thrusts his staff into the ground, indicating where springs are present, Ms. Punohu depicts the fertility of the *mo* 'o, a water spirit, as the source of springs in the mountains, the *pu* 'uwai.

Along with this detailed explanation, Ms. Punohu drew a metaphysical diagram that displays the geographical relationship between the *mo* 'o and Kaua'i island (see Figure 23). The diagram shows five large *mo* 'o, whose noses all form an apex at the highest point of Kaua'i, Mount Wai'ale'ale. The *mo* 'o are connected to one another by their "interlocking claws," and their "swishing" tails "always go one direction, pointing east "into the ocean." Each *mo* 'o represents a district, or *moku*, of Kaua'i:

Over here, where the heads, and feets, and the eyes are. Kay? This is the most sacred.... Every tail, exit, is an end, the ending coming out of the water." The lines on the backs of the *mo'os* represent "the *kuas* [backs], these are the major ridge lines" and the bodies of the *mo'o*, in between the front feet and the tails, is where the *manu* thrive: "You got the 'io [Hawaiian hawk], you got the hawk, right? You get the *pueo* [Hawaiian short-eared owl], you get the *koa'e* [tropic or boatswain bird], and here you also have all the, you know, you have all the bird catcher birds, which is why all of the trails are always *uka*, and they always go this way up ... ok, the bird catcher trails.

Ms. Punohu indicates that the area at the base of the moʻo tail, is all birthing area." She elaborates that this zone is where the "female chiefesses" lived and where one could find most of the birthing resources, such as, "tapa, this would be wauke [paper mulberry], lauhala [pandanus or screw pine], and other female medicinal plants." The moʻo tails lead to the ocean, where "you

have all the $man\bar{o}$ [shark] people" and "all of the ocean ' $am\bar{a}kua$ [personal gods, deified ancestors]." To relate these concepts, Ms. Punohu reveals that, in "Latin terms," the mo 'o heads are the alpha, the tails are the omega, "connecting mauka to makai, and connecting Kawelo to the mo 'o [through the] awa [harbor], wai, 'auwai [irrigation ditch] and miki 'ao [claws: figuratively]" found along the geographical mo 'o. (The "miki 'ao" refers to the indentations near the ridgeline, the hands and feet ($n\bar{a}$ $w\bar{a}wae$ a me $n\bar{a}$ lima). On her diagram she writes, "Alpha" near the mo 'o heads and "Omega" near the tails (see Figure 23). Through this complex metaphysical representation, Ms. Punohu reminds us that, "this is just a mo 'o belief, this is the mo 'o religious side of it."

Ms. Punohu specifies that many of her notes, "have to do with wai and mo'o and talk about the original line and some of the original names." The connection of the mo'o and wai in Kālāheo are through the place name of Pu'uwai. As mentioned above, pu'uwai literally means "pu'u," or mound, and "wai," or water, thus referring to a spring. The Project area is primarily along Pu'uwai Road, describing the nearby spring, Papapaholahola. Because of this sacred nature of a pu'uwai, Ms. Punohu believes that a heiau, a lele (sacrificial altar or stand) and a small house platform are located near the spring, Papapaholahola. Referring to a map of the Project area, she explains:

It's sacred there, and that should be where there is a *heiau*, right around this [pointing at Papapaholahola Spring] ... just this tight area right here, where the *pu'u*, the dip, it's a geological dip, is in the ground where you can actually see the hole in the ground right here, in here. It should be there.

Ms. Punohu describes all that she believes will be found near the Papapaholahola Spring:

You gotta really look around that spring good you know, you guys. Because, around there you're gonna find one of those things. I can guarantee you, I can guarantee you. I don't anticipate a hula platform, I don't anticipate a large house, it would be a small house, because more than often it would have been a *kahuna lā'au* [*kahu wai*, or guardian of the water] that lived there, a priest that would have protected that water from impurities, or from someone else taking it that shouldn't have been touching it.... So it would have been a small house platform that you're looking for, not necessarily of royal capacity, it would have been very simple, it may have had a coral floor or sand floor ... a foreign material floor from that general area, material that's there ... but I can guarantee that you will find one of that. You either find a *lele* or you will find a *lele* and a small house platform. So, now, the *lele* ... *lele's* are tough because ... They could be anything, they could be a $p\bar{a}kaukau$ [platform] out of $p\bar{o}haku$ [stones], it could've been. There wouldn't be a standing $p\bar{o}haku$, but a $p\bar{o}haku$ that had then [been] leveled as a table, that could've worked easily as a *lele*.

