

**DRAFT ENVIRONMENTAL ASSESSMENT**

**CONSTRUCTION OF THE KYNERSLEY NO. 1 RESERVOIR**  
**0.3 MG REPLACEMENT**

**TMKs: (3rd) 5-4-002:008 and 022, and 5-4-011:099**  
**Pūehuehu, North Kohala District, Hawai‘i Island, State of Hawai‘i**

**July 2010**

**County of Hawai‘i**  
**Department of Water Supply**  
**345 Kekuanaoa Street, Suite 20**  
**Hilo, Hawai‘i 96720**



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**PROPOSING/  
APPROVING AGENCY:**

County of Hawai‘i  
Department of Water Supply  
345 Kekuaaoa Street, Suite 20  
Hilo, Hawai‘i 96720

**CONSULTANT:**

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PO Box 396  
Hilo HI 96721

**CLASS OF ACTION:**

Use of County Land  
Use of County Funds

This document is prepared pursuant to:

The Hawai‘i Environmental Policy Act,  
Chapter 343, Hawai‘i Revised Statutes (HRS), and  
Title 11, Chapter 200, Hawai‘i Department of Health Administrative Rules (HAR).

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## SUMMARY

The County of Hawai‘i, Department of Water Supply (DWS), plans to demolish a 0.1 million gallon (MG) steel water tank on one DWS property on Kynnersley Road and replace it with a 0.3 MG reinforced concrete reservoir on an adjacent DWS property. Also included are water level control facilities, electrical work for the SCADA (supervisory control and data acquisition) system, site piping, site asphalt paving, perimeter fencing and a paved driveway. The project will also demolish an existing 0.05 MG unused tank on a cane camp subdivision lot lower down on Kynnersley Road and restore the site. The new reservoir will be constructed of reinforced concrete and will be designed to current DWS and applicable building code standards. Once water service is reconnected to the new reservoir on TMK 5-4-002:022, the existing tanks on TMKs 5-4-002:008 and 5-4-011:099 will be demolished and properly disposed of. The improvements will promote public health and safety by improving water storage capacity for North Kohala.

The contractor will develop and implement a Storm Water Pollution Prevention Plan (SWPPP) to contain sediment and storm water runoff during construction. Implementation of the project would have a minor effect on local traffic, possibly requiring only a short-term single-lane closure during grading and paving of vehicular access points. Hazardous substances will be abated by appropriate measures during construction and demolition. The new reservoir site is a former sugar cane field, and the other site is within a cane camp subdivision. Biological surveys and coordination with appropriate resource agencies have confirmed that no significant biological, archaeological or cultural resources will be adversely affected. If archaeological resources or human remains are encountered during land-altering activities, work in the immediate area of the discovery will be halted and the State Historic Preservation Division will be contacted.

## **PART 1: PROJECT DESCRIPTION, PURPOSE AND NEED AND ENVIRONMENTAL ASSESSMENT PROCESS**

### **1.1 Project Description, Location and Property Ownership**

As depicted in Figures 1-4, the County of Hawai'i, Department of Water Supply (DWS), plans to demolish a 0.1 million gallon (MG) steel water tank on one DWS property on Kynnersley Road and replace it with a 0.3 MG reinforced concrete reservoir on an adjacent DWS property. Also included are water level control facilities, electrical work for the SCADA (supervisory control and data acquisition) system, site piping, site asphalt paving, perimeter fencing and a paved driveway. The project will also demolish an existing 0.05 MG unused tank on a cane camp subdivision lot lower down on Kynnersley Road and restore the site. The new reservoir will be constructed of reinforced concrete and will be designed to current DWS and applicable building code standards. Once water services are reconnected to the new reservoir on TMK 5-4-002:022 and tested, the existing tanks on TMKs 5-4-002:008 and 5-4-011:099 will be demolished. The material from the demolished reservoirs will be properly disposed of in consultation with the County Department of Environmental Management.

No firm cost estimates are yet available for construction and demolition, but the cost is expected to be in the range of \$1.4 to \$1.8 million. If approvals and funding proceed as planned, design will be finished by October 2010, and construction may start as soon as January 2011 and will finish within approximately six to eight months. These estimates will be refined as the project proceeds.

### **1.2 Purpose and Need**

The facility is needed to promote public health and safety by improving water service for the North Kohala community. The improvements are necessary because the existing facilities have reached the end of their service life, have required expensive maintenance, are undersized for current needs, and do not meet current DWS standards. The new reservoir will hold three times as much water as the existing tank, and will thus be better able to meet current and future demands in its water service area and provide adequate storage capacity for fire protection for commercially zone parcels in this part of Kohala. The project is meant to improve service for lots within the existing service area that are eligible to have water service and involves no service area expansion.

### **1.3 Environmental Assessment Process**

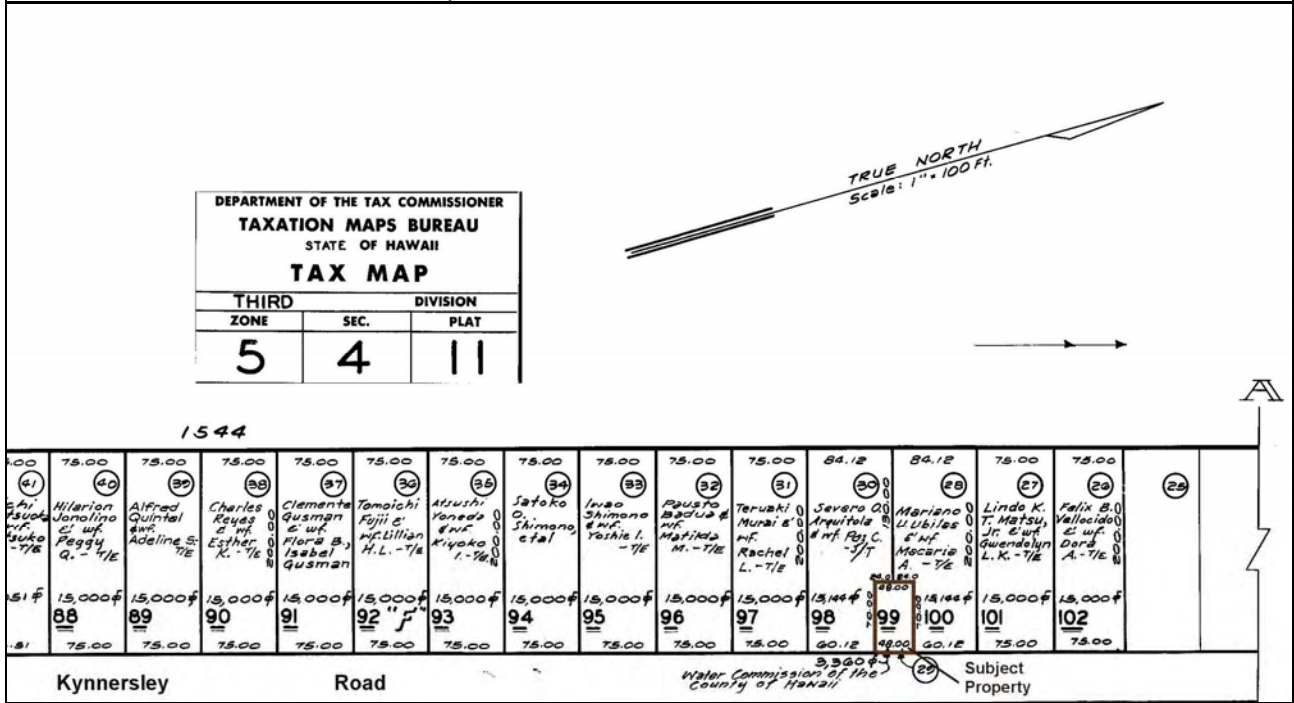
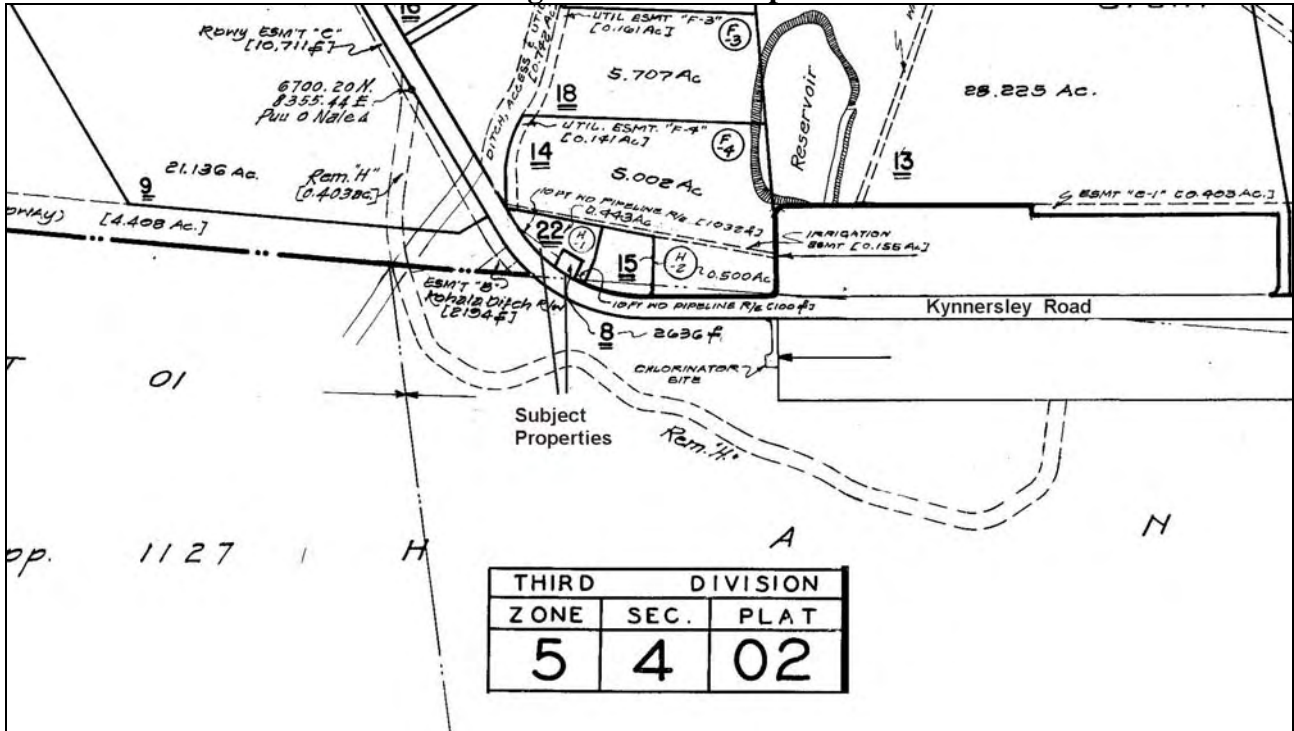
This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawai'i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai'i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai'i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria.

**Figure 1  
Location Map**





Figure 2 TMK Maps

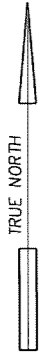


**Figure 3 Project Site Photos**



3a Existing Upper Tank and Adjacent Site ▲ ▼ 3b Existing Lower Tank





NOTE:  
 EXISTING UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE ONLY. EXISTING UNDERGROUND UTILITIES SHOWN ARE BASED ON AVAILABLE REFERENCE PLANS FROM THE DEPT. OF WATER SUPPLY. EXACT LOCATIONS OF ALL UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD.

LOT "F-4"  
 TMK: (3) 5-4-02 : 014

NEW 0.3 M.G. REINFORCED CONCRETE RESERVOIR  
 F.F.=946.5  
 O.F.=962.0

LOT "H-2"  
 TMK: (3) 5-4-02 : 015

TRAV. T-1 (SPIKE)  
 9,043.36 N  
 8,827.03 E  
 ELEV.=943.71

EXIST. 0.10 M.G. STEEL TANK  
 F.F.=946.5  
 O.F.=970.0

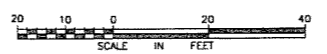
LOT "H-1"

EXISTING 0.10 M.G. STEEL TANK TO BE REMOVED AFTER COMPLETION OF NEW RESERVOIR.

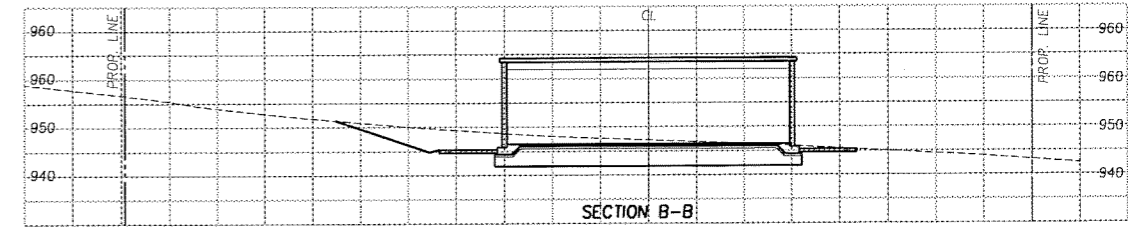
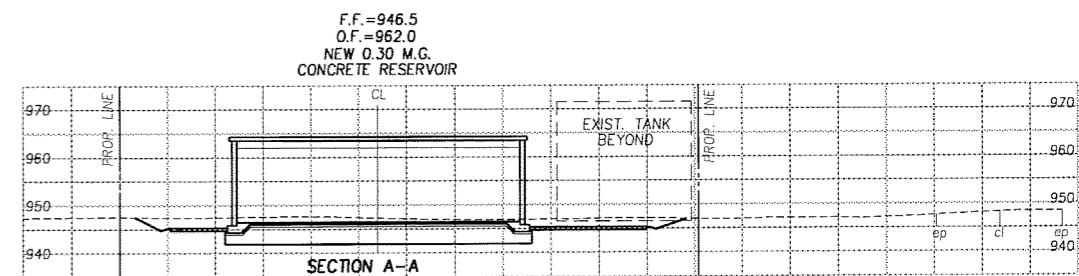
FIELD SURVEY & MAP BY:  
 DEPARTMENT OF WATER SUPPLY  
 345 KEKUANAOA STREET, SUITE 20  
 HILO, HAWAII 96720  
 MARCH 11, 2009

OWNER:  
 WATER BOARD, COUNTY OF HAWAII  
 345 KEKUANAOA STREET, SUITE 20  
 HILO, HAWAII 96720

TOPOGRAPHIC SURVEY MAP  
 OF LOT "H-1" AND "TANK SITE"  
 PORTION OF GRANT 1544 TO MAKANOANO, MARIA AND KANEHALAU  
 KYNNERSLEY ROAD TRACT 2, BLOCK "F", FILE PLAN 659  
 AT PUEHEHU, NORTH KOHALA, ISLAND OF HAWAII, HAWAII  
 TAX MAP KEY: BRD DIVISION 5-4-002:022 AND 008



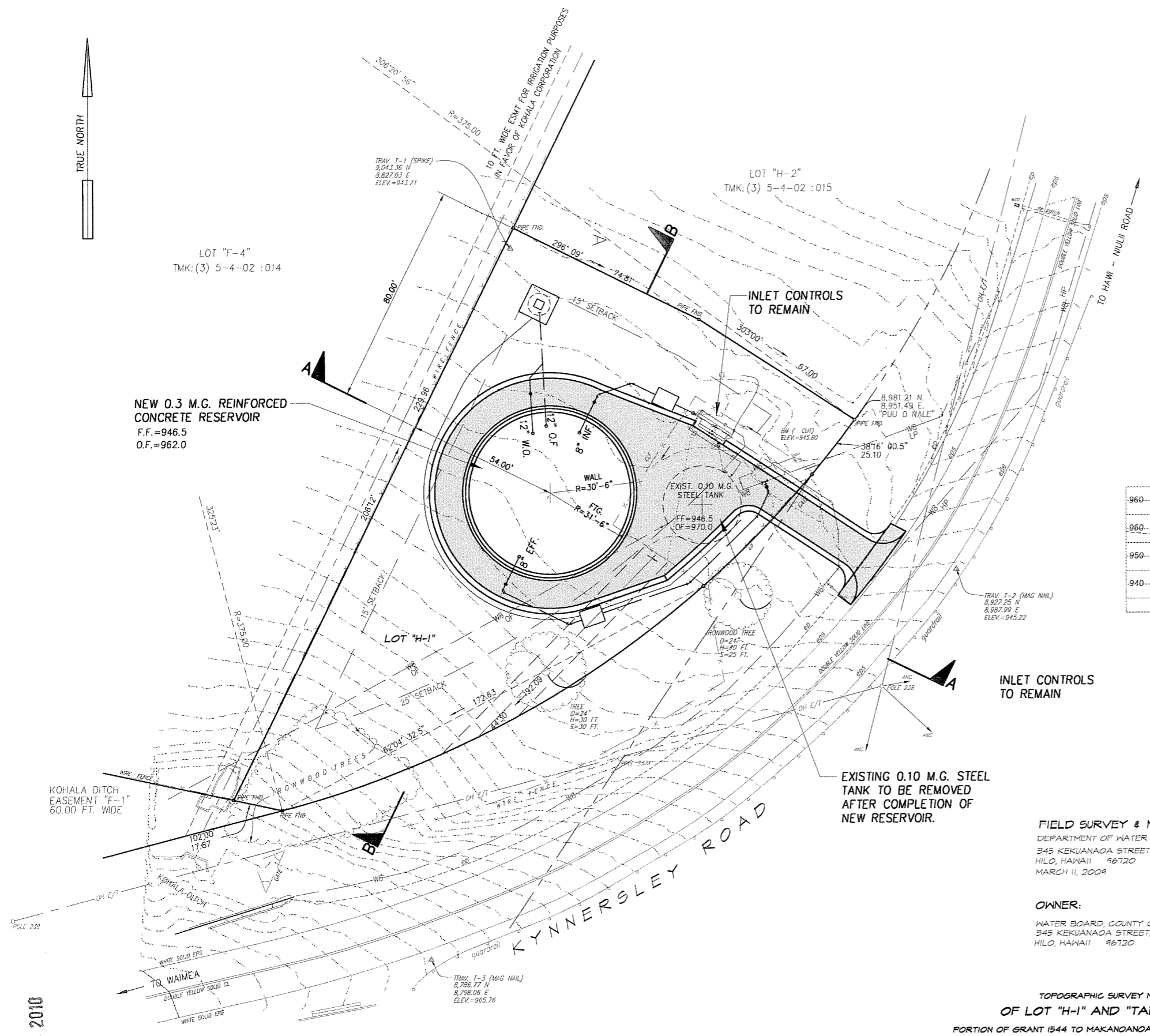
SITE LAYOUT PLAN  
 SCALE: Horiz.: 1"=20'



MAY 28 2010

	DEPARTMENT OF WATER SUPPLY COUNTY OF HAWAII	
	PROJECT: CONSTRUCTION OF THE KYNNERSLEY NO. 1 RESERVOIR 0.3 MG REPLACEMENT	SHEET NO.
PRELIMINARY SCHEMATIC SUBJECT TO CHANGE		OF SHEETS
JOB NO. 2008-950		

MAY 28 2010



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Part 4 of this document states the finding (anticipated, in the Draft EA) that no significant impacts are expected to occur; Part 5 lists each criterion and presents the findings for each made by the Hawai'i County Department of Water Supply, the proposing/approving agency. If, after considering comments to the Draft EA, the agency concludes that, as anticipated, no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) will be prepared. DWS may also seek U.S. Safe Drinking Water Act State Revolving Funds for the improvements, which require addressing federal "cross-cutter" authorities, as discussed in Section 3.7 of this EA.

#### **1.4 Public Involvement and Agency Coordination**

The following agencies and organizations have been or are being consulted in development of the environmental assessment and/or supporting documents:

Federal:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. Natural Resources Conservation Service

State:

- Department of Health
- Department of Land and Natural Resources, Division of Forestry and Wildlife
- Department of Land and Natural Resources, State Historic Preservation Division
- Office of Hawaiian Affairs

County:

- Department of Environmental Management
- Fire Department
- Planning Department
- Public Works Department
- Police Department
- County Council

Private:

- Sierra Club
- Neighboring landowners

Copies of communications received during early consultation are contained in Appendix 1a.

## **PART 2: ALTERNATIVES**

### **2.1 No Action**

Under the No Action Alternative, the existing reservoirs would not be replaced. At some point in the future the quality of water service in this part of North Kohala may not be adequately dependable or able to meet the normal growth in demand. Because of its mandate to provide reliable and high-quality water service to all its customers, the Hawai'i County Department of Water Supply considers the No Action Alternative unacceptable.

However, the No Action Alternative would also avoid disturbance of land and temporary construction-related impacts to air quality, noise and traffic, and is thus an important baseline for evaluating environmental impacts of the proposed project.

### **2.2 Alternative Locations or Strategies**

During early phases of project planning, DWS examined the North Kohala area and determined that the upper Kynnersley Road site provided the best overall location for the required function. It is already served by a water main and supports DWS uses, and it would be the most economical site to acquire and use. Therefore, DWS acquired the property. Furthermore the site is the proper elevation to provide optimum service. When replacing tanks, DWS usually tries to keep the overflow elevations similar so as not to alter the total system and require installation of appurtenances such as pressure reducing valves. North Kohala has steep slopes in most areas and there are very few alternative properties in the proper elevational range, and none with the site's other advantages.

As there do not appear to be any environmental or other disadvantages associated with the specific proposed site, which has good access, existing facilities, and no apparent environmental issues, no alternative sites have been advanced in the Environmental Assessment. There is no other approach to water storage that would accomplish the goals of the project.

## **PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES**

### *Basic Geographic Setting*

The properties upon which the new reservoir would be constructed and from which the old tanks would be removed are referred to throughout this EA as the *project sites*. The site with the larger tank, where the new reservoir will be constructed, is termed the *upper project site*. The *lower project site* is where the existing 0.05 MG tank will be removed. The term *project area* is used to describe the general environs of North Kohala.

The upper project site is part of a former sugar cane field located at about 950 feet in elevation, and the lower project site is in a cane camp subdivision at about 735 feet in elevation. Both sites are located along Kynnersley Road, which extends southwest from an intersection with the Akoni Pule Highway between Hawi and Kapa‘au to its junction with the Kohala Mountain Road (see Figures 1-3). The climate in the area is mild and moist, with an average annual rainfall of 65 inches (U.H. Hilo-Geography 1998:57). Adjacent land use is primarily residential.

### **3.1 Physical Environment**

#### **3.1.1 Geology, Soils and Geologic Hazards**

##### *Environmental Setting*

Geologically, this part of North Kohala is located on the lower flank of Kohala volcano. The surface consists of highly weathered basalt soils on Pleistocene-era lava flows from the Pololu Volcanics series from Kohala (Wolfe and Morris 1996). The project site soil is classified by the U.S. Natural Resources Conservation Service (formerly Soil Conservation Service) as Ainakea silty clay loam (AaC), a well-drained soil 24 to 36 inches deep underlain by bedrock. Areas with this soil type were formerly used extensively for sugarcane cultivation (U.S. Soil Conservation Service 1973), and they now support diversified agriculture, secondary forest, or pasture.

A preliminary geotechnical investigation (see Appendix 4) classified the surface soil as mottled brown clayey silt derived from volcanic ash. The clayey silt was in a medium-stiff to stiff condition, extending to depths of about four feet. Initial laboratory testing of the clayey silt found relatively high in-situ moisture content and low dry densities, which indicate moderately to highly compressible soil. Underlying the clayey silt was mottled brown completely weathered basalt. The basalt was in a medium-stiff to stiff condition extending to the maximum depths drilled. Neither groundwater nor seepage water was encountered in the borings.

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of North Kohala is Zone 9, on a scale of ascending risk from 9 to 1 (Heliker 1990:23). The very low hazard risk is based on

the fact that Kohala Volcano, the oldest volcano on the island, has not erupted for 60,000 years and is possibly extinct. As such, there is negligible risk of lava inundation over relatively short time scales in the project area.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (Uniform Building Code, 1997 Edition, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006, demonstrated. The moderate slopes and relatively stable soils at the project site do not appear prone to subsidence or rockfall, landslides or other forms of mass wasting.

### *Impacts and Mitigation Measures*

In general, geologic conditions impose no constraints on the proposed project, and the proposed water system improvements are not imprudent to construct. Based on the proposed finish floor elevation and the existing topography of the site, grading will primarily consist of cuts with maximum cut depths of two to three feet. Foundation excavations will thus expose both the surface clayey silt and the underlying completely weathered basalt. Conventional shallow foundations may be used to support the proposed tank. Due to the poor workability and compressible nature of the onsite clayey silt/volcanic ash, preliminary geotechnical recommendations are that the clayey silt beneath the tank footprint be completely removed down to the underlying weathered basalt. Footings may then be founded directly on the medium-stiff to stiff weathered basalt. The excavated clayey silt beneath the tank slab should be replaced with granular fill. The upper six inches of granular fill should consist of aggregate base course. The remainder of the fill section should consist of granular structural fill. The full geotechnical report will present final recommendations. The standard reinforced concrete reservoir will be designed in accordance with applicable American Water Works Association and American Concrete Institute standards for Seismic Zone 4, as well as all applicable County Building Department requirements.

### **3.1.2 Drainage, Water Features and Water Quality**

#### *Existing Environment*

No perennial surface water bodies are located on the project sites. Directly to the south of the upper project site passes the Kohala Ditch. This 20-mile long network of irrigation flumes and ditches was completed in 1905. Meant to serve the sugar plantations, it was damaged in the 2006 earthquake but has since been repaired to provide stock water for ranches and irrigation for farms. No known areas of substantial local (non-stream related) flooding are present in the project area, but local ephemeral drainages may overflow after very heavy rains. The Federal Emergency Management Agency’s Flood Insurance Rate Map (FIRM) 1551660100C (9/16/88) shows the project sites to be located entirely within Zone X, areas not known to be within the 500-year floodplain.



### *Impacts and Mitigation Measure*

Because of the limited scale of construction and the environmental setting, the risks for flooding or impacts to water quality at the project site are very minor. The project includes the design of site drainage to retain normal runoff on the property. There will be no effects to the Kohala Ditch.

In order to minimize the potential for sedimentation and erosion, the contractor shall perform all earthwork and grading in conformance with Chapter 10, Erosion and Sediment Control, Hawai'i County Code. The project will involve preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the project. These BMPs may include, but will not be limited to, the following:

- Minimization of soil loss and erosion by revegetation and stabilization of slopes and disturbed areas of soil, possibly using hydromulch, geotextiles, or binding substances, as soon as possible after working;
- Minimization of sediment loss by emplacement of structural controls possibly including silt fences, gravel bags, sediment ponds, check dams, and other barriers in order to retard and prevent the loss of sediment from the site;
- Minimizing disturbance of soil during periods of heavy rain;
- Phasing of the project to disturb the minimum area of soil at a particular time;
- Application of protective covers to soil and material stockpiles;
- Construction and use of a stabilized construction vehicle entrance, with designated vehicle wash area that discharges to a sediment pond;
- Washing of vehicles in the designated wash area before they egress the project site;
- Use of drip pans beneath vehicles not in use in order to trap vehicle fluids;
- Routine maintenance of BMPs by adequately trained personnel; and
- Proper cleanup and disposal at an approved site of material from significant leaks or spills, if they occur.

### 3.1.3 Flora, Fauna and Ecosystems

#### *Existing Environment*

The natural vegetation of this part of North Kohala was most likely lowland rain forest dominated by ‘ōhi‘a (*Metrosideros polymorpha*) and koa (*Acacia koa*) (Gagne and Cuddihy 1990). These original communities, however, were destroyed or heavily degraded by sugar cane cultivation, cattle grazing, and clearing for small farms and residences. The vegetation in the area is now either managed vegetation (i.e., farms, pasture or landscaped grounds) or adventive “communities” of various alien weeds. Only small areas of remnant forest are present, mainly in the more mauka areas of North Kohala and on certain shoreline and stream gulch cliffs.

The vegetation of the upper project site is entirely non-natural and consists of the non-native species California grass (*Urochloa mutica*), Guinea grass (*Panicum maximum*), Napier grass (*Pennisetum purpureum*), ironwood (*Casuarina equisetifolia*), ti (*Cordyline fruticosa*), wedelia (*Wedelia trilobata*), Formosan koa (*Acacia confusa*), and a number of other alien species (see Figure 3a). A few individuals of the common native plant ‘uhaloa (*Waltheria indica*) are also present. Vegetation on the lower project site is controlled by herbicide and restricted to ti (*Cordyline fruticosa*) and wedelia (see Figure 3b).

A large variety of alien birds makes up the avifauna of this area. Cats, dogs, mice, rats and mongooses probably all visit the site occasionally. Terrestrial vertebrates listed as threatened or endangered may be present in this part of Kohala and may overfly, roost, nest, or utilize resources here, including the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell’s Shearwater (*Puffinus auricularis newelli*). The Hawaiian Hawk (and Hawaiian hoary bat are almost certainly present in the general area, as they are in most windward lowland areas of the island of Hawai‘i, but would not find the mostly grassy area dominated by alien plants particularly suitable habitat.

#### *Impacts and Mitigation Measures*

Because of the lack of native ecosystems or threatened or endangered plant species on partly developed and former agricultural project sites, no adverse impacts to botanical resources would occur as a result of building the new reservoir or demolishing the two existing ones.

A landscape plan (see discussion in Section 3.1.4) will be implemented around the new reservoir to preserve not only the scenic values of the area but also to mitigate any impact to the erosion control functions of the existing vegetation. The lower site will be grassed to match the existing area.

No temporary or permanent lighting or erect structures such as poles are planned, and therefore no impacts to listed seabirds are anticipated. The scattered low-statured trees in the area do not appear to be conducive to providing nesting sites for Hawaiian Hawks.

However, it is conceivable that the shrubby vegetation may serve as roosts for Hawaiian hoary bats. Furthermore, bats are known to become tangled in barb-wire fences. In order to avoid impacts to the bat, the design does not include barbed wire for any fences. In addition, contract conditions will require that the contractor refrain from activities that disturb or remove the vegetation during critical pupping months for the Hawaiian hoary bat, from May 15 to August 15 of each year. Coordination with the U.S. Fish and Wildlife Service pursuant to the Endangered Species Act and the Fish and Wildlife Coordination Act is discussed in Section 3.7.5, below.

### **3.1.4 Air Quality, Noise, and Scenic Resources**

#### *Environmental Setting*

The strong and steady tradewinds of this part of Kohala contribute to excellent air quality by generally dispersing human-derived pollutants as well as volcano-induced vog. In areas with bare surfaces, however, the strong winds may also exacerbate dust problems caused by fugitive dust emissions from nearby agricultural and construction activities and vehicle traffic.

Noise on the project site is low and derived mainly from motor vehicles on Kynnersley Road and some residential and agricultural activities.

Other than various views of the coastline from the Kohala Mountain Road, which is not visible from the project sites on Kynnersley Road, the project area contains no sites considered significant for their scenic character in the Hawai'i County General Plan.

#### *Impacts and Mitigation Measures*

The proposed action would not measurably affect air quality or noise levels except minimally during construction. Operationally, noise levels should remain similar, as there is already a pump present. In order to minimize noise impacts to nearby sensitive receptors, construction should be conducted only during reasonable hours. Development would entail limited excavation, grading, compressors, vehicle and equipment engine operation, and construction of new infrastructure. These activities may generate noise exceeding 95 decibels at times, impacting nearby sensitive noise receptors, including residences. In cases where construction noise is expected to exceed the Department of Health's (DOH) "maximum permissible" property-line noise levels, contractors would obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH would review the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers.

As the coastline views from Kohala Mountain Road listed in the General Plan are not relevant to the project site, and no other scenic resources are present, no scenic impacts are anticipated.

After demolition of the existing tank at the lower project site, the lot will be grassed to match the surroundings. During final design, a landscape plan will be developed for the upper project site to help the site match its surroundings. Once water services are reconnected to the new reservoir, the existing tank will be demolished and much of the existing tank area will likely be paved to allow pump maintenance equipment and cranes to easily maneuver in the small site. The landscape plan will use mainly rock and grass, which will require little maintenance or water. Other plantings, if utilized, will emphasize indigenous or Polynesian-introduced species adapted to the climate of North Kohala.

### **3.1.5 Hazardous Substances, Toxic Waste and Hazardous Conditions**

#### *Environmental Setting, Impacts and Mitigation Measures*

Older reservoir tanks sometimes have asbestos-containing materials and lead-containing paint, which are hazardous substances. In order to assess the potential hazard, a survey was conducted by EnvironMETeo Services, Inc. (EMET) on March 30, 2010. A report detailing the inspection is attached to this EA as Appendix 2. The survey was limited to the inspection and sample collection for asbestos-containing surfaces and lead-containing painted surfaces by EPA-accredited inspectors from the two existing tanks. The survey results are based on analyses of samples of suspect materials collected from visually and physically accessible areas/materials. Painted surfaces were tested for lead concentrations using an X-Ray Fluorescence (XRF) spectrum analyzer, a testing methodology approved by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Housing and Urban Development (HUD).

EMET was unable to safely access the top and interior of the lower tank due to its severely deteriorated condition. The interior of the upper tank was inaccessible since it was still in use at the time of the survey. No suspect asbestos-containing material was observed in the accessible work scope areas during this survey.