She clarifies that:

If you find a site where you find a lot of powder coral, white sand, you find that and you find it *uka*, then you know that was brought up there for a reason. It wouldn't be brought up there for a common person, a common person was not of the means, the will, or even the intent to do that. It would only be done for

someone of status and that goes the same way for the well worn paths that are up there, especially around waterways, waterfalls, natural springs, things like that ... and as I told you before, things like a natural spring, it is the intensity of the water, the purity of the water that makes it sacred, so ... you have a word like Pu'uwai.

Ms. Punohu sees Kalāheo as one of the few *ahupua* 'a associated with the male *mo* 'o: "this is one of the very few areas of Kaua'i that is male dominated ... Kalāheo and parts of Waimea.... There's a male *mo* 'o here who was associated with all of the streams in this area." She further relates that, "The belief up here is that the big *mo* 'o up here, associated with Waita, is a male *mo* 'o and everything up here is male *mo* 'o."

Because of the *mo'olelo* of Hahaloa, Ms. Punohu believes a $h\bar{o}lua$ course may exist near the Project area. The story describes a young chief who secretly builds a $h\bar{o}lua$ slide out of milo wood, with the help of a mysterious tiny man. Ms. Punohu stresses that this man is not a *menehune* and that the location for the $h\bar{o}lua$ slide must be in upper Kalāheo. The $h\bar{o}lua$ course was unique because there was grass between the stones, and that structure provided the slickness. Regarding the place, she refers to the map of the Project area, "If you're up there, they're planting grass between $p\bar{o}haku$ and you're riding that thing on top, you're talking about a very wet area, Kalāheo, so it would have to be somewhere where it was very wet and close to water and everybody knows Kalāheo is like Hanalei [an ahupua'a noted for its frequent rains]."

Ms. Punohu one specific recommendation. She says "as I've told you these stories of the purity of the water ... the purity of the spring, must not be compromised, yeah?" With that she wants to ensure that a buffer zone is established near Papapaholahola Spring: "Make sure that there is a good enough buffer zone around that entire area, and especially the geological feature of the pu'u." Overall, Ms. Punohu has a positive impression of the project:

If this is a sacred place then think of it as an *ali'i* [chiefly] house, which must be cleaned carefully and with the best material, and made fresh because only common things are left old and to rot, and this is not a common area, therefore I think its proper and appropriate to make repairs and make it better and make it work. That's how I would tie it in religiously and philosophically to the *mana'o*, that's what I would say.

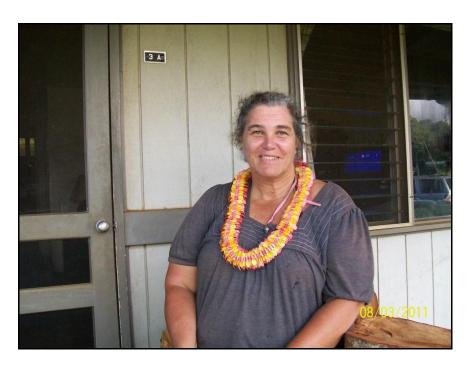


Figure 21. Anne Punohu outside her Kalāheo home (August 3, 2011 CSH)



Figure 22. On left Pōhaku Pa'awa (the canoe breaker) and on right Pōhaku Kukui (initially double candle, this symbolic candle was never lit; instead, it was used to teach young men about *pono* [correct] behavior) (August 3, 2011 CSH)

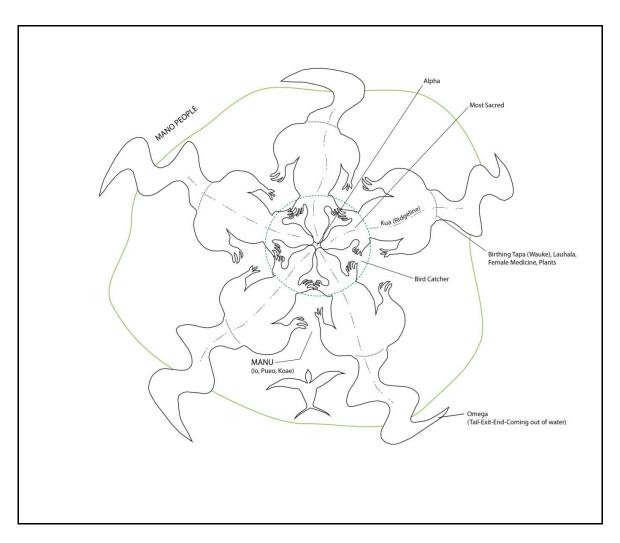


Figure 23. Computer rendering of Anne Punohu's drawing of Kaua'i and the *mo'o*, representing the districts of the island; the light green line represents the outline of Kaua'i, the dark green line represents the that area where the purist water is found in the mountain areas

Section 8 Cultural Landscape

Discussions of specific aspects of traditional Hawaiian culture as they may relate to the Project area are presented below. This section integrates information from Sections 3–7, to examine cultural resources and practices identified with proximity to the Project area and within the broader context of the encompassing Kalāheo and Wahiawa landscape. Excerpts from interview sessions from past and the present cultural studies are incorporated throughout this section where applicable.

8.1 Cultivation, Hunting and Gathering

LCAs from the Māhale of 1848 indicate that the coastal region of Kalāheo was used as *lo'i kalo*, *kula* lands for sweet potato cultivation, and salt pans, and that the uplands of Kalāheo was also used for the cultivation of *kalo* (Waihona 'Aina 2000). Terraces, rock mounds, platforms, and walls indicative of agriculture during the plantation era are located just west of the Project area (SIHP #50-30-10-406, Perzinski et al. 2001). Testimonies in the early twentieth century indicated that the *kula* lands of Kukuiolono were famous for the cultivation of sweet potatoes (Handy and Handy 1972:428). Mount Kahili was a place that community participant Mr. Brune visited to hunt pigs and gather 'aloe and *noni* for medicinal purposes, and community participant Mr. Ferreira observes that feral pigs continue to enter Kukuiolono Park looking for food.

8.2 Mauka Water Resources

Mauka freshwater resources in the vicinity of the Project area include several streams (Monsarrat 1896) and a spring called Papapaholahola (Soehren 2010). Community participant Ms. Punohu translates Pu'uwai (the name of the road near the Project area) as "sacred water" in reference to nearby Papapaholahola Spring. Since a kahuna would have once guarded the sanctity of the spring, Ms. Punohu believes that a heiau, a lele, and a small house would have once been located near the spring. In his youth, Mr. Brune caught koi, tilapia, catfish, and bass in two Kalāheo reservoirs.

8.3 Fishing and Makai Resources

The coastal site of Nōmilu (Site 67, Bennett 1931; Kikushi 1963) contained a fishpond and salt pans, as well as taro terraces. In his youth, Mr. Brune caught *akule*, lobsters, crabs in the ocean, and gathered 'opihi.

8.4 Mauka-Makai Relationships

The *ahupua'a* of Kalāheo is associated with a male *mo'o*, one of five *mo'o* that govern the districts of Kaua'i, according to Ms. Punohu. The *mo'o* are connected to the pure fresh water streams, waterfalls, and springs in the *mauka* lands, as well as the ocean waters, creating a *mauka-makai* relationship. The shapes of these *mo'o* are connected to the entire geography of Kaua'i, with the heads in the mountainous center of the island, the backs forming the ridges, the bodies containing *manu* such as 'io, pueo, and koa'e, and the tails extending into the ocean waters. The ocean itself is governed by the god Kawelo, but the *mo'o* and Kawelo are

intertwined: "They cannot be separated on Kaua'i, because Kawelo rules in the ocean and *mo'o* rules in the mountain, and it is the *manu* that grew in the middle."

8.5 Historic and Cultural Properties

The largest *heiau* on Kaua'i was Kukuiolono Heiau, a large, square three-terraced platform that was located on top of the dominant cinder cone in Kalāheo (Site 66, Bennett 1931; Site 46, Kikuchi 1963). This *heiau* was connected to three smaller *heiau* called Kahaleki'i (Site 65, Bennett 1931; Site 47, Kikuchi 1963), Nāpōhakuaki'iloa, and Ipuolono (Wichman 1998:34). Other cultural sites farther *makai* toward the coast include house sites (Site 64, Bennett 1931; Kikuchi 1963), a fishpond, salt pans and taro terraces at Nōmilu (Site 67, Bennett 1931; Kikuchi 1963), Kapoho Heiau (Site 68, Bennett 1931; Kikuchi 1963), shelter caves, stone walls, a spring, fishing shrines, an enclosure, and walls (Kikuchi 1963).