Painted surfaces were analyzed for lead using an XRF analyzer. A total of 19 analyses of painted surfaces, building components and calibrations were performed. Lead-based paint was found on the exterior walls, ladder, and level indicator of the lower tank and the exterior walls, level indicator, valve, and vertical pipe of the upper tank. Lead-containing paint was found on the remaining surfaces tested.

When lead-containing paint is disturbed during demolition work, regulations including those of the EPA, the Occupational Safety and Health Administration (OSHA), and the State Department of Health (DOH), among others, must be complied with. All lead-containing paint must undergo testing to determine if it may be disposed of in a municipal landfill. Metal debris coated with lead paint (less than 0.5% or 5000 ppm) may be sent to recyclers as scrap metal without removing the

paint. DWS and its contractors will coordinate with the Hawai‘i County Department of Environmental Management, Solid Waste Division, to ensure proper handling and disposal, and obtain a Landfill Disposal Permit if required.

Based on onsite inspection and information on file, it appears that the project sites contain no other hazardous or toxic substances and exhibit no other hazardous conditions. No permanent or temporary land use that would tend to result in these conditions appears to have ever occurred on the project site, which is former sugar cane land.

### 3.2 Socioeconomic and Cultural

#### 3.2.1 Socioeconomic Characteristics

The project would affect and benefit the district of North Kohala and more specifically the Hawi/Kapa‘au area. Table 1 provides information on the socioeconomic characteristics of North Kohala along with those of Hawai‘i County as a whole for comparison, from the United States 2000 Census of Population.

The proposed project would benefit public health and welfare in North Kohala through improvements in water supply, a basic and required public service for a community. No adverse socioeconomic impacts are expected.

**Table 1: Selected Socioeconomic Characteristics**

CHARACTERISTIC	Hawai‘i Island	North Kohala
Total Population	148,677	6,038
Percent White	31.5	32.8
Percent Asian	26.7	24.6
Percent Hawaiian or Pacific Islander	9.7	9.5
Percent Two or More Races	28.4	31.1
Median Age (Years)	38.6	38.2
Percent Under 18 Years	26.1	24.4
Percent 65 Years and Over	13.5	13.4
Percent Households with Children	37.5	33.0
Average Household Size	2.75	2.97
Percent Housing Vacant	15.5	8.9
Median Household Income	\$39,805	\$47,733
Percent Below Poverty Level	15.7	12.1

Source: U.S. Bureau of the Census. May 2001. *Profiles of General Demographic Characteristics, 2000 Census of Population and Housing, Hawai‘i*. (U.S. Census Bureau Web Page).

### 3.2.2 Archaeology and Historic Sites

The general area has been cultivated, grazed or used for residences for over a hundred years and has thus experienced intensive grubbing and grading. In addition, much of the area at the project sites was reworked later as part of preparing the land for the existing tanks. Archaeologists Robert B. Rechtman, Ph. D. and Matthew R. Clark, B.A. conducted a field inspection of both the upper and lower project sites on March 11, 2010. No archaeological resources were observed on either of these sites. Furthermore, there were no resources (landforms, vegetation, etc.) of a traditional cultural nature observed within either of the sites. Based on this context, the State Historic Preservation Division (SHPD) was requested by letter to concur with the determination that no historic properties are present and that the project would have no effect on historic properties. By letter of May 17, 2010, (see Appendix 1a), SHPD provided this concurrence. In the unlikely event that historic resources, including artifacts, human skeletal remains, lava tubes, and lava blisters/bubbles, are encountered during future development activities within the current study area, work in the immediate area of the discovery will be halted and SHPD contacted as outlined in Hawai'i Administrative Rules 13§13-275-12.

### 3.2.3 Cultural Resources

The cultural impact assessment (CIA) contained within this section is derived from the archaeological assessment in Appendix 3 and other sources. The CIA is brief and limited because of the minor scope of the project and the low cultural sensitivity of the very small and completely disturbed properties involved. In the interest of readability, the summary below has eliminated most scholarly references; readers interested in sources may consult Appendix 3.

#### *Cultural Historical Background*

According to the model developed by Kirch (1985), the Settlement or Colonization period of Hawai'i was between A.D. 300-600, with colonists possibly from the southern Marquesas Islands. Early Hawaiian farmers developed new subsistence strategies during this period, adapting familiar patterns and traditional tools for use in their new environment. Order was kept through adherence to their ancient and ingrained philosophy of life and through the principle of genealogical seniority. According to Fornander (1969), Hawaiians brought from their homeland a variety of Polynesian customs including the major gods of Kane, Ku and Lono; the *kapu* system of law and order; *pu'uhonua* or places of refuge or asylum; the *'aumakua* concept of a family or ancestral spirit and the concept of *mana*, or spiritual power.

The Development Period, which lasted from A.D. 600-1100, brought changes that included an evolution of traditional tools as well as some distinctly Hawaiian inventions. The evolution of the adze was an example of the former, while the latter included the two-piece fishhook and the octopus-lure breadloaf sinker. Another invention was the *lei niho palaoa*, an item worn by those of high rank which represented a trend toward greater status differentiation.

The Expansion Period from A.D. 1100 to 1650 saw an increase in social stratification and major socioeconomic changes. It also was a time of expansive settling, with the development of the most favorable windward areas as well as more marginal areas on the island's leeward side. This was the time of the greatest population growth as large irrigated field systems were developed and expanded into more arid areas. *Loko* or fishpond aquaculture also flourished during this period.

The second major migration to Hawai'i also occurred during the Expansion Period, with the settlers for this expansion coming from Tahiti in the Society Islands. According to Kamakau (1976) the *kahuna* Pā'ao settled in the islands during the 13<sup>th</sup> century. Pā'ao was the keeper of the god Kūkā'ilimoku, who had fought bitterly with his older brother, the high priest Lonopele. After much tragedy on both sides, Pā'ao escaped Lonopele's wrath by fleeing in a canoe. Kamakau (1991:100–102) told the following story in 1866:

Puna on Hawai'i Island was the first land reached by Pa'ao, and here in Puna he built his first *heiau* for his god Aha'ula and named it Aha'ula [Waha'ula]. It was a *luakini*. From Puna, Pa'ao went on to land in Kohala, at Pu'uepa. He built a *heiau* there called Mo'okini, a *luakini*. It is thought that Pa'ao came to Hawai'i in the time of the *ali'i* La'au because Pili ruled as *mo'i* after La'au. You will see Pili there in the line of succession, the *mo'o kū'auhau*, of Hanala'anui. It was said that Hawai'i Island was without a chief, and so a chief was brought from Kahiki; this is according to chiefly genealogies. Hawai'i Island had been without a chief for a long time, and the chiefs of Hawai'i were *ali'i maka'āinana* or just commoners. There were seventeen generations during which Hawai'i Island was without chiefs—some eight hundred years.

There are several versions of this story that are discussed by Beckwith (1976), including the version where Mo'okini and Kaluawilinau, two *kāhuna* of Moikeha, decide to stay on at Kohala. The bones of the *kahuna* Pā'ao are said to be deposited in a burial cave in Kohala in Pu'uwepa [possibly Pu'uepa?] (Kamakau 1964:41).

Pukui (1983) cites a proverb that reference Kohala. She provides an explanation and notes that Hawaiian proverbs have layers of meaning that are best left to the imagination of the reader:

*I 'ike 'ia no o Kohala i ka pae kō, a o ka pae kō ia kole ai ka waha.*

One can recognize Kohala by her rows of sugar cane which can make the mouth raw when chewed.

Pukui interprets this proverb as follows:

When one wanted to fight a Kohala warrior, he would have to be a very good warrior to succeed. Kohala men were vigorous, brave, and strong (1983:127).

Sugarcane (*Saccharum officinarum*) was a Polynesian introduction and served a variety of uses. The *kō kea* or white cane was the most common, usually planted near Hawaiian homes for medicinal purposes, and to counteract bad tastes. Sugarcane was a snack, condiment, and famine food; it was

fed to nursing babies and helped to strengthen children's teeth. The leaves were used to thatch houses when *pili* grass (*Heteropogon contortus*) or *lau hala* (*Pandanus odoratissimus*) were not abundant. Sugarcane was also used in relation to taro and sweet potato. Handy and Handy explain:

In wet-taro farming, cane was planted along the embankments separating the flooded terraces and flats. In dry-taro and sweet-potato fields on the sloping *kula* or in the lower forest zone, cane was planted as hedges along the lines of stone and rubbish thrown up between the fields. Thus it helped the planter to utilize to the maximum his soil and water, and acted as a windbreak against the gusty breezes which blow in most valley bottoms, along the coasts, and on the uplands where taro is grown. (Handy and Handy 1972:186)

The concept of the *ahupua'a* was established during the A.D. 1400s (Kirch 1985), adding another component to a then well-stratified society. This land unit became the equivalent of a local community, with its own social, economic, and political significance. *Ahupua'a* were ruled by *ali'i 'ai ahupua'a* or lesser chiefs; who, for the most part, had complete autonomy over this generally economically self-supporting piece of land, which was managed by a *konoiki*. *Ahupua'a* were usually wedge or pie-shaped, incorporating all of the ecozones from the mountains to the sea and for several hundred yards beyond the shore, assuring a diverse subsistence resource base.

The project site is located in the *ahupua'a* of Pūehuehu in the district of North Kohala. Pūehuehu is a typical *ahupua'a*, if rather small and narrow. It runs for about three miles on the east side of Kapua Stream before being "cut-off" by the larger Pahoā *ahupua'a* to the west.

An increase in warfare marked the Proto-Historic Period (A.D. 1650-1795), both locally and between islands. Some of that warfare involved Kohala and the Kawaihae area. Shortly before this period, around 1600, Maui chief Kamalalawalu sent spies to areas that included Kawaihae to gauge their population and how many warriors it would take to conquer the areas. According to one account:

The spies sent by Kama-lala-walu went to Hawaii and landed at Kawaihae in the evening. Ka-uhi-o-ka-lani ran about that same evening and returned before the canoes were dismantled and placed in the house. The keepers of the gods at Mailekini were servants of Kama, and so they concealed the canoes of the spies...[Kamakau 1992:56].

However, during the spies' visit to Kohala, which according to Kamakau was a "thickly-populated land," they found many empty houses because most of the men were in upland areas taking part in sports competitions. Kamalalawalu's forces first defeated the residents they found in the northern part of Kohala but when they arrived at Kawaihae they again found empty houses because their residents were attending services at Mailekini Heiau in Waimea. The grassy plains of Waimea soon became the setting for a battle between the Maui warriors and the forces of chiefs from Kohala, Waimea, Kona, Puna and Ka'u. The combined Hawai'i Island forces slew Kamalalawalu and many of his chiefs and warriors, with the remainder making their way back to Maui.



There is evidence that suggests that there were substantial changes to the political system during the Proto-Historic Period. Within Kohala, the Great Wall complex at Koai'e is organized with platforms in the complex apart from contemporaneous features, perhaps symbolizing class stratification. By A.D. 1600, there is island-wide evidence to suggest that growing conflicts between independent chiefdoms were resolved through warfare, culminating in a unified political structure at the district level. It has been suggested that this unification resulted in a partial abandonment of portions of leeward Hawai'i, with people moving to more favorable agricultural areas. By the time of contact with the West, numerous coastal villages and extensive dry land and wetland agricultural systems were in place in North Kohala.

North Kohala is also known as the birthplace of Kamehameha I, who was born in the *ahupua'a* of Kokoiki during the reign of Kalaniopu'u. It has been said that when he was born, an army was assembling on the leeward Kohala coast, preparing for an attack on Maui, and his birth occurred on a night filled with rain, thunder and lightning. Also at that time, Maui chief Kekaulike was involved in a battle with Alapa'i of Kona. During the conflict, Kekaulike's men cut down trees in Kona and, according to Kamakau, all of the coconut trees in Kawaihae. According to Kamakau, he also "slaughtered the country people of Kohala" before seizing their possessions and returning to Maui, where he soon became ill and surrendered his power to Kamehamehanui.

This period was one of continual wartime strife. Ke'eaumoku set up a fort at Pololu and Honokane where he was attacked by Kalaniopu'u, and then relocated to Maui. Kalaniopu'u also conquered East Maui, defeating Kamehamehanui, who was Kekaulike's successor and also Kalaiopu'u's wife's brother. Kalaniopu'u appointed one of his chiefs, Puna, to be governor of Hana and Kipahulu. When Kamehamehanui died of illness in 1766, he was succeeded as Maui's king by Kahekili. At about that time, Ke'eamoku took Kamehamehanui's widow, Namahana, who was Kamehameha's cousin, as his wife. Their daughter, Ka'ahumanu, who would eventually become the favorite wife of Kamehameha I, was born in a cave at the base of Pu'u Kau'iki in 1768.

In 1775, Kalani'ōpu'u and his forces from Hana overran the neighboring Kaupo district and raided Molokai, Lanai, Kaho'olawe and parts of West Maui. Kamehameha's efforts at the battle of Kalaeoka'ilio near Kaupo earned him recognition as a great warrior and the name of Pai'ea (meaning hard-shelled crab) from Maui chiefs and warriors. Ka'ahumanu and her parents left Maui for Hawai'i Island during the battles between Kalaniopu'u and Kahekili.

Hawai'i's history took a sharp turn on January 18, 1778 with the arrival of British Capt. James Cook in the islands. On a return trip to Hawai'i ten months later, with the Maui turmoil still raging, Kamehameha visited Cook aboard his ship the *Resolution* off the east coast of Maui and helped Cook navigate his way to Hawai'i Island. Cook exchanged gifts with Kalaniopu'u at Kealakekua Bay the following January, and Cook left Kealakekua in February. However, Cook's ship then sustained damage to a mast in a severe storm off Kohala and returned to Kealakekua, setting the stage for his death on the shores of the bay.

Kalani'ōpu'u, who was at war with Kahekili, visited Cook on board the *Resolution* off the East coast of Maui. Kamehameha observed this meeting, but chose not to participate. The following January [1779], Cook and Kalani'ōpu'u met again in Kealahou Bay and exchanged gifts. In February, Cook set sail; however, a severe storm off the Kohala coast damaged a mast and they had to return to Kealahou. Cook's return occurred at an inopportune time, and this misfortune cost him his life (Kuykendall and Day 1976, Sahlins 1985). In 1779 King of the Cook expedition explored the North Kohala country and reported:

As far as the eye could reach, seemed fruitful and well inhabited. [Three and four miles inland, plantations of taro and potatoes and *wauke*] neatly set out in rows. The walls that separate them are made of the loose burnt stone, which are got in clearing the ground; and being entirely concealed by sugar-canes planted close on each side, make the most beautiful fences that can be conceived. [The exploring party stopped six or seven miles from the sea.] To the left a continuous range of villages, interspersed with groves of coconut trees spreading along the sea-shore; a thick wood behind this; and to the right, an extent of ground laid out in regular and well-cultivated plantations . . . as they passed, they did not observe a single foot of ground, that was capable of improvement, left unplanted. (Handy and Handy 1972:528)

The following year, in 1780, Kalani'ōpu'u designated his son, Kiwalao, to be his successor, and granted Kamehameha guardianship of the war god Kuka'ilimoku. When it appeared Kiwalao was not honoring his land claims, Kamehameha usurped Kiwalao's authority with a sacrificial ritual and retreated to his district of Kohala where he farmed the land, growing taro and sweet potatoes. Civil war broke out when Kalani'ōpu'u died in 1782 and Kiwalao was killed. The wars between Maui and Hawai'i Island would continue until 1795.

Two American vessels visited Hawaiian waters in 1790. The crew of one of the ships, the *Eleanor*, massacred more than 100 Hawaiians at Olowalu on Maui before leaving crewmember John Young on land. The other vessel, the *Fair American*, was captured off the western coast of Hawai'i and its entire crew – with the exception of Isaac Davis – was killed. Kamehameha did not take part but kept the *Fair American* as part of his fleet. Young eventually made his way to Hawai'i Island where he became governor, living at Kawaihae.

By 1796, Kamehameha had conquered every island kingdom except Kauai, but it wasn't until 1810, after Kaumuali'i of Kauai pledged his allegiance to Kamehameha, that all of the Hawaiian Islands were unified under a single ruler.

During this period there was a continuation of the trend toward intensification of agriculture, *ali'i*-controlled aquaculture, settling of upland areas and development of traditional oral history. The Ku cult, *luakini heiau* and *kapu* system were at their peaks, but the influence of western civilization was being felt in the introduction of trade for profit and a market-system economy. By 1810, the sandalwood trade established by Europeans and Americans twenty years earlier was flourishing. That contributed to the breakdown of the traditional subsistence system, as farmers and fishermen were required to toil at logging which resulted in food shortages and a decline in population.