A stone wall associated with terraces and a paved platform, located just west of the Project area, was previously considered a remnant of either Kahaleki'i or Kakaianahoa Heiau SIHP #50-30-10-406, McMahon 1988), until more recent work determined it to be related to the plantation era (Perzinski et al. 2001). Five archaeological sites were uncovered within Kukuiolono Park, including an assemblage of historic properties associate with the estate of Walter D. McBryde, including artifacts and structures (SIHP50-30-10-3906), a collection of traditional stones and artifacts (SIHP #50-30-10-3907), and graves (SIHP #50-30-10-3908), as well as a retaining wall (SIHP #50-30-10-3909) and stone wall alignment (SIHP #50-30-10-3910) (Jones et al. 2006; Tulchin et al. 2005).

8.6 Burials

As mentioned above, the former Walter D. McBryde estate within Kukuiolono Park contained graves (SIHP #50-30-10-3908; Jones et al. 2006; Tulchin et al. 2005).

8.7 Wahi Pana and Mo'olelo

The ahupua 'a of Kalāheo is dominated by a large cinder cone, Kukuiolono, where signal fires were built that could be seen by fishermen and navigators (Wichman 1998:33-34). Mo'olelo of wahi pana in the ahupua'a of Kalāheo indicate that the goddess Pele created the depression of Nōmilu when she explosively left Kaua'i for O'ahu and caused a volcano to erupt, and that menehune gathered the fallen rocks and passed them to one other in order to construct Ale Koko Fishpond in Niumalu (Knudsen 1946:250–252). In addition, fourteen culturally significant pōhaku, collected from Kalāheo Ahupua'a, have been recently relocated along the paths of Kukuiolono Park, located one mile south of the Project area. A bowl-shaped stone, Pōhakuawa, was used by travelers on a trail toward the mauka lands of Wahiawa Ahupua'a to store their catch of awa (Donohugh 2001:233), and the stone may refer to Wahiawa, or the "place [where] milkfish [were stored]" (Clark 1990:61). Other stones were formerly associated with a hiding place for a chiefly feathered cloak (Pōhakuhunaahula), connected to a ko 'a at the junction of two trails (Pōhakuloa), and reported to have resembled the island of Kaua'i (Kaua'i Iki) (Donohugh 2001:234). In 1873, two pōhaku called Waipapaaina and Kupuna were located in the vicinity of the Project area, as well as a tree called Kapiliwahine (Hawai'i Commission of Boundaries 1873:44).

8.8 Trails

Several *wahi pana* are connected to trails in Kalāheo. As mentioned above, the stone called Pōhakuawa was used by travelers on a trail heading toward Wahiawa Ahupua'a, and the stone called Pōhakuloa was located at the junction of two trails (Donohugh 2001:233–234). Monsarrat's 1896 map shows a road half a mile west of the Project area that leads down to Government Road south of the Project area, with a trail extending farther *makai*.

Section 9 Summary and Recommendations

CSH undertook this CIA at the request of Belt Collins Hawaii, Ltd. The cultural survey broadly included the entire ahupua'a of Kalāheo and Wahiawa including the specific Project area.

9.1 Results of Background Research

Background research for this Project yielded the following results:

- 1. The *ahupua* 'a (land division generally running from the mountains to the sea) of Kalāheo is dominated by a large cinder cone, Kukuiolono (Lono's light), where signal fires were built that could be seen by fishermen and navigators (Wichman 1998:33–34).
- 2. *Mo'olelo* (oral traditions) of *wahi pana* (storied places) in the *ahupua'a* of Kalāheo indicate that the goddess Pele created the depression of Nōmilu when she explosively left Kaua'i for O'ahu and caused a volcano to erupt, and that *menehune* (legendary race of small people) gathered the fallen rocks and passed them to one other in order to construct Ale Koko Fishpond in Niumalu (Knudsen 1946:250–252).
- 3. Fourteen culturally significant *pōhaku* (stones), collected from Kalāheo Ahupua'a, have been recently relocated along the paths of Kukuiolono Park, located one mile south of the Project area. A bowl-shaped stone, Pōhakuawa, was used by travelers on a trail toward the *mauka* (upland) lands of Wahiawa Ahupua'a to store their catch of *awa* (milkfish) (Donohugh 2001:233), and the stone may refer to Wahiawa, or the "place [where] milkfish [were stored]" (Clark 1990:61). Other stones were formerly associated with a hiding place for a chiefly feathered cloak (Pōhakuhunaahula), connected to a *ko'a* (fishing shrine) at the junction of two trails (Pōhakuloa), and reported to have resembled the island of Kaua'i (Kaua'i Iki) (Donohugh 2001:234).
 - In 1873, two *pōhaku* called Waipapaaina and Kupuna were located in the vicinity of the Project area, as well as a tree called Kapiliwahine (Hawai'i Commission of Boundaries 1873:44).
- 4. The largest *heiau* (temple, religious site) on Kaua'i was Kukuiolono Heiau, a large, square three-terraced platform that was located on top of the dominant cinder cone in Kalāheo (Site 66, Bennett 1931; Site 46, Kikuchi 1963). This *heiau* was connected to three smaller *heiau* called Kahaleki'i (Site 65, Bennett 1931; Site 47, Kikuchi 1963), Nāpōhakuaki'iloa, and Ipuolono (Wichman 1998:34).
- 5. Other cultural sites farther *makai* (seaward) toward the coast include house sites (Site 64, Bennett 1931; Kikuchi 1963), a fishpond, salt pans and taro terraces at Nōmilu (Site 67, Bennett 1931; Kikuchi 1963), Kapoho Heiau (Site 68, Bennett 1931; Kikuchi 1963), shelter caves, stone walls, a spring, fishing shrines, an enclosure, and walls (Kikuchi 1963).
- 6. A stone wall associated with terraces and a paved platform, located just west of the Project area, was previously considered a remnant of either Kahaleki'i or Kakaianahoa

Heiau SIHP #50-30-10-406, McMahon 1988), until more recent work determined it to be related to the plantation era (Perzinski et al. 2001). Five archaeological sites were uncovered within Kukuiolono Park, including an assemblage of historic properties associate with the estate of Walter D. McBryde, including artifacts and structures (SIHP50-30-10-3906), a collection of traditional stones and artifacts (SIHP #50-30-10-3907), and graves (SIHP #50-30-10-3908), as well as a retaining wall (SIHP #50-30-10-3909) and stone wall alignment (SIHP #50-30-10-3910) (Jones et al. 2006; Tulchin et al. 2005).

- 7. LCAs from the Māhale of 1848 indicate that the coastal region of Kalāheo was used as *loʻi kalo* (irrigated taro fields), *kula* (dryland agriculture) lands for sweet potato cultivation, and salt pans, and that the uplands of Kalāheo was also used for the cultivation of *kalo* (Waihona 'Aina 2000). Testimonies in the early twentieth century indicated that the *kula* lands of Kukuiolono were famous for the cultivation of sweet potatoes (Handy and Handy 1972:428).
- 8. The companion archaeological literature review and field inspection study for the Project did not identify any archaeological sites within the Project area, which had been previously disturbed for transportation, residential, or commercial purposes (Yamauchi and Hammatt 2011).

9.2 Results of Community Consultation

CSH attempted to contact 30 community members and government agency and community organization representatives. Of the 10 people that responded, three $k\bar{u}puna$ (elders) and/or kama ' $\bar{a}ina$ (Native-born) participated in formal interviews for more in-depth contributions to the CIA. This community consultation indicates:

- 1. The *ahupua* 'a of Kalāheo is associated with a male *mo* 'o (lizard, water spirit), one of five *mo* 'o that govern the districts of Kaua'i, according to Ms. Anne Punohu. The *mo* 'o are connected to the pure fresh water streams, waterfalls, and springs in the *mauka* lands, as well as the ocean waters, creating a *mauka-makai* relationship. The shapes of these *mo* 'o are connected to the entire geography of Kaua'i, with the heads in the mountainous center of the island, the backs forming the ridges, the bodies containing *manu* such as 'io, pueo, and *koa* 'e, and the tails extending into the ocean waters. The ocean itself is governed by the god Kawelo, but the *mo* 'o and Kawelo are intertwined: "They cannot be separated on Kaua'i, because Kawelo rules in the ocean and *mo* 'o rules in the mountain, and it is the *manu* that grew in the middle."
- 2. The Project area is located primarily along Pu'uwai Road, which Ms. Punohu translates as "sacred water" in reference to nearby Papapaholahola Spring. Since a *kahuna* would have once guarded the sanctity of the spring, Ms. Punohu believes that a *heiau*, a *lele*, and a small house platform are located near the spring. In addition, a *heiau* is located at the southern end of the plateau of Kukuiolono, according to Mr. Ferreira, and a *hōlua* course with unique grass-filled stones may exist near the Project area, according Ms. Punohu.
- 3. Mount Kahili was a place that Mr. John Brune, Jr. visited to hunt pigs and gather 'aloe and noni for medicinal purposes. Mr. Brune also caught koi (carp), tilapia, catfish, and