Following the death of Kamehameha I in 1819, the relaxing of customary *kapu* took place. But with the introduction of Christianity shortly thereafter, his successor, Kamehameha II, renounced the traditional religion and ordered that *heiau* structures either be destroyed or left to deteriorate. The family worship of ‘*aumakua* images was allowed to continue.

The Protestant missionaries who arrived from Boston in 1820 soon were rewarded with land and government positions, as many of the *ali‘i* were eager to assimilate western-style dress and culture. But at the same time, the continuing sandalwood trade was becoming a heavier burden on commoners.

The rampant sandalwood trade resulted in the first Hawaiian national debt, as promissory notes and levies granted by American traders were enforced by American warships. The assimilation of Western ways continued with the short-lived whaling industry to the production of sugarcane, which was more lucrative but carried a heavy environmental price.

Sugarcane had long been grown on all islands, and when Cook arrived he wrote of seeing sugarcane plantations. The Chinese on Lāna‘i are credited with producing the first commercial sugar, as early as 1802. However, it was not until 1835 that sugar became established commercially, replacing the waning sandalwood industry. Kohala became a land in transition and eventually a major force in the sugar industry with the arrival of American missionary Elias Bond. In her comprehensive study of North Kohala, Tomonari-Tuggle relates this transition:

The arrival in 1841 of Elias Bond, of the Protestant American Board of Commissioners for Foreign Missions, to Kohala marked the beginning of a 22-year period of transition in the district’s history. In those years a new religion, a new land tenure system, and a changing economy altered the lifestyles and worldview of the indigenous population of the district. The Kohala community was in flux, attempting to find a firm footing in a changing world, in a much larger network of social, political, and economic interactions than had previously existed. (Tomonari-Tuggle 1988:I-23)

When Elias Bond directed his efforts to initiating sugar as a major agricultural industry in Kohala, he could not have foreseen the incredible success of his modest venture. His primary concern was to develop a means for the Hawaiian people of the district to compete successfully in the market economy that had evolved in Hawaii. What resulted was a vigorous, stable, and competitive industry which survived over a century of changing economic situations. For the Hawaiian people, however, the impact was not what Bond anticipated. (Tomonari-Tuggle 1988:I-39)

In 1860 Rev. Bond engaged Samuel N. Castle in founding the Kohala Sugar Company on lands owned by Bond and his neighbor Dr. James Wight. The first crop was harvested in January 1865. Kohala’s transition was a reflection of what was happening elsewhere in Hawai‘i as the sugar industry grew. The industry brought in tens of thousands of laborers from Asia, Europe, the Americas, Oceania, and Africa to work on the many plantations and mills that were being

established on all major islands. By 1904 six sugar mills were operating in North Kohala. This influx not only radically changed the culture, but also drastically altered agricultural lands and destroyed traditional architectural features in the process. The rise of the sugar industry in North Kohala stimulated the growth of other economic enterprises in the region. A primary harbor was built at Māhukona in the 1880s in order to economically export the raw sugar to market. By 1883 the Hawaiian Railway Company had laid twenty miles of track along the Kohala coast to carry processed sugar from the mills to the harbor. By 1906 construction of the Kohala Ditch was completed, bringing a reliable source of water to the sugarcane fields, which were subject to periodic drought. The drier leeward portions of Kohala were not suited for cane cultivation and thus became vast pasturelands for grazing cattle (Tomonari-Tuggle 1988:40-42).

Prior to the 1880s, the sugar companies hauled their product by ox-cart to landings at Hāpu‘u, Kauhola Point, and Honoīpu. With the completion of the North Kohala Railroad in 1883 – with its twenty-mile length, crossing seventeen trestles, and running from Māhukona to Niuli‘i (three *ahupua‘a* southeast of the project sites – all but one of the sugar companies began shipping the processed sugar to the newly improved Māhukona Harbor facility. In 1884, the railroad carried 20,000 tons of freight and 6,000 passengers.

Despite the success of the railroad and the growth of the sugar industry, not all the residents of North Kohala were happy. An 1882 letter from a disgruntled Hawaiian farmer relates that his property was being:

...ruthlessly destroyed by railroad overseers of S. G. Wilder. This act is equal to that of plain murder, because the livelihood of myself and my family is reduced to nothing, that is. My plants and that of my family are covered with dirt, the taro, banana, ti leaves, coffee, mango, orange, bamboo, and other plants. My property is filled with fruits, but these days it is reduced to naught. (Tomonari-Tuggle 1988:50)

Construction of the Kohala Ditch, which runs in an east/west direction just south of the *mauka*-most study parcel, began in 1904 and was completed two years later. Tomonari-Tuggle notes that, “its construction marked the virtual end of the frontier period; it was the last major effort by the sugar pioneers in fully developing their industry in Kohala” (1988:42). The ditch was conceived of by John Hind who, with the financial help of Sam Parker and the irrigation knowledge of J. T. McCrosson and M. M. O’Shaughnessy, formed the Kohala Ditch Company. They hired Japanese laborers for wages of seventy-five cents to a dollar and a half a day to construct the twenty-one mile long ditch from the headwaters of the Kohala valleys to Puakea Plantation (in upland Kukuipahu *ahupua‘a*). The ditch ran through miles of ridge terrain, valleys, and forty-four tunnels. Seventeen laborers died during the construction of the Kohala Ditch (Schweitzer 2003). The venture was successful, however, carrying twenty million gallons of water a day at the outset, with a projected maximum of seventy million gallons a day, to the sugar fields and ranch lands of North Kohala (Tomonari-Tuggle 1988:I-42).

During the 1940s the global effects of World War II were felt in North Kohala. In 1941 Māhukona Harbor was closed for security reasons (Tomonari-Tuggle 1988:I-59). The railroad continued to operate, hauling unprocessed cane from the fields to the mills, but that too shutdown in October of 1945 (Schweitzer 2003).

The *ahupua'a* system of social organization was also firmly established by this time, with wedge-shaped land units extending from the mountains to the sea. The *ahupua'a* were controlled by local chiefs, and were integrated at the district level. Districts were ruled by paramount chiefs through a system of taxation and redistribution. Social stratification was defined by a class separation between the ruling *ali'i* (chiefs) at one end, and the *maka'ainana* (commoners) at the other. Kamehameha I eventually united the Island of Hawai'i, and ultimately all of the Hawaiian Islands, and freely participated in the European-introduced market economy.

Traditional land use patterns saw a rapid shift after the *Māhele* in 1848. At this time, land ownership was defined by grants and awards by the king (Kamehameha III) to the chiefs and other retainers. By 1850 laws were enacted under which commoners could also own land (*kuleana*) if they could prove that they actually occupied those lands. The *Māhele* paved the way for land to be sold to foreigners.

By the mid-19th century, leeward settlement shifted to the windward side of North Kohala as the leeward, agriculturally marginal, areas were abandoned in favor of more productive and wetter sugarcane lands. In addition, native populations were decimated by disease and a depressed birth rate. According to Tomonari-Tuggle (1988:I-37), the remnant leeward population nucleated into a few small coastal communities and dispersed upland settlements. Settlements were no longer based on traditional subsistence patterns, largely because of the loss of access to the full range of necessary resources. At this point most communities were centered on sugar mills and became part of the plantation social hierarchy.

In 1848, the traditional Hawaiian land tenure system was changed by what is commonly known as the "Māhele". The *Māhele* defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the *konohiki*. As a result of the *Māhele*, all land in the Kingdom of Hawai'i came to be placed in one of three categories: (a) Crown Lands (for the occupant of the throne); (b) Government Lands; and (c) *Konohiki* Lands. Laws enacted at the time of the *Māhele* record that ownership rights to all lands in the kingdom were "subject to the rights of the native tenants;" those individuals who lived on the land and worked it for their subsistence and the welfare of the chiefs. As a result of the *Māhele*, Pūehuehu Ahupua'a, which contains the project sites, was held as Government land. A review of the Waihona 'Āina database reveals that two Land Commission claims were made within Pūehuehu Ahupua'a, neither of which were awarded.

Beginning in the 1850s portions of Pūehuehu Ahupua'a were divided and sold by the government as land grants. One such grant (Grant No. 1544 totaling 487.5 acres) was purchased by M & K Makanoanoa in 1855; all three study parcels seem to fall within the boundary of this former land grant. While the land uses associated with Makanoanoa grant were not discovered, it is likely that the *kula* portions of the grant were used to graze cattle.

In 1873 the English born Robert Robson Hind moved to Kohala from Maui to invest in the booming sugar industry. He purchased land in the flat plains of Pūehuehu west of Kohala Sugar Company, although rainfall was less than ideal (Schweitzer 2003), and established the Union Mill. Months prior to formal opening in 1874, a fire broke out destroying the mill. The mill was rebuilt just in time to harvest and process its first crops. Again in 1878, another fire broke out, destroying the rebuilt mill. Shortly thereafter, Hind sold the mill to James Renton, Daniel Vida, Theo H. Davies & Co., and the brothers Clement (Cecil) and Ralph Sneyd Kynnersley (Schweitzer 2003). These independent growers organized themselves and started the Pūehuehu Plantation Company, and were later joined by the Pūehuehu Agricultural Company in 1910. In 1905, Henry Renton took over management of the mill. Most of the mill's 280 employees were of Japanese descent. During this time the mill was harvesting 1,260 acres of cultivated sugar. In 1932, the Union Mill was joined with the Niuli'i Mill and Plantation, under Robert Lindsey. At its peak the mill cultivated three thousand acres, only one-fifth of which was leased (Schweitzer 2003). The Union Mill was purchased by the Kohala Mill in 1937, the cane harvested from the former Union Mill planting fields was then transferred to Hala'ula for processing.

During the 1930s, the Union Mill had seven camps consisting of approximately 100 houses that the immigrant workers lived in surrounding the Mill (Schweitzer 2003). These camps included the New Camp, Old Camp, Japanese Camp, Puerto Rican Camp, and Haole Camp. Plantations would build and manage stores that would supply canned foods, household goods, and various supplies used by the plantation workers. The Chai Chee Store was operated by Union Mill from 1929 to 1935, Kenichi Hayashi took over and remained open until 1945 (Stevenson 1977). In 1933, the Union Market was opened by Bushita Higa to service the camps surrounding the mill (this structure still remains along the main Highway in Kapa'au). Nakahara Store, W.O. Kim Store, and a pharmacy were located at Union Mill. There was a swimming hole in a pasture near Union Mill as well as a large park that maintained by the plantation and used for recreation purposes for the plantation workers and their families. There was also a movie theater near Union Mill. One of six places in Kohala that had a Portuguese bread oven is located in a pasture below Union Mill subdivision (Stevenson 1977). Pratt Road, which runs from the lower section of 'Upolu to Niuli'i, was the main cane hauling road used by the plantations.

### *Cultural Resources and Practices on the Project Sites*

The three small properties that make up the project sites do not appear to have any significance in the cultural history of the area. They were probably farmed by pre-Contact Hawaiians and then planted in sugar cane before being developed for water system infrastructure. As discussed in the previous section, no archaeological remains are present. The context of the project sites is existing water supply reservoirs on small lots that are bounded by private residential or agricultural properties. The vegetation is weedy regrowth from sugar cane agriculture that is managed by mowing, trimming and herbicide and it does not contain the quality and quantity or resources that would be important for native gathering. Furthermore, no caves, springs, *pu'u*, native forest groves, gathering resources or other natural features are present on or near the project sites. The project sites

do not support any traditional resource uses, nor are there any Hawaiian customary and traditional rights or practices known to be associated with the properties. In summary, it would appear that no known valuable natural, cultural or historical resources are present.

As part of the current study an effort was made to obtain information about any potential traditional cultural properties and associated practices that might be present or have taken place in this area of North Kohala. The Office of Hawaiian Affairs was contacted by letter, as were neighbors with direct knowledge of the property. None provided any information on cultural sites or practices that would be affected by the project.

### *Impacts and Mitigation Measures*

Although there are no indications so far from literature review or consultation with State Historic Preservation Division, the Office of Hawaiian Affairs, or local residents knowledgeable about Hawaiian cultural practices that there are any traditional cultural properties or practices on or near the project site, various parties are being supplied a copy of the EA in order to help finalize this finding.

As it currently appears that no resources or practices of a potential traditional cultural nature (i.e., landform, vegetation, etc.) appear to be present on or near the project sites, and there is no evidence of any traditional gathering uses or other cultural practices, the proposed construction and maintenance of the reservoir and demolition of the two existing tanks would not likely impact any culturally valued resources or cultural practices.

## **3.3 Infrastructure**

### **3.3.1 Utilities**

#### *Existing Facilities and Services*

Electrical power to the facility is supplied by Hawai'i Electric Light Company (HELCO), a privately owned utility company regulated by the State Public Utilities Commission, via their island-wide distribution network. Electrical service is available at the project site. Telephone service is available from Hawaiian Telcom. No wastewater system is available or necessary for the project.

#### *Impacts and Mitigation Measures*

The proposed action would not have any substantial impact on existing electrical facilities. Appropriate coordination with HELCO and Hawaiian Telcom will be conducted during design and construction. No other utilities will be affected in any way.

### **3.3.2 Roadways**

#### *Existing Facilities*

Kynnersley Road, a two-lane road maintained by the County of Hawai‘i, will continue to provide access to the upper project site for maintenance reservoir (see Figures 1-4). The driveway will be paved and an advance warning sign or signs will be installed, if required by the County of Hawai‘i Traffic Division, to alert drivers to the driveway location. Sight distance will be improved by removing vegetation and trees near the front property line as well as minor grading behind the embankment within the road right of way.

#### *Impacts and Mitigation Measures*

The proposed action would require construction vehicles to access the project sites during a period of several months for grading, hauling fill and materials, building the new reservoir, and demolishing the old ones. That may cause very temporary delays along Kynnersley Road, but access will be maintained to all properties during construction. The new driveway will require a permit from the Hawai‘i County Department of Public Works (DPW) and must comply with Chapter 22 of the Hawai‘i County Code. Construction plans will be submitted for review and approval signature by DPW prior to bidding.

Operationally, as there is already an existing reservoir on Kynnersley Road, no increase in traffic related to occasional DWS visits is expected. Paving the driveway, installing a warning sign if required, and improving sight distance will increase the driveway’s efficiency and safety.

### **3.4 Secondary and Cumulative Impacts**

The proposed project will not involve any secondary or cumulative impacts, such as population changes or effects on public facilities, because it simply fulfills the mandate of the Department of Water Supply to provide high-quality service to its customers in existing service areas. Although the project would provide some short-term construction jobs, these would almost certainly be filled by local residents and would not induce in-migration.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The adverse effects of the project – very minor and temporary disturbance to air quality, noise, visual quality during construction – are very limited in severity, nature and geographic scale.

At the current time, according to review files at the Planning Department, review of projects in the OEQC *Environmental Notice*, and other sources, the following projects are occurring in this area of North Kohala:



- *Agricultural Park development on private and State land in Hawai.* More than 500 acres of private land formerly part of Kohala Surety has been purchased by German industrialist and *SunFuels Hawaii* owner Michael Saalfeld, who is reported to be developing what has been described as a non-profit agricultural park in the area. The Hawai‘i State Department of Agriculture (DOA) has obtained Executive Orders for former grazing land and intends to actively develop more agricultural uses. The DOA has also lobbied for laws that facilitate development of shared water and power sources for diversified agriculture in North Kohala, including rehabilitation of the Kohala Ditch. These activities, if successful, will increase land use intensity, economic activity, traffic, and water consumption (although most water will be agricultural, from sources such as the Kohala Ditch) (McNarie 2008; Kunimoto 2009).
- *North Kohala Solid Waste Transfer Station relocation.* The County of Hawai‘i is in the initial stages of identifying a site for a relocated recycling and transfer station. Sites under examination are all centered around Akoni Pule Highway. The existing station is accessed by many Kohala residents via Kynnersley Road (M. Dworsky, Hawaii County Division of Solid Waste, pers. comm. to R. Terry, 2010).

Because of their distance from the project sites and their scale and nature, neither of these projects has the type of impacts that would combine with those of the Kynnersley Reservoir project in such a way as to produce adverse cumulative effects.

### **3.5 Required Permits and Approvals**

The following permits and approvals may be required:

- Hawai‘i County Building Division Approval and Building Permit
- Hawai‘i County Public Works Department Grading Permit and Permit to Construct Within Right of Way
- Hawai‘i County Department of Environmental Management Landfill Disposal Permit (potential)

### **3.6 Consistency With Government Plans and Policies**

#### **3.6.1 Hawai‘i State Plan**

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State’s long-run growth and development activities. The three themes that express the basic purpose of the Hawai‘i State Plan are individual and family self-sufficiency, social and economic mobility and community or social well-being. The proposed project would promote these goals by modernizing and improving water service for the North Kohala district.

### 3.6.2 Hawai‘i County General Plan and Zoning

The General Plan for the County of Hawai‘i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai‘i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai‘i County Planning Department). The General Plan itself is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai‘i. Most relevant to the proposed project are the following Goal and Policies, and Courses of Action:

#### PUBLIC UTILITIES

##### Goals

- (a) Ensure that properly regulated, adequate, efficient and dependable public and private utility services are available to users.
- (b) Maximize efficiency and economy in the provision of public utility services.
- (c) Design public utility facilities to fit into their surroundings or concealed from public view.

##### Policies

- (a) Public utility facilities shall be designed to complement adjacent land uses and shall be operated to minimize pollution or disturbance.
- (b) Provide utilities and service facilities that minimize total cost to the public and effectively service the needs of the community.
- (c) Utility facilities shall be designed to minimize conflict with the natural environment and natural resources.
- (d) Improvement of existing utility services shall be encouraged to meet the needs of users.
- (f) Develop short and long-range capital improvement programs and plans for public utilities within its jurisdiction that are consistent with the General Plan.

#### PUBLIC UTILITIES – WATER

##### Policies

- (a) Water system improvements shall correlate with the County’s desired land use development system.
- (b) All water systems shall be designed and built to Department of Water Supply standards.
- (c) Improve and replace inadequate systems.
- (e) Water system improvements should be first installed in areas that have established needs and characteristics, such as occupied dwellings, agricultural operations and other uses, or in areas adjacent to them if there is need for urban expansion.

## Standards

(a) Public and private water systems shall meet the requirements of the Department of Water Supply and the Subdivision Control Code.

## Courses of Action – North Kohala

(c) Improve and replace inadequate distribution mains and storage facilities.

Discussion: The proposed project satisfies relevant policies, standards and courses of action related to water systems in the North Kohala District.

*The Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG).* The LUPAG map component of the General Plan is a graphic representation of the Plan's goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The upper project site where the new reservoir will be built is classified as Important Agricultural Lands in the LUPAG. The parcel on which the smaller tank to be demolished is located is classified Low-Density Urban in the LUPAG. As the project is a public purpose use, it is consistent with both of these designations.

*Hawai'i County Zoning.* At the upper project site, the existing reservoir parcel and the parcel for the new proposed reservoir are both zoned A-20a (Agriculture, minimum lot size 20 acres). The proposed project is a permitted use within this designation. The property is not situated within the County's Special Management Area (SMA). The parcel on which the smaller tank to be demolished is located is zoned RS-15 (Single-Family residential, minimum lot size 15,000 square feet). As the project is a public purpose use, it is consistent with both of these designations.

### **3.6.3 North Kohala Community Development Plan**

The North Kohala Community Development Plan (CDP) encompasses the judicial district of North Kohala, and was developed under the framework of the February 2005 County of Hawai'i General Plan. Community Development Plans are intended to translate broad General Plan Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for community input into land-use, delivery of government services and any other matters relating to the planning area. The General Plan now requires that a Community Development Plan shall be adopted by the County Council as an "ordinance," giving the CDP the force of law. This is in contrast to plans created over past years, adopted by "resolution" that served only as guidelines or reference documents to decision-makers. In November 2008, the North Kohala CDP was adopted by the County Council. The version referenced in this Environmental Assessment is at: <http://www.hcrc.info/community-planning/north-kohala-cdp/nkcdpfinal11.08.pdf>.

The Plan articulates the vision and values of North Kohala residents for their community, identifies priority issues, and develops strategies and action programs to address the areas of growth management, public access, affordable housing, and infrastructure and public facilities.

The project is consistent with all aspects of the North Kohala CDP in that it promotes an adequate supply of safe drinking water to accommodate current and future needs. Most particularly, under Section 4.4, Infrastructure and Public Facilities, is the following goal:

Revamp, repair, and/or replace aging or damaged infrastructure; improve emergency preparedness; prioritize and implement future improvements to public facilities and services; and develop and implement rural infrastructure standards.

Strategy 4.5, “Upgrade Potable Water System,” articulates the necessary tasks:

- Repair or replace aging water lines.
- Create redundancy for Kohala’s water system by putting in a new well in Hala‘ula.
- It will be a matching well to the current wells in Hawi. They will be connected, which will create redundancy.
- In addition, a new well at Makapala will be brought on-line in the near future, and DWS has plans to build and/or replace three enclosed reservoirs in the district.

The Kynnersley Reservoir Project specifically fulfills part of the last listed task.

### **3.6.4 Hawai‘i State Land Use Law**

All land in the State of Hawai‘i is classified into one of four land use categories – Urban, Rural, Agricultural, or Conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The upper project site is within the State Land Use Agricultural District, and the lower project site is within the State Land Use Urban District. The proposed use is consistent with intended uses for these Land Use Districts.

## **3.7 Federal “Cross-Cutter” Authorities**

The following sub-sections address the proposed project’s relationship to other federal “crosscutting” environmental, economic, social, and miscellaneous federal authorities as required by the State of Hawai‘i’s Drinking Water State Revolving Fund (DWSRF) program.

### **3.7.1 Archeological and Historic Preservation Act (16 U.S.C. § 469a-1) and National Historic Preservation Act (16 U.S.C. § 470)**

As discussed in Section 3.2.2, the general area has been cultivated, grazed or used for residences for over a hundred years and has thus experienced intensive grubbing and grading. Based on the findings of an archaeological assessment (see Appendix 3), the State Historic Preservation Division (SHPD) determined in a letter of May 17, 2010 (see Appendix 1a) that no historic properties are present and that the project will have no effect on historic properties. Consequently, the proposed action is in compliance with these regulations.

### **3.7.2 Clean Air Act As Amended (42 USC 7401, et seq.)**

As discussed in Section 3.1.4, air quality at the project sites is good. The sites are in an air quality attainment area as defined by the State of Hawai'i Department of Health in its EPA-approved Air Quality program. Minor grading and excavation will include plans to minimize fugitive dust through watering and planting as soon as feasible. Diesel-powered construction equipment will be used to build the reservoir. Emissions from the diesel will slightly degrade air quality for the short period of time they are in operation. However, all applicable emission and ambient air quality standards will continue to be met. Normal operation of the reservoir will not produce on-site air emissions, will not alter air flow in the vicinity, and will have no other measurable effect on the area's micro-climate. Consequently, the proposed project complies with the provision of the Clean Air Act.

### **3.7.3 Coastal Barriers Resource Act, 16 U.S.C. 3501**

The Coastal Barrier Resources Act designated various undeveloped coastal barrier islands, depicted by specific maps, for inclusion in the Coastal Barrier Resources System. No coastal barriers are present in the State of Hawai'i, and the project is not inconsistent with the Coastal Barriers Resource Act.

### **3.7.4 Coastal Zone Management Act, 16 U.S.C.1456(c)(1)**

The Hawai'i Coastal Zone Management (CZM) Program was established in 1977 through the adoption of the Coastal Zone Management Act, incorporated in Chapter 205A HRS. Projects with federal involvement significantly affecting areas under jurisdiction of the State CZM Agency may be required to undergo review for consistency with the State's approved coastal program. The entire State of Hawai'i is included in the coastal zone for such purposes. The CZM objectives are outlined as follows.

- Recreational Resources. Provide coastal recreational opportunities accessible to the public.
- Historic Resources. Protect, preserve, and, where desirable, restore those natural, man-made historic, and pre-historic resources in the CZM area that are significant in Hawaiian and American history and culture.
- Scenic and Open Space Resources. Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
- Coastal Ecosystems. Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.
- Economic Use. Provide public or private facilities and improvements important to the State's economy in suitable locations.
- Coastal Hazards. Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.
- Managing Development. Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

- Public Participation. Stimulate public awareness, education, and participation in coastal management, and maintain a public advisory body to identify coastal management problems and provide policy advice and assistance to the CZM program.
- Beach Protection. Protect beaches for public use and recreation; locate new structures inland from the shoreline setback to conserve open space and minimize loss of improvements due to erosion.
- Marine Resources: Implement the state's ocean resources management plan.

The project sites are a minimum of 1.75 miles from the shoreline and there are no streams connecting the project sites to the sea. The DWS has evaluated the project and believes that the project does not impact coastal zone resources and is consistent with the objectives of the program. The Hawai'i CZM Program is not authorized to provide federal consistency reviews for Safe Drinking Water Act State Revolving Funds projects. However, in accordance with consultation with the Hawai'i CZM Program, this EA has been submitted by DWS to the Hawai'i CZM Program for general review.

### **3.7.5 Endangered Species Act, 16 U.S.C. 1536(a)(2) and (4); Fish And Wildlife Coordination Act, 16 USC 661; and Magnuson-Stevens Fishery Conservation And Management Act, 16 USC 1801**

The Endangered Species Act (16 U.S.C. §§ 1531-1544, December 28, 1973, as amended 1976-1982, 1984 and 1988) (ESA) provides broad protection for species of plants and animals that are listed as threatened or endangered in the U.S. or elsewhere. The Act mandates that federal agencies seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species, and contains exceptions and exemptions.

Existing biota on and near the project sites are discussed in Section 3.1.3 of this EA. There are no known rare or endangered plant species on or immediately around the project sites. Terrestrial vertebrates listed as threatened or endangered may be present in this part of Kohala and may overfly, roost, nest, or utilize resources here, including the endangered Hawaiian Hawk (*Buteo solitarius*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*). No temporary or permanent lighting or erect structures such as poles are planned, and therefore no impacts to listed seabirds are anticipated. The scattered low-statured trees in the area do not appear to be conducive to providing nesting sites for Hawaiian Hawks. However, it is conceivable that the shrubby vegetation may serve as roosts for Hawaiian hoary bats.

The U.S. Fish and Wildlife Service (USFWS) was consulted by letter on March 8, 2010 pursuant to the ESA, as well as the Fish and Wildlife Coordination Act, in which wildlife officials are asked to determine the effect the proposed project may have on wildlife and its habitat. The letter to USFWS

included proposed mitigation measures, including proposed contract conditions that would require the contractor to refrain from activities that disturb or remove the vegetation during critical pupping months for the Hawaiian hoary bat, from May 15 to August 15 of each year. In a letter of April 8, 2010 (see Appendix 1a), the Service concurred with the evaluation and mitigation measures proposed in the letter and further requested that no barbed wire be used. Therefore, in order to avoid impacts to the bat, the design does not include barbed wire for any fences.

No Essential Fish Habitat as defined in maps prepared by the National Marine Fisheries Service under the Magnuson-Stevens Fishery Conservation and Management Act is present in the area to be affected by the Kynnersley Reservoir project.

### **3.7.6 Environmental Justice, Executive Order 12898**

The Environmental Justice Executive Order was issued in 1994 for the purpose of protecting low income and minority residents of the United States from disproportionate exposure to environmental and health hazards. As discussed in Section 3.2.1, North Kohala exhibits a median household income that is slightly higher than the countywide average and a poverty level that is somewhat lower. Minorities make up approximately 67 percent of the population, which is typical of the County as a whole. The purpose of the proposed reservoir improvements is to provide residents of Kohala with additional water storage that conforms to State and federal standards. The project will not have adverse secondary environmental, economic, or social impacts, as discussed in Section 3.2.1. Moreover, the State and federal regulations regarding safe drinking water are applicable to all water systems in Hawai‘i, irrespective of the economic or demographic characteristics of their residents. Thus, the proposed project complies with this Executive Order.

### **3.7.7 Farmland Policy Protection Act, 7 U.S.C. 4202(8)**

The Farmland Protection Policy Act (FPPA) (Public Law 97-98, Sec. 1539-1549) requires identification of proposed actions that would affect any lands classified as prime and unique farmlands. Agencies must consider alternative actions that could reduce adverse effects and ensure that their programs, to the extent practicable, are compatible with State, local government and private programs and policies to protect farmland. The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) has national leadership for administering the FPPA.

“Farmland”, as used in the FPPA and applied to the State of Hawai‘i, includes Agricultural Lands of Importance in the State of Hawai‘i (ALISH), a system in which the State Department of Agriculture classifies lands into three categories: 1) Prime Agricultural Land, (2) Unique Agricultural Land, and (3) Other Important Agricultural Land. The reservoir to be demolished on Kynnersley Road is classified as Urban Land on ALISH maps, but the site of the new reservoir is classified as Prime Agricultural Land. Because the new reservoir involves the use of 0.443 acres of Prime Agricultural Land and might use funding assistance from a federal agency, the proposed action is subject to the FPPA.

The area that would be affected is a small fraction of the agricultural land in the area. There is currently no agricultural use of the land, which has non-native trees and grass. The project will not impact continued agricultural use of surrounding properties. The proposed project is intended to serve residents of Kohala, many of whom are engaged in agriculture. The DWS has determined that the project appears to be in compliance with the FPPA and has distributed the Draft EA to the U.S. NRCS for comment.

### **3.7.8 Floodplain Management Act, 42 U.S.C., 4321, and Executive Order 11988, Floodplain Management (24 May 1977)**

The Floodplain Management Act deals with critical action inside designated floodplains, and Executive Order 11988 requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy of the floodplain, and to avoid direct and indirect support of floodplain development where there is a practicable alternative. In accomplishing this objective, “each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains.”

The project site is not within a designated floodplain and it is consistent with EO 11988 and the Floodplain Management Act.

### **3.7.9 Protection of Wetlands, Executive Order No. 11990 & Exec. Order No. 12608, and Clean Water Act, as Amended (33 USC 1251 et seq.)**

It has been determined through fieldwork and confirmed through consultation with the U.S. Army Corps of Engineers that no wetlands or other waters of the U.S. are present on the site (see letter of May 6, 2010 in Appendix 1a). Therefore, implementation of the project would not involve the discharge of dredged or fill materials into waters of the United States. The project would thus be in compliance with the Clean Water Act, Section 404(b)(1) Guidelines. None of the proposed construction materials would be expected to contain any contaminants.

As discussed in Section 3.1.2, the project will involve preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the project.

### **3.7.10 Safe Drinking Water Act, 42 U.S.C., 300H-3(E)**

The Safe Drinking Water Act (SDWA) is the principal federal law that ensures the quality of Americans’ drinking water. Under the SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The SDWA requires that all public water systems meet stringent water quality standards. These standards cover a long list of potential chemical, radiological and biological contaminants. The standards distinguish



between surface water and groundwater sources, with the testing and monitoring requirements for surface water being far greater than those for groundwater sources.

The reservoir improvements will assist DWS in maintaining the compliance of the North Kohala Water System with the standards mandated pursuant to the SDWA. Testing of the water from the reservoir will be undertaken by the County of Hawai‘i before it is connected to the system to ensure that the water is consistent with all State of Hawai‘i and federal standards for potable water. The Safe Drinking Water Act is also the authority for regulatory protection of principal or sole source aquifers. Specifically, once a sole source aquifer is designated, commitments for federal assistance must ensure that projects will not contaminate the aquifer through a recharge zone so as to create a significant hazard to public health.

As identified by the U.S. Environmental Protection Agency, Region IX groundwater Office ([http://www.epa.gov/safewater/sourcewater/pubs/qrg\\_ssamap\\_reg9.pdf](http://www.epa.gov/safewater/sourcewater/pubs/qrg_ssamap_reg9.pdf)) (checked May 2010), there are only two sole source aquifers in Hawai‘i. They are the Southern O‘ahu Basal Aquifer on the Island of O‘ahu and the Moloka‘i Aquifer on the island of Moloka‘i. There are no sole source aquifers on the Island of Hawai‘i where the proposed project is located. The project will therefore not affect sole source aquifers.

### **3.7.11 Wild and Scenic Rivers Act, 15 U.S.C. 1271-1287**

The Act makes it the national policy that certain rivers of the U.S which, along with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition. There are no designated Wild and Scenic Rivers in the State of Hawai‘i at this time. Consequently, the proposed project is consistent with the provisions of the Wild and Scenic Rivers Act.

### **3.7.12 Demonstration Cities and Metropolitan Development Act of 1966, Pub.L. 89-754, as Amended (42 USC § 3331)**

To demonstrate compliance with this Act, the Hawai‘i State Department of Health requires DWSRF assistance recipients to describe the proposed project’s effect on local development plans. Section 3.6 of this EA addresses this requirement by discussing the proposed action’s consistency with the Hawai‘i State Plan, the County of Hawai‘i General Plan, and the North Kohala Community Development Plan.

### **3.7.13 Administration of the Clean Air Act and the Water Pollution Control Act with Respect to Federal Contracts or Loans (Executive Order 11738)**

Executive Order 11738, entitled “Administration of the Clean Air Act and the Water Pollution Control Act with respect to federal Contracts or Loans”, prohibits the provision of federal assistance to facilities that are not in compliance with either the Clean Water Act or the Clean Air Act unless the purpose of the assistance is to remedy the cause of the violation. As discussed in

Sections 4.2.1.2 and 3.2.2, the Kynnersley Reservoir project will comply with applicable provisions of the Clean Air Act and Clean Water Act. Consequently, it is consistent with the intent of this Executive Order.