bass in two Kalāheo reservoirs and caught *akule* (big-eyed scad), lobsters, crabs and *'opihi* (limpets) in the ocean during his youth. Mr. Ferreira observes that feral pigs continue to enter Kukuiolono Park looking for food. A swamp or lake at the summit of Mount Kahili is known as "Black Lake" to Mr. Ferreira and Mr. Brune.

- 4. Community participants and respondents state two recommendations:
 - i. Ms. Punohu recommends that a buffer zone be established around Papapaholahola Spring so as to not compromise its purity as a source of water for the district's *mo* 'o.
 - ii. Ms. Coochie Cayan of SHPD identifies cultural practices for access and gathering, spirituality at sacred sites, and protecting ancient burials as potential issues should the Project expose or degrade such cultural resources or sites.

9.3 Impacts and Recommendations

Based on the information gathered for the cultural and historic background and community consultation detailed in this CIA report, the proposed Project is unlikely but may potentially impact Native Hawaiian cultural resources and burials. CSH identifies these potential impacts and makes the following recommendations:

- 1. The companion archaeological literature review and field inspection did not identify any archaeological sites within the Project area (Yamauchi and Hammatt 2011), but there is a possibility that land-disturbing activities during construction may uncover presently undetected burials or other cultural finds. In addition, historic-era terraces, rock mounds, platforms, and walls were previously identified just west of the Project area (SIHP #50-30-10-406, Perzinski et al. 2001). Personnel involved in the construction activities of the Project should be informed of the possibility of inadvertent cultural finds, including human remains. Should burials or other cultural finds be identified during ground disturbance, the construction contractor should immediately cease all work and the appropriate agencies notified pursuant to applicable law.
- 2. Land-disturbing activities during construction may disturb cultural sites outside of the Project area, such as Papapaholahola Spring. Best management policies should be implemented to avoid disturbing such cultural sites.

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Appendix A Glossary

To highlight the various and complex meanings of Hawaiian words, the complete translations from Pukui and Elbert (1986) are used unless otherwise noted. In some cases, alternate translations may resonate stronger with Hawaiians today; these are placed prior to the Pukui and Elbert (1986) translations and marked with "(common)."

Diacritical markings used in the Hawaiian words are the 'okina and the kahakō. The 'okina, or glottal stop, is only found between two vowels or at the beginning of a word that starts with a vowel. A break in speech is created between the sounds of the two vowels. The pronunciation of the 'okina is similar to saying "oh-oh." The 'okina is written as a backwards apostrophe. The kahakō is only found above a vowel. It stresses or elongates a vowel sound from one beat to two beats. The kahakō is written as a line above a vowel.

Hawaiian Word	English Translation		
ahupua'a	land division usually extending from the uplands to the sea, so called because the boundary was marked by a heap (<i>ahu</i>) of stones surmounted by an image of a pig (<i>pua'a</i>), or because a pig or other tribute was laid on the altar as tax to the chief		
ʿāina	land		
akule	big-eyed scad		
aliʻi	chief, chiefess, officer, ruler, monarch, peer, headman, noble, aristocrat, king, queen, commander		
'aloe	aloe		
ʻāpana	place, slice, portion, fragment, section, segment, installation, part, land parcel, lot, district, sector, ward, precinct		
awa	milkfish		
heiau	pre-Christian place of worship, shrine; some <i>heiau</i> were elaborately constructed stone platforms, others simple earth terraces		
hōlua	sled, especially the ancient sled used on grassy slopes		
ʻili	land section, next in importance to an <i>ahupua'a</i> and usually a subdivision of an <i>ahupua'a</i>		