### **3.7.14 Procurement Prohibitions (Executive Order 11738, Section 306 of the Clean Air Act)**

This Executive Order requires recipients of federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA's list of Clean Air Act violators. DWS will comply with this requirement in selecting contractors, construction materials, and other services for the Kynnersley Reservoir project.

### **3.7.15 Procurement Prohibitions (Section 508 of the Clean Water Act)**

This Executive Order requires recipients of federal assistance to certify that they will not procure goods, services or materials from suppliers who are on the EPA's list of Clean Water Act violators. DWS will comply with this requirement in selecting contractors, construction materials, and other services for the Kynnersley Reservoir project.

### **3.7.16 Social Policy Authorities**

For any Drinking Water State Revolving Fund Loan, the applicant, in this case the County of Hawai'i, is also required to certify that it has complied, or will comply with, the following federal social policy authorities. This information is required to be contained in an Environmental Assessment, if one is applicable for the project.

- **Age Discrimination Act of 1975 (42 USC § 6102).** This Act stipulates that no person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with this requirement in hiring contractors and other staff for its Kynnersley Reservoir project.
- **Civil Rights Act of 1964, Title VI (42 USC §2000(d)).** This Act stipulates that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with this requirement in hiring contractors and other staff for its Kynnersley Reservoir project.
- **Equal Employment Opportunity (Executive Order 11246, as amended).** This Executive Order requires all recipients of federal contracts to include certain non-discrimination and "affirmative action" provisions in all contracts. The provisions commit the contractor or subcontractor to maintain a policy of non-discrimination in the treatment of employees, to make this policy known to employees, and to recruit, hire and train employees without regard to race, color, sex, religion and national origin. DWS will include these provisions in all contracts for the Kynnersley Reservoir project.

- **Minority Business Enterprise Development, Executive Order 12432.** This executive order sets forth in more detail the responsibilities of federal agencies for the monitoring, maintaining of data and reporting of the use of minority enterprises. DWS will comply with all such requirements for all contracts for the Kynnersley Reservoir project.
- **National Program for Minority Business Enterprise, Executive Order 11625.** This Executive Order directs federal agencies to promote and encourage the use of minority business enterprises in projects utilizing federal funds. DWS will comply with all such requirements for all contracts for the Kynnersley Reservoir project.
- **National Women’s Business Enterprise Policy and National Program for Women's Business Enterprise, Executive Order 12138.** This Executive Order directs each department or agency empowered to extend federal financial assistance to any program or activity to issue regulations requiring the recipient of such assistance to take appropriate affirmative action in support of women’s business enterprises and to prohibit actions or policies which discriminate against women's business enterprises on the grounds of sex. DWS will comply with all the Executive Order for the Kynnersley Reservoir project.
- **Rehabilitation Act of 1973, 29 USC 794.** This Act mandates that no otherwise qualified handicapped individual in the United States shall, solely by reason of his handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance. DWS will comply with the Act for all contracts for the Kynnersley Reservoir project.
- **Small Business Administration Reauthorization and Amendment Act of 1998, Pub. L. 100-590, Section 129.** This Amendment directs federal agencies to promote and encourage the use of small business enterprises in projects utilizing federal funds. DWS will comply with the Act for all contracts for the Kynnersley Reservoir project.
- **Department of Veterans Affairs and Housing and Urban Development, and Agencies Appropriations Act, 1993, Pub. L. 102-389.** This Act requires the Administrator of the Environmental Protection Agency, to the fullest extent possible, ensure that at least 8 per cent of federal funding for prime and subcontracts awarded in support of authorized programs, including grants, loans and contracts for wastewater treatment and for leaking under ground storage tanks, be made available to businesses or other organizations owned or controlled by socially and economically disadvantaged individuals (within the meaning of Section 8(a)(5) and (6) of the Small Business Act (15 USC 637(a)(5) and (6)), including historically black colleges and universities. For purposes of this section, economically and socially disadvantaged individuals shall be deemed to include women...” DWS will comply with the Act for the Kynnersley Reservoir project.
- **Disadvantaged Business Enterprise Rule, 2008, 40 CFR Part 33.** This Rule sets forth in detail the responsibilities of entities receiving an identified loan under a financial assistance agreement capitalizing a revolving loan fund, for the monitoring, maintaining of data and reporting of the use of disadvantaged business enterprises (DBEs). The Applicant is required to comply with 40 CFR Part 33, entitled “Participation by Disadvantaged Business Enterprises in Procurement Under Environmental Protection Agency (EPA) Financial Assistance Agreements” and ensure that all contracts funded by a DWSRF loan include a

term or condition requiring compliance with 40 CFR Part 33. The Applicant is required not to discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Applicant shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Applicant to carry out these requirements is a material breach of this contract, which may result in the termination of the contract or other legally available remedies. DWS will comply with the Rule for all contracts for the Kynnersley Reservoir project.

#### **PART 4: DETERMINATION**

The County of Hawai‘i, Department of Water Supply, has preliminarily determined that the proposed project will not significantly alter the environment, as impacts will be minimal, and intends to issue a Finding of No Significant Impact (FONSI). This determination will be reviewed based on comments to the Draft EA, and the Final EA will present the final determination.

#### **PART 5: FINDINGS AND REASONS**

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resources would be committed or lost. The surrounding area is largely agricultural, with residential areas that would directly benefit from the project.
2. *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project expands and in no way curtails beneficial uses of the environment.
3. *The proposed project will not conflict with the State's long-term environmental policies.* The State’s long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is minor, environmentally beneficial, and fulfills aspects of these policies calling for an improved social environment. It is thus consistent with all elements of the State’s long-term environmental policies.
4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project would not have any adverse effect on the economic or social welfare of the County or State, and would improve the water system infrastructure of North Kohala.
5. *The proposed project does not substantially affect public health in any detrimental way.* The facility would promote public health and safety by improving water storage capacity for North Kohala, and would thereby enhance the quality of water service.

6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* No secondary effects are expected to result from the proposed action, which would simply improve water system facilities for an existing service area and would not induce in-migration or affect public facilities.

7. *The proposed project will not involve a substantial degradation of environmental quality.* The project is minor and environmentally benign, and would thus not contribute to environmental degradation.

8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* The project sites support overwhelmingly alien vegetation. Impacts to rare, threatened or endangered species of flora would not occur. Impacts to wide-ranging endangered fauna are being avoided through project design, in coordination with the U.S. Fish and Wildlife Service.

9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The project is not related to other activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.

10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on these resources would occur. Mitigation of construction-phase impacts would preserve water quality. Ambient noise impacts due to construction will be temporary and restricted to daytime hours.

11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the project is located in an area with seismic risk, the entire Island of Hawai‘i shares this risk. The project is not imprudent to construct and will employ design and construction standards appropriate to the seismic zone and soil setting.

12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic vistas or viewplanes would be adversely affected by the project.

13. *The project will not require substantial energy consumption.* The construction and operation of the reservoir would require minimal consumption of energy. No adverse effects would be expected.

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**ENVIRONMENTAL ASSESSMENT**

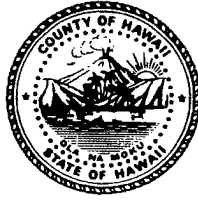
**CONSTRUCTION OF THE KYNNERSLEY NO. 1 RESERVOIR**  
**0.3 MG REPLACEMENT**

**TMKs: (3rd) 5-4-002:008 and 022, and 5-4-011:099**  
**Pūehuehu, North Kohala District, Hawai‘i Island, State of Hawai‘i**

**APPENDIX 1a**  
**Comments in Response to Early Consultation**



**William P. Kenoi**  
Mayor



**Harry S. Kubojiri**  
Police Chief

**Paul K. Ferreira**  
Deputy Police Chief

## County of Hawaii

### POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998  
(808) 935-3311 • Fax (808) 961-8865

March 5, 2010

Mr. Ron Terry  
Principle  
Geometrician Associates  
P.O. Box 396  
Hilo, Hawaii 96720

Dear Mr. Terry:

**SUBJECT:** Early Consultation for Environmental Assessment for Reservoir  
Replacement and Demolition  
TMK: (3<sup>rd</sup>.) 5-4-002:008 and 022, and 5-4-011:099  
Kynnersley Road, North Kohala, Island of Hawaii

This responds to your request for comments regarding the above-noted project.  
We have no recommendations or comments to offer at this time.

Should you have any questions, please contact Captain Richard Miyamoto,  
Commander of the North Kohala District, at 889-6540.

Sincerely,

HARRY S. KUBOJIRI  
POLICE CHIEF



HENRY J. TAVARES JR.  
ASSISTANT POLICE CHIEF  
AREA II OPERATIONS

RM:dmv  
RS100179

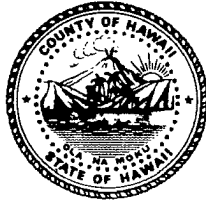
Aloha Ron,

Thank for your early consultation on the subject project for the Hawaii Department of Water Supply. Based on the information provided, the Safe Drinking Water Branch would not have any comments. However, this could change if the Hawaii DWS were to pursue a Drinking Water State Revolving Fund loan. Therefore, at a minimum, we would like to receive a notice when the EA is completed.

Stuart Yamada

[stuart.yamada@doh.hawaii.gov](mailto:stuart.yamada@doh.hawaii.gov)

William P. Kenoi  
Mayor



BJ Leithead Todd  
Director

Margaret K. Masunaga  
Deputy

## County of Hawai'i

### PLANNING DEPARTMENT

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawai'i 96720  
Phone (808) 961-8288 • Fax (808) 961-8742

March 17, 2010

Mr. Ron Terry  
Geometrician Associates, LLC  
PO Box 396  
Hilo, Hawaii 96721

Dear Mr. Terry:

**SUBJECT: Early Consultation for Draft Environmental Assessment**  
**Project: Reservoir Replacement and Demolition**  
**TMK: (3) 5-4-002:008 and 022, and 5-4-011:099 North Kohala,**  
**Hawai'i**

Thank you for your letter dated March 2, 2010, requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA).

According to the Tax Map Key numbers and map provided, the subject properties are zoned A-20a (Agricultural-20 acre minimum lot size) and RS-15 (Single-Family Residential 15,000 square foot minimum lot size). The properties are situated within the State Land Use Agricultural and Urban districts. The subject area is not within the Special Management Area (SMA).

The proposed project will include the demolition of a steel water tank on one property and construction of a reinforced concrete reservoir on an adjacent property. Final Subdivision No. 7875 was granted approval on November 1, 2004, for the purpose of a reservoir and other water facilities. Lot H-1 (TMK (3) 5-4-002:022) was created for a proposed reservoir site for the Department of Water Supply. The proposed project would also demolish an existing unused water tank on a nearby site located within the Kynnersley Road Tract 2 Lots and restore that site with landscaping to match the surrounding area. The DEA should include discussion as to the disposal of the demolished structures. The demolition of the structures and the disposal of waste material are subject to the requirements of Chapter 20 - Refuse, of the Hawai'i County Code and may require a Landfill Disposal Permit from the Department of Environmental Management.

Mr. Ron Terry  
Geometrician Associates, LLC  
Page 2  
March 17, 2010

The North Kohala Community Development Plan (CDP), adopted by Ordinance No. 08-151 on November 5, 2008, contains identified priority issues, and subsequent strategies and actions to address those issues. Specifically, Strategy 4.5: Upgrade Potable Water System, establishes several action steps that will be led by the County of Hawai'i Department of Water Supply. One of which states that "DWS has plans to build and/or replace three enclosed reservoirs in the district." Please include some discussion in the DEA that addresses this action step and if the proposed project refers to the three reservoirs mentioned in the North Kohala CDP.

We have no further comments to offer, at this time. However, please keep us informed and provide our department with a copy of the Final Environmental Assessment for our records.

If you have any further questions or if you need further assistance, please feel free to contact this office.

Sincerely,



BJ LEITHEAD TODD  
Planning Director

BJM:cs

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**William P. Kenoi**  
Mayor



**Darryl J. Oliveira**  
Fire Chief

**Glen P. I. Honda**  
Deputy Fire Chief

**County of Hawai'i**  
**HAWAII FIRE DEPARTMENT**  
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720  
(808) 932-2900 • Fax (808) 932-2928

March 22, 2010

Mr. Ron Terry  
Geometrician Associates  
PO Box 396  
Hilo, HI 96721

Dear Mr. Terry,

**SUBJECT:** EARLY CONSULTATION ON ENVIRONMENTAL ASSESSMENT  
FOR RESERVOIR REPLACEMENT AND DEMOLITION  
TMK: 5-4-002:008 AND 022, 5-4-011:099, KYNERSLEY ROAD, NORTH  
KOHALA

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The Hawai'i Fire Department does not have any comments to offer at this time regarding the above-referenced early consultation on Environmental Assessment.

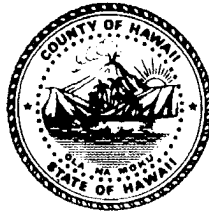
Thank you for the opportunity to comment.

Sincerely,

  
DARRYL OLIVEIRA  
Fire Chief

RP:lc





**William P. Kenoi**  
*Mayor*

**William T. Takaba**  
*Managing Director*

**Warren H. W. Lee**  
*Director*

**Tim T. Esaki**  
*Deputy Director*

**County of Hawai'i**  
**DEPARTMENT OF PUBLIC WORKS**

**Aupuni Center**

101 Pauahi Street, Suite 7 · Hilo, Hawai'i 96720-4224  
(808) 961-8321 · Fax (808) 961-8630  
[www.co.hawaii.hi.us](http://www.co.hawaii.hi.us)

March 30, 2010

Mr. Ron Terry, Principal  
Geometric Associates, LLC  
P.O. Box 396  
Hilo, HI. 96721

**SUBJECT:** Early Consultation for Environmental Assessment for Reservoir Replacement and Demolition, TMKs: 5-4-002: 008 & 022, and 5-4-011: 099, Kynnersley Road, North Kohala, Island of Hawaii.

We received your request for early consultation dated March 2, 2010. Kynnersley Road is a County owned and maintained road. The mauka site is on the inside of a curve and sight distance is a concern for any planned driveway approach to Kynnersley Road. Please discuss this issue in the draft assessment.

If you have any questions, please contact Kiran Emler of our Kona office at 327-

3530.

Galen M. Kuba, Division Chief  
Engineering Division

KE

Eng Hilo/Kona





**STATE OF HAWAII**  
**OFFICE OF HAWAIIAN AFFAIRS**  
711 KAPI'OLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813

HRD10/4868

March 29, 2010

Ron Terry, Principle  
Geometrician Asscoaites, LLC  
P.O. Box 396  
Hilo, Hawaii 96721

**Re: Pre-Environmental Assessment consultation  
Reservoir replacement and demolition  
Kohala, Island of Hawai'i**

Aloha e Ron Terry,

The Office of Hawaiian Affairs (OHA) is in receipt of your March 2, 2010 letter initiating consultation ahead of a draft environmental assessment (EA) for the proposed demolition of water tanks and construction of a new reservoir by the County of Hawai'i-Department of Water Supply (DWS). These improvements are necessary because existing reservoirs and supporting facilities have reached the end of their service life, are undersized for current needs, require expensive maintenance, or do not meet current DWS standards.

While we have no specific comments at this time, we are pleased to see that new reservoirs will be constructed prior to the demolition of existing tanks, which will avoid prolonged water service interruption to area residents. We applaud DWS efforts to landscape the project area upon the completion of construction activities and suggest that appropriate native species be considered as landscaping plans are finalized.

Thank you for the opportunity to provide comments. We request the opportunity to receive a copy of the draft EA and provide additional comments at that time. Should you have any questions, please contact Keola Lindsey at 594-1904 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

A handwritten signature in black ink, appearing to read "Clyde W. Nāmu'o".

Clyde W. Nāmu'o  
Chief Executive Officer

C: OHA- West Hawaii Community Resources Coordinator



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office  
300 Ala Moana Boulevard, Room 3-122, Box 50088  
Honolulu, Hawaii 96850

In Reply Refer To:  
2010-TA-0194

Mr. Ron Terry  
Geometrician Associates  
P.O. Box 396  
Hilo, Hawaii 96721

APR 08 2010

Subject: Comments on the Pre-consultation of the Draft Environmental Assessment for Reservoir Replacement and Demolition, North Kohala, Island of Hawaii

Dear Mr. Terry:

Thank you for the opportunity to provide comments regarding the development of a Draft Environmental Assessment (DEA) for the Reservoir Replacement and Demolition project in North Kohala on the Island of Hawaii. We received your March 8, 2010, letter on March 9, 2010. The County of Hawaii Department of Water Supply (DWS) is proposing to demolish and replace an existing steel water tank.

The proposed project will demolish a 0.1-million-gallon steel water tank and replace it with a 0.3-million-gallon enclosed concrete reservoir. A 0.05-million-gallon unused water tank will also be demolished. Additional project activities include: water level control facilities, electrical work, site piping, site asphalt paving, perimeter fencing (measurements not stated) and paving a driveway. The project area encompasses three small, previously cleared, roadside parcels totaling 0.58 acres (25,293 square feet).

Your letter states that the project area is vegetated with only non-native flora and that no streams, ponds, wetlands, or native forest exist on or near the property. According to information in our files including information compiled by the Hawaii Biodiversity and Mapping Program, we agree that the endangered Hawaiian hawk (*Buteo solitarius*), the endangered Hawaiian petrel (*Pterodroma sandwichensis*), the threatened Newell's shearwater (*Puffinus auricularis newelli*) and the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), may overfly, roost, nest or utilize resources in or adjacent to the project area.

TAKE PRIDE®  
IN AMERICA 

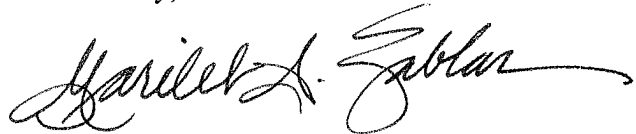
You requested our assistance in evaluating potential impacts to listed species related to the proposed project. Many bird species are known to strike objects such as antennas or guy wires that protrude above the surrounding vegetation. In Hawaii, the Hawaiian petrel and Newell's shearwater are attracted to lights and are collide with building light poles, wires, and other tall objects. Your letter states that construction activity will take place in an already disturbed footprint and no tall structures or lights are being installed. You also state that you do not anticipate impacts to the Hawaiian petrel or Newell's shearwater. We concur with this assessment for these two species.

Hawaiian hoary bats roost in both exotic and native woody vegetation and leave their young unattended in "nursery" trees and shrubs when they forage. We concur with your proposed avoidance measure that woody plants suitable for Hawaiian hoary bat roosting will not be removed or trimmed during the bat birthing and pup rearing season (May 15 through August 15). Thank you for including this measure in your DEA. In addition, you mentioned fencing will be a part of the project. Hawaiian hoary bats have been observed impaled on barbed wire fences; therefore, we recommend that barbed wire not be used in your final fence design.

The Hawaiian hawk nests in trees that are an average of 52 feet (16 meters) tall. The non-native, grassy habitat at the proposed project site is likely unsuitable for nesting by the Hawaiian hawk. Therefore, it is unlikely that the proposed project as described would disturb this species.

We hope this information assists you in developing a thorough and complete DEA and we would like to request a copy upon completion. If you have questions regarding these comments, please contact Jodi Charrier, Fish and Wildlife Biologist, (phone: 808-792-9400, email: [jodi\\_charrier@fws.gov](mailto:jodi_charrier@fws.gov)).

Sincerely,



for Loyol Mehrhoff  
Field Supervisor



**DEPARTMENT OF THE ARMY**  
U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT  
FORT SHAFTER, HAWAII 96858-5440

REPLY TO  
ATTENTION OF:

May 6, 2010

Regulatory Branch

POH-2010-00086

Ron Terry  
Geometrician Associates, LLC  
P.O. Box 396  
Hilo, Hawai'i 96721

Dear Mr. Terry:

We have received your letter dated March 8, 2010 on behalf of the County of Hawaii, Department of Water Supply regarding proposed activities to demolish a 0.1MG steel water tank and 0.005MG unused tank at Kynnersley Road and replace it with a 0.3MG reinforced concrete reservoir on an adjacent property also along Kynnersley Road. The proposed activities are located on TMKs 354002008, 354002022, and 354011099. Your letter attests that no wetlands, ponds, gulches or other surface water resources occur on the above parcels and specifically requests our assessment that there are no waters of the United States (U.S.) in the project area. This information shall be used for the preparation of a State- Environmental Assessment (EA) for the proposed action using County and State funds.

We have reviewed the proposed project pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404). Using in-office resources, we have determined that there are no jurisdictional waters present on those 3 parcels; therefore, a Department of Army (DA) permit is not required for any proposed or future work. Section 10 requires that a DA permit be obtained for certain structures or work in or affecting navigable waters of the U.S., prior to conducting the work (33 U.S.C. 403). Section 404 requires that a DA permit be obtained for the discharge of dredged and/or fill material into waters of the U.S., including wetlands and navigable waters of the U.S, prior to conducting the work (33 U.S.C. 1344). Because the worksite is not located near a navigable water, a Section 10 DA permit is not required. We have also determined that there are no waters of the U.S. in the areas of the proposed work. As such, work that would occur within these areas do not require DA authorization under Section 404 of the Clean Water Act. Other state and local regulations may still apply.

We recommend Best Management Practices be incorporated into the project design to minimize and contain any runoff from the proposed worksites which could eventually make its way to any tributary drainageway to the Pacific Ocean. This office does not wish to receive a copy of the final EA when it is completed.

This letter contains an approved JD for the properties in question and is valid for a period

of 5 years from the date of this letter unless new information warrants revisions of the determination. If you object to this determination, you may request an Administrative Appeal under Corps regulations at 33 Code of Federal Regulations (CFR) Part 331. We have enclosed an *Administrative Appeal Process Flowchart* and the *Notification of Administrative Appeal Options and Process and Request for Appeal* (NAP/RFA) form. If you wish to appeal this determination you must submit a completed RFA form, as detailed in the attached NAP/RFA form, to the Corps' Pacific Ocean Division office at the following address:

Thom Lichte, Appeals Review Officer  
U.S. Army Corps of Engineers  
Pacific Ocean Division, ATTN: CEPOD-PDC  
Building 525  
Fort Shafter, HI 96858-5440

In order for an NAP/RFA to be accepted by the Corps, the Corps must determine that the RFA is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division office within 60 days of the date of the NAP/RFA sheet. If you decide to submit an NAP/RFA form, it must be received at the above address by July 6, 2010. It is not necessary to submit an NAP/RFA form to the Division office if you do not object to the determination in this letter. You may contact Mr. Lichte at (808) 438-0397.

Thank you for giving us the opportunity to review this proposal and for your cooperation with our regulatory program. Please be advised you can provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at <http://per2.nwp.usace.army.mil/survey.html>.

Should you have any questions, please contact Farley Watanabe of my staff at (808) 438-7701 or by Email at [Farley.K.Watanabe@usace.army.mil](mailto:Farley.K.Watanabe@usace.army.mil) and refer to File No. POH-2010-00086 in all future communications with this office regarding this project location.

Sincerely,



George P. Young, P.E.  
Chief, Regulatory Branch

Enclosures

**APPROVED JURISDICTIONAL DETERMINATION FORM**  
**U.S. Army Corps of Engineers**

**SECTION I: BACKGROUND INFORMATION****A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):** 06-May-2010**B. DISTRICT OFFICE, FILE NAME, AND NUMBER:** Honolulu District, POH-2010-00086-JD1**C. PROJECT LOCATION AND BACKGROUND INFORMATION:**State : County/parish/borough: 

City:

Lat:

Long:

Universal Transverse Mercator

Folder UTM List

*UTM list determined by folder location*

Enter POH-2010-00086 location information to display the UTM list.

Waters UTM List

*UTM list determined by waters location*

- NAD83 / UTM zone 5N

Name of nearest waterbody:

Name of nearest Traditional Navigable Water (TNW):

Name of watershed or Hydrologic Unit Code (HUC):

Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

Check if other sites (e.g., offsite mitigation sites, disposal sites, etc.) are associated with the action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION:**

Office Determination Date: 06-May-2010

Field Determination Date(s):

**SECTION II: SUMMARY OF FINDINGS****A. RHA SECTION 10 DETERMINATION OF JURISDICTION**There  "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area.

Waters subject to the ebb and flow of the tide.

Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Explain:

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**There  "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area.**1. Waters of the U.S.****a. Indicate presence of waters of U.S. in review area:<sup>1</sup>**

Water Name	Water Type(s) Present
POH-2010-00086 UPLANDS C	Uplands
POH-2010-00086 UPLANDS B	Uplands
POH-2010-00086 UPLANDS A	Uplands

**b. Identify (estimate) size of waters of the U.S. in the review area:**Area: 405 (m<sup>2</sup>)

Linear: (m)

**c. Limits (boundaries) of jurisdiction:**

based on:

OHWM Elevation: (if known)

**2. Non-regulated waters/wetlands:<sup>3</sup>**

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:  
All 3 parcels are UPLANDS

**SECTION III: CWA ANALYSIS**

**A. TNWs AND WETLANDS ADJACENT TO TNWs**

**1. TNW**

Not Applicable.

**2. Wetland Adjacent to TNW**

Not Applicable.

**B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):**

**1. Characteristics of non-TNWs that flow directly or indirectly into TNW**

**(i) General Area Conditions:**

Watershed size:

Drainage area:

Average annual rainfall: inches

Average annual snowfall: inches

**(ii) Physical Characteristics**

**(a) Relationship with TNW:**

Tributary flows directly into TNW.

Tributary flows through  tributaries before entering TNW.

:Number of tributaries

Project waters are  river miles from TNW.

Project waters are  river miles from RPW.

Project Waters are  aerial (straight) miles from TNW.

Project waters are  aerial(straight) miles from RPW.

Project waters cross or serve as state boundaries.

Explain:

Identify flow route to TNW:<sup>5</sup>

Tributary Stream Order, if known:

Not Applicable.

**(b) General Tributary Characteristics:**

Tributary is:

Not Applicable.

Tributary properties with respect to top of bank (estimate):

Not Applicable.

Primary tributary substrate composition:

Not Applicable.

Tributary (conditions, stability, presence, geometry, gradient):

Not Applicable.

**(c) Flow:**  
Not Applicable.

**Surface Flow is:**  
Not Applicable.

**Subsurface Flow:**  
Not Applicable.

**Tributary has:**  
Not Applicable.

**If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction:**

**High Tide Line indicated by:**  
Not Applicable.

**Mean High Water Mark indicated by:**  
Not Applicable.

**(iii) Chemical Characteristics:**  
**Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).**  
Not Applicable.

**(iv) Biological Characteristics. Channel supports:**  
Not Applicable.

## **2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

**(i) Physical Characteristics:**  
**(a) General Wetland Characteristics:**  
**Properties:**  
Not Applicable.

**(b) General Flow Relationship with Non-TNW:**

**Flow is:**  
Not Applicable.

**Surface flow is:**  
Not Applicable.

**Subsurface flow:**  
Not Applicable.

**(c) Wetland Adjacency Determination with Non-TNW:**  
Not Applicable.

**(d) Proximity (Relationship) to TNW:**  
Not Applicable.

**(ii) Chemical Characteristics:**  
**Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).**  
Not Applicable.

**(iii) Biological Characteristics. Wetland supports:**  
Not Applicable.

## **3. Characteristics of all wetlands adjacent to the tributary (if any):**



**All wetlands being considered in the cumulative analysis:**  
Not Applicable.

**Summarize overall biological, chemical and physical functions being performed:**  
Not Applicable.

### C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

**Significant Nexus:** Not Applicable

### D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE:

**1. TNWs and Adjacent Wetlands:**  
Not Applicable.

**2. RPWs that flow directly or indirectly into TNWs:**  
Not Applicable.

**Provide estimates for jurisdictional waters in the review area:**  
Not Applicable.

**3. Non-RPWs that flow directly or indirectly into TNWs:<sup>8</sup>**  
Not Applicable.

**Provide estimates for jurisdictional waters in the review area:**  
Not Applicable.

**4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**  
Not Applicable.

**Provide acreage estimates for jurisdictional wetlands in the review area:**  
Not Applicable.

**5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs:**  
Not Applicable.

**Provide acreage estimates for jurisdictional wetlands in the review area:**  
Not Applicable.

**6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs:**  
Not Applicable.

**Provide estimates for jurisdictional wetlands in the review area:**  
Not Applicable.

**7. Impoundments of jurisdictional waters:<sup>9</sup>**  
Not Applicable.

**E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS:<sup>10</sup>**  
Not Applicable.

**Identify water body and summarize rationale supporting determination:**  
 Not Applicable.

**Provide estimates for jurisdictional waters in the review area:**  
 Not Applicable.

**F. NON-JURISDICTIONAL WATERS. INCLUDING WETLANDS**

If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements:

Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce:

Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR):

Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (Explain):

Other (Explain):

**Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (ie., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment:**  
 Not Applicable.

**Provide acreage estimates for non-jurisdictional waters in the review area, that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction.**  
 Not Applicable.

**SECTION IV: DATA SOURCES.**

**A. SUPPORTING DATA. Data reviewed for JD**

(listed items shall be included in case file and, where checked and requested, appropriately reference below):

Data Reviewed	Source Label	Source Description
--Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant	-	-
--Corps navigable waters study	-	-
--U.S. Geological Survey map(s).	-	-
--National wetlands inventory map(s).	-	-
--Photographs	-	-
---Other	-	-

**B. ADDITIONAL COMMENTS TO SUPPORT JD:**

Not Applicable.

<sup>1</sup>-Boxes checked below shall be supported by completing the appropriate sections in Section III below.

<sup>2</sup>-For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

<sup>3</sup>-Supporting documentation is presented in Section III.F.

<sup>4</sup>-Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

<sup>5</sup>-Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

<sup>6</sup>-A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

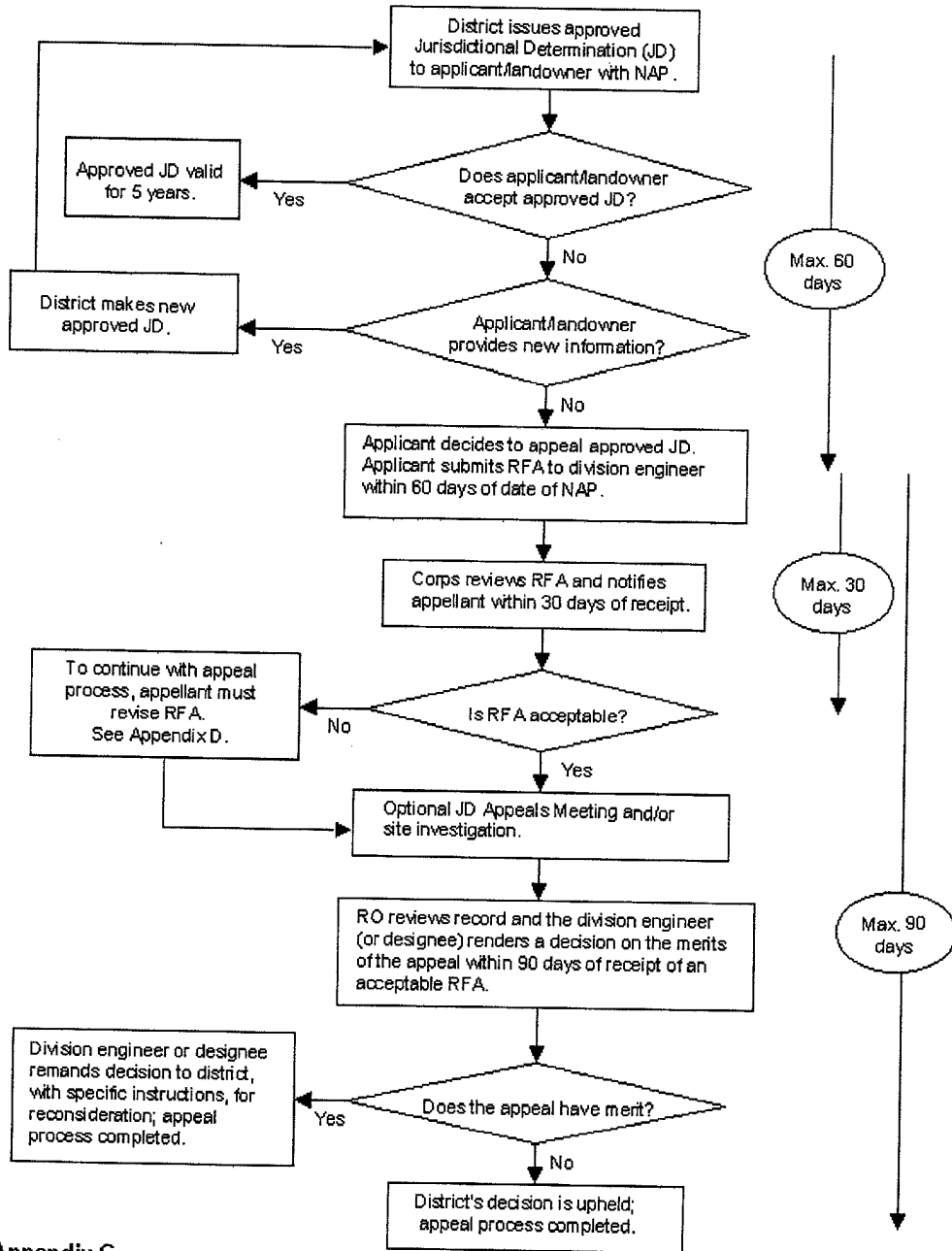
<sup>7</sup>-Ibid.