Hawaiian Word	English Translation		
ʻio	Hawaiian hawk		
kāhili	feather standard, symbolic of royalty		
kahuna	priest, sorcerer, magician, wizard, minister, expert in any profession. <i>Kāhuna</i> —plural of <i>kahuna</i>		
kai	ocean		
kalo	taro		
kama ʻāina	Native-born, one born in a place, host; native plant; acquainted, familiar, lit., land child		
koʻa	shrine, often consisting of circular piles of coral or stone, built along the shore or by ponds, used for ceremonies to make fish multiply		
koa'e	tropic or boatswain bird		
koi (Japanese)	carp		
kula	plain, field		
kupuna, kūpuna (pl.)	elder (common). Grandparent, ancestor, relative or close friend of the grandparent's generation, grandaunt, granduncle; <i>Kūpuna</i> —plural of <i>kupuna</i>		
lele	sacrificial altar or stand		
loʻi	irrigated terrace, especially for taro, but also for rice; paddy		
makai	seaward		
manu	bird		
mauka	inland		
menehune	legendary race of small people who worked at night, building fish ponds, roads, temples; if the work was not finished in one night, it remained unfinished		
то 'о	lizard, reptile of any kind, dragon, serpent; water spirit		

Hawaiian Word	English Translation
moʻolelo	story, tale, myth, history, tradition, literature, legend, journal, log, yarn, fable, essay, chronicle, record, article; minutes, as of a meeting. (From <i>mo 'o 'ōlelo</i> , succession of talk; all stories were oral, not written)
noni	Indian mulberry
'ohana	family
ʻōlelo noʻeau	proverb, wise saying, traditional saying
ʻōpeʻapeʻa	Hawaiian hoary bat
ʻopihi	limpets
pōhaku	rock, stone, mineral, tablet
pueo	Hawaiian short-eared owl
pu'u	any kind of protuberance from a pimple to a hill, peak, cone, hump, mound, bulge, heap, pile, portion, bulk, mass, quality, clot, bunch, knob
wahi pana	Storied place (common); legendary place
uka	mountain
wahi pana	storied places
wai	water
wailele	waterfall
wauke	paper mulberry

Appendix B Common and Scientific Names for Plants and Animals Mentioned by Community Participants

Common Names		Possible Scientific Names		Source
Hawaiian	Other	Genus	Species	
akule	big-eyed scad	Selar	crumenophthalmus	Hoover 2003
'aloe	aloe	Aloe	ssp. *	Pukui and Elbert 1986
iʻa ʻulaʻula uli	koi (Japanese), carp	Cyprinus	carpio	Pukui and Elbert 1986
ʻio	Hawaiian hawk	Buteo	solitarius	Pukui and Elbert 1986
koa'e	tropic or boatswain bird	Phaethon	ssp.	Pukui and Elbert 1986
noni	Indian mulberry	Morinda	citrifolia	Wagner et al. 1999
ʻopihi	limpet	Cellana	spp.	Pukui and Elbert 1986
риео	short-eared owl	Asio	flammeus	Hawaiʻi DLNR 2005

^{*} spp. = multiple species

Appendix C Authorization and Release Form

Cultural Surveys Hawai'i, Inc.

Archaeological and Cultural Impact Studies Hallett H. Hammatt, Ph.D., President



P.O. Box 1114

Kailua, Hawai'i 96734

Ph: (808) 262-9972

Fax: (808) 262-4950

Job code: KALAHEO 3

kvogeler@culturalsurveys.com

www.culturalsurveys.com

AUTHORIZATION AND RELEASE FORM

Cultural Surveys Hawai'i (CSH) appreciates the generosity of the *kūpuna* and *kama'āina* who are sharing their knowledge of cultural and historic places, experiences of past and present cultural practices. At the request of [Company Name], Cultural Surveys Hawai'i (CSH) is conducting a Cultural Impact Assessment (CIA) for the proposed [Project].

We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:

- 1. The interview will not be tape-recorded without your knowledge and explicit permission.
- You will have the opportunity to review the written transcript or notes of our interview with you. At that time you may make any additions, deletions or corrections you wish.
- 3. You will be given a copy of the interview transcript or notes for your records.
- 4. You will be given a copy of this release form for your records.

For your protection, we need your written confirmation that:

- You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.
- 2. You agree that the interview shall be made available to the public.

I,	, agree to the procedures outlined above and, by my		
(Please print your nam			
signature, give my conse	nt and release for this interview and/or photograp	h to be used as specified.	
	(Signature)		
	(Signature)		
	(Date)	-	

Appendix D Community Consultation Letter

Cultural Surveys Hawai'i, Inc.

Archaeological and Cultural Impact Studies Hallett H. Hammatt, Ph.D., President

P.O. Box 1114

Kailua, Hawai'i 96734

Ph: (808) 262-9972

Fax: (808) 262-4950

Job code: KALĀHEO 3

kvogeler@culturalsurveys.com

www.culturalsurveys.com

June 14, 2011

Aloha SAMPLE.

At the request of Belt Collins Hawaii, Ltd., Cultural Surveys Hawai'i, Inc. (CSH) is conducting a Cultural Impact Assessment for the proposed Kaua'i County Kalāheo Water System Improvements Project, Kalāheo and Wahiawa Ahupua'a, Koloa District, Kaua'i Island, [TMK: (4) 2-4-003:007, 2-4-003:999 por., 2-4-004:039, 2-4-004:049, 2-4-004:999 por., 2-4-005:999 por., 2-4-006:999 por., 2-4-009:003].

The Kaua'i County Department of Water is planning to upgrade its aging Kalāheo Water System in upland Kalāheo, Kaua'i. Plans call for replacing two existing water tanks, constructing a new well, constructing new transmission mains, booster pump station, and pressure reducing valve stations, and modifying existing pressure reducing valve stations and booster pump station affected by the proposed upgrades.

The two existing tanks, known as the Nursery and Clearwell Tanks, will each be replaced with a 0.5 MG water tank. The Nursery Tank replacement will be located on a nearby parcel acquired from the Yamada family and identified as the Yamada Tank. The Clearwell Tank replacement will be located on the same parcel within the grounds of the existing facility.

The new well and booster pump station will be located at the Yamada Tanksite. Modifications will be made to the existing booster pump station at the existing 908 Tank site. A new transmission main will be constructed along Poʻohiwa and Puʻuwai Roads from the 908 Tank site to the Yamada Tank site. An additional extension of transmission main is planned for Kikala Road. Finally, modifications to and additions of pressure reducing valve stations are planned within the Puʻuwai and Kikala Road rights-of-way.

The purpose of this cultural study is to assess potential impacts to cultural practices as a result of potential changes to the Kalāheo Water System in upland Kalāheoi Ahupua * a. We are seeking your $k\bar{o}kua$ and guidance regarding the following aspects of our study:

- General history and present and past land use of the project area.
- Knowledge of cultural sites which may be impacted by future development of the project area - for example, historic sites, archaeological sites, and burials.
- Knowledge of traditional gathering practices in the project area, both past and ongoing.
- · Cultural associations of the project area, such as legends and traditional uses.

Page 2 Referrals of kūpuna or elders and kama'āina who might be willing to share their cultural knowledge of the project area and the surrounding ahupua'a lands. Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area. I invite you to contact me, Kūhiō Vogeler, at (808) 262-9972, or send me an e-mail at kvogeler@culturalsurveys.com if you have any information you would like to share. Mahalo nui, Kūhiō Vogeler, Ph.D. Cultural Researcher Cultural Surveys Hawai'i

APPENDIX F PRECONSULTATION LETTERS



RECEIVED

2012 FEB -9 PM 12: 31

BELT COLLINS HAWAII

February 7, 2012

In reply refer to File #12-05-200JL

Belt Collins Hawaii LLC 2153 North King Street, Suite 200 Honolulu, HI 96819-4554

Attention: Mr. Glen T. Koyama

SUBJECT:

ENVIRONMENTAL ASSESSMENT

PROPOSED KALĀHEO WATER SYSTEM IMPROVEMENTS

TMKs #(4) 2-3-003:007; #(4) 2-4-009:003; #(4) 2-4-004:049 AND KIKALA ROAD PO'OHIWI ROAD AND PU'UWAI ROAD, KALĀHEO, KAUA'I

Dear Mr. Koyama:

Thank you for the opportunity to provide preliminary input to the above subject projects. As a utility, we recognize the need to upgrade existing aging facilities. At this time, we do not have any immediate comments. However, as projects are developed, we ask that you keep us in the loop and submit plans to us for review and comments. In addition, new water facilities that may require new electrical service will need to be reviewed by our office as well.

We look forward to working with you on this project and should you have any further questions please call Mr. Juan Lorenzo Jr, the planner assigned to this project at (808) 246-2354.

Very truly yours,

FERDINAND "FRED" PASCUAL Distribution Planning Coordinator

FP:lk