<sup>8</sup>-See Footnote #3.

<sup>9</sup>-To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

<sup>10</sup>-Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

### Administrative Appeal Process for Approved Jurisdictional Determinations



Appendix C

Applicant: County of Hawaii, Department of Water Supply		File Number: POH-2010-00086	Date: May 6, 2010
Attached is:		See Section below	
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
	PERMIT DENIAL	C	
XX	APPROVED JURISDICTIONAL DETERMINATION	D	
	PRELIMINARY JURISDICTIONAL DETERMINATION	E	

**SECTION I -** The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/inet/functions/cw/cecwo/reg> or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**E: PRELIMINARY JURISDICTIONAL DETERMINATION:** You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

**SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

**REASONS FOR APPEAL OR OBJECTIONS:** (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

**ADDITIONAL INFORMATION:** The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

If you have questions regarding this decision and/or the appeal process you may contact:

Robert D. Deroche  
U.S. Army Corps of Engineers  
Honolulu District, ATTN: CEPOH-EC-R  
Building 230  
Fort Shafter, Hawaii 96858-5440  
  
Tel. (808) 438-2039

If you only have questions regarding the appeal process you may also contact:

Mr. Thom Lichte, Appeal Review Officer  
Pacific Ocean Division  
ATTN: CEPOD-PDC  
Building 525  
Fort Shafter, HI 96858-5440  
  
Tel. (808) 438-0397

**RIGHT OF ENTRY:** Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:
---	-------	-------------------



# **ENVIRONMENTAL ASSESSMENT**

## **CONSTRUCTION OF THE KYNERSLEY NO. 1 RESERVOIR 0.3 MG REPLACEMENT**

**TMKs: (3rd) 5-4-002:008 and 022, and 5-4-011:099  
Pūehuehu, North Kohala District, Hawai'i Island, State of Hawai'i**

### **APPENDIX 2**

#### **Lead and Asbestos Survey of Existing Reservoirs**







**EnvironMETeo Services, Inc.**  
Environmental / Industrial Health & Safety

## **Asbestos & Lead Survey Report**

**For:**

**Inaba Engineering, Inc.  
273 Waiuanue Avenue  
Hilo, Hawaii 96720**

**Facility Surveyed:**

**Existing 50,000 and 100,000 Gallon Steel Tanks  
TMK 5-4-011:099 and 5-4-002:008  
Kynnersley Road  
Kohala, Hawaii**

**Project:**

**Department of Water Supply County of Hawaii  
Construction of the Kynnersley No. 1 Reservoir 0.30MG Replacement  
Job No. 2008-950**

**Conducted by:**

**EnvironMETeo Services, Inc. (EMET)  
94-520 Ukee Street, Suite A  
Waipahu, Hawaii 96797**

**Date of Report: April 21, 2010**

**EMET ID: 0905270**



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## Certification of Report

We certify that this report is based on a physical survey of EMET scope of work areas at the Kynnersley Reservoirs, located in Kohala, Hawaii for asbestos-containing materials (ACM) and lead-painted surfaces / building components.

The survey was conducted by EnvironMETeo Services, Inc. (EMET) on March 30, 2010, and was limited to the inspection and sample collection for asbestos and lead-containing painted surfaces by EPA-accredited inspectors from the two (2) existing tanks scheduled for demolition located in Kohala on the Big Island prior to planned demolition activities

The existing Kynnersley Reservoirs are located in two locations: the "lower" tank site at TMK 5-4-011:099 which contains the abandoned 50,000 gallon tank and the "upper" tank site at TMK 5-4-002:008 which contains the 100,000 gallon tank still in use.

The survey results are based on analyses of samples of suspect materials collected from visually- and physically-accessible areas/materials.

Painted surfaces were tested for lead concentrations using an X-Ray Fluorescence (XRF) spectrum analyzer, a testing methodology approved by the EPA and the U.S. Department of Housing and Urban Development (HUD).

EMET makes no warranty and assumes no liability for the inappropriate use or misuse of this document.

A handwritten signature in black ink, appearing to read "Stephen Kaneshiro", is written over a horizontal line.

Stephen Kaneshiro

Asbestos Building Inspector

Hawaii State Certification # HIASB-2307



## Summary

EnvironMETeo Services, Inc. (EMET) conducted a survey for asbestos-containing materials (ACM) and lead-painted surfaces/building components at EMET scope of work areas at the existing Kynnersley Reservoirs, located in Kohala, Hawaii, on March 30, 2010. The existing Kynnersley Reservoirs are located in two locations: the "lower" tank site at TMK 5-4-011:099 which contains the abandoned 50,000 gallon steel tank and the "upper" tank site at TMK 5-4-002:008 which contains the 100,000 gallon steel tank still in use. The survey was conducted by Clifford How and Stephen Kaneshiro of EMET in accordance with Hawaii Administrative Rules (HAR) 11-501 and EMET's scope of work.

The survey was requested and authorized by Jason Inaba of Inaba Engineering, Inc. and performed in preparation for planned demolition.

EMET was unable to safely access the top and interior of the lower tank due to its severely deteriorated condition. The interior of the upper tank was inaccessible since it was still in use at the time of the survey.

No suspect ACM was observed in the accessible work scope areas during this survey.

Lead-based paint was found on the exterior walls, ladder, and level indicator of the lower tank and the exterior walls, level indicator, valve, and vertical pipe of the upper tank. Lead-containing paint was found on the remaining surfaces tested.



## **Asbestos-Containing Material**

The State of Hawaii and the EPA define ACM as any material containing more than one percent (>1%) asbestos by area. This definition can be found in the following regulations:

- HAR, Title 11, Department of Health, Chapter 501 (11-501), Asbestos Requirements
- HAR, Title 12, Department of Labor and Industrial Relations, Subtitle 8, Hawaii Occupational Safety and Health Division (HIOSH), Part 3, Construction Standards, Chapter 145.1 (12-145.1), Asbestos
- EPA 40 CFR Part 61, Subpart M - National Emission Standards for Hazardous Air Pollutants (NESHAP), revised July 1, 1990, Asbestos NESHAP Revision Final Rule

## **Asbestos Bulk Sampling**

No suspect ACM was observed at the accessible work scope areas during this survey. No asbestos samples were collected.

## **Lead Paint**

HUD regulations, 24 CFR Parts 35, 200, 881, and 886, guidelines for the evaluation and control of lead-based paint (LBP) hazards in housing, revised April 1, 1999, define LBP as paint with a lead content of 1.0 mg/cm<sup>2</sup> or greater by XRF analyzer, or 0.5% wt. or 5000 ppm by Atomic Absorption (AA) analysis. The EPA regulations 40 CFR Part 745, revised July 1, 1999, similarly defined LBP as stated in HUD regulations.

However, the Occupational Safety and Health Administration (OSHA) and HIOSH regulate any activity disturbing paint that contains lead (referred to as lead-containing paint or LCP), even if the lead content is below the EPA/HUD standard for lead-based paint.

XRF test results of painted surfaces equal to or greater than 1.0 mg/cm<sup>2</sup> are defined as LBP in accordance with EPA and HUD regulations.

### Lead Paint Sampling and Analyses

Painted surfaces were analyzed for lead using an XRF analyzer. A total of nineteen (19) analyses of painted surfaces/building components and calibrations were performed. A unique identification number was assigned to each test location and entered on a field data sheet and a field drawing. The ID number, location, description, and lead concentration of each sample are indicated in the XRF Analyzer Test Results, which are provided in Appendix A.

#### Lower Tank Lead-based Paint

XRF No.	Testing Combination Component / Substrate	Condition	Color
765	exterior side of tank / metal	poor	black
767	exterior side of tank / metal	poor	green
768	ladder / metal	poor	green
769	level indicator / metal	poor	white

### Upper Tank Lead-based Paint

XRF No.	Testing Combination Component / Substrate	Condition	Color
770	exterior side of tank / metal	good	green
771	valve at exterior side of tank / metal	good	green
772	vertical pipe / metal	good	green
775	level indicator / metal	fair	white

The remaining samples registered a lead content of less than 1.0 mg/cm<sup>2</sup> and they are considered to contain LCP. Painted surfaces may vary in paint type, color and condition, and any damaged painted surfaces may vary significantly from area to area in terms of the condition and degree of damage. The LBP and LCP results provide the lead content of all paint layers in a tested surface, as there may be more than one layer of paint on the tested surface.

### Limitations

This hazardous materials survey was performed to identify suspect materials in areas scheduled for planned demolition. Original building plans and specifications and those for past renovations, if any, were not available for review. Therefore, because of these limitations, the highly variable nature of building construction, and the limits to the survey as defined by EMET's scope of work, the potential remains for undiscovered hazardous materials.

Materials found inside of either tank or at the top of the lower tank should be assumed to be ACM until sampled by a certified building inspector and analyzed by an accredited laboratory to show otherwise.

This report is not a specification for the removal of ACM or lead and should not be used as such.



## **Appendix A**

### **Lead Survey Report**

DWS County of Hawaii  
Construction of the Kynnersley No. 1 Reservoir 0.3 MG Replacement

Asbestos & Lead Survey  
EMET: 0905270





EMET ID: 0905270

Test Date: March 30, 2010

DWS Kynnersley 0.30MG Reservoir Construction  
Existing 50K and 100K Gallon Tanks

XRF#	Location	Component	Substrate	Condition	Color	PbC (mg/cm <sup>2</sup> )	Lead-based Paint?	Lead-containing Paint?
762	Calibration					1.00 ± 0.10		
763	Calibration					1.00 ± 0.10		
764	Calibration					1.00 ± 0.10		
765	50K Tank (Lower Tank Site)	side of tank	metal	poor	black	33.90 ± 26.90	yes	yes
766	50K Tank (Lower Tank Site)	side of tank	metal	poor	green	0.90 ± 0.10	no	yes
767	50K Tank (Lower Tank Site)	side of tank	metal	poor	green	21.90 ± 13.10	yes	yes
768	50K Tank (Lower Tank Site)	ladder	metal	poor	green	35.30 ± 29.60	yes	yes
769	50K Tank (Lower Tank Site)	level indicator	metal	poor	white	17.50 ± 11.50	yes	yes
770	100K Tank (Upper Tank Site)	side of tank	metal	good	green	22.20 ± 13.60	yes	yes
771	100K Tank (Upper Tank Site)	valve	metal	good	green	11.80 ± 9.30	yes	yes
772	100K Tank (Upper Tank Site)	vertical pipe	metal	good	green	18.00 ± 11.50	yes	yes
773	100K Tank (Upper Tank Site)	pipes	metal	good	blue	0.00 ± 0.02	no	yes
774	100K Tank (Upper Tank Site)	pipes	metal	good	black	0.00 ± 0.02	no	yes
775	100K Tank (Upper Tank Site)	level indicator	metal	fair	white	10.10 ± 8.50	yes	yes
776	100K Tank (Upper Tank Site)	ladder	metal	good	green	0.09 ± 0.27	no	yes
777	100K Tank (Upper Tank Site)	ladder	metal	good	green	0.04 ± 0.12	no	yes
778	Calibration					1.00 ± 0.10		
779	Calibration					1.00 ± 0.10		
780	Calibration					1.00 ± 0.10		

Determination of paint as lead-based paint by the U. S. Department of Housing and Urban Development (HUD) is based on the values in the "PbC" column reported in mg/cm<sup>2</sup>. HUD regulations; 24 CFR Parts 35, 200, 881, and 886; and Guidelines for the Evaluation and Control of Lead-based Paint (LBP) Hazards in Housing, dated June 1995, define LBP as paint with a lead content of 1.0 mg/cm<sup>2</sup> or greater.

However, OSHA and HIOSH regulate activities disturbing paint that contains lead (lead-containing paint), even if the content is below the HUD standard.

Serial #7587

Page 1 of 1



## **Appendix B**

### **Certifications**



# Lead-Based Paint Activities Firm Certification

THIS IS TO CERTIFY THAT

## EnvironMETeo Services, Inc.

has fulfilled the requirements of Chapter 11-41 Hawaii Administrative Rules and the Toxic Substance Control Act (TSCA) Section 402(a)(2), and has received certification as a firm pursuant to §11-41-4, HAR to conduct lead-based paint activities in Hawaii.

This certification is valid from the date of issuance and expires on **JUNE 19, 2012**.

Date of Issue: **JUNE 15, 2009**  
Certification # **PBF-0024**

FOR DIRECTOR OF HEALTH

NON-TRANSFERABLE

REVOCABLE FOR CAUSE



## State of Hawai'i Asbestos Certification

### Training Course Exp. Dates

W	n/a	MP	12/30/10
CS	06/20/10	PD	12/31/10
INS	2/30/10	PM	02/05/11

**How**  
Clifford  
EnvironMETeo Services, Inc.  
**HIASB-0011**  
State Exp. Date: 08/27 2010

W= Worker  
CS= Cont./Sup.  
INS= Inspector  
PD= Project Designer  
MP= Mgmt. Planner  
PM= Project Monitor



## State of Hawai'i Asbestos Certification

### Training Course Exp. Dates.

W	n/a	MP	n/a
CS	n/a	PD	n/a
INS	06/19/10	PM	07/10/10

**Kaneshiro**  
Stephen Y.  
EnvironMETeo Services, Inc.  
**HIASB-2307**  
State Exp. Date: 09/07/2010

W= Worker  
CS= Cont./Sup.  
INS= Inspector  
PD= Project Designer  
MP= Mgmt. Planner  
PM= Project Monitor



End of Report  
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# **ENVIRONMENTAL ASSESSMENT**

## **CONSTRUCTION OF THE KYNERSLEY NO. 1 RESERVOIR 0.3 MG REPLACEMENT**

**TMKs: (3rd) 5-4-002:008 and 022, and 5-4-011:099  
Pūehuehu, North Kohala District, Hawai'i Island, State of Hawai'i**

### **APPENDIX 3 Archaeological Assessment**





# An Archaeological Assessment in Compliance with Section 106 of the National Historic Preservation Act for the Proposed Hawai‘i County Department of Water Supply’s Kynnersley Road Project

(TMKs:3-5-4-02:008, 022  
and 3-5-4-11:099)

Pūehehu Ahupua‘a  
North Kohala District  
Island of Hawai‘i



---

DRAFT VERSION

PREPARED BY:

Robert B. Rechtman, Ph.D.

PREPARED FOR:

Geometrician Associates, LLC  
P.O. Box 396  
Hilo, HI 96721

March 2010

---

**RECHTMAN CONSULTING, LLC**

507-A E. Lanikaula St. Hilo, Hawaii 96720

phone: (808) 969-6066 fax: (808) 443-0065

e-mail: bob@rechtmanconsulting.com

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

An Archaeological Assessment in Compliance with Section  
106 of the National Historic Preservation Act for the  
Proposed Hawai‘i County Department of Water Supply’s  
Kynnersley Road Project

(TMKs: 3-5-4-02:008, 022  
and 3-5-4-11:099)

Pūehuehu Ahupua‘a  
North Kohala District  
Island of Hawai‘i

## **EXECUTIVE SUMMARY**

At the request of Geometrician Associates, LLC, on behalf of the County of Hawai'i Department of Water Supply (DWS), Rechtman Consulting, LLC conducted an archaeological assessment for the demolition of two small water tanks and the construction of a new 0.3 MG tank/reservoir on three separate parcels in Pūehuehu Ahupua'a, North Kohala District, Island of Hawai'i. The study parcels (TMKs:3-5-4-02:008, 022 and 3-5-4-11:099) together comprise less than 1 acre of land located along Kynnersley Road. DWS may seek federal funding for the project under the Drinking Water State Revolving Fund (DWSRF) program administered by the Safe Drinking Water Branch of the State Department of Health. Because allocation of DWSRF funds would constitute a federal undertaking, this study was prepared in support of environmental documentation in compliance with both Chapter 343, Hawai'i Revised Statutes and the National Environmental Policy Act (NEPA).

Robert B. Rechtman, Ph. D. and Matthew R. Clark, B.A. conducted a field inspection of all three study parcels on March 11, 2010. Parcel 3-5-4-11:099 is a fenced and fully developed lot with an existing water tank and exposed soil surface, as is Parcel 3-5-4-02:008. No archaeological resources were observed on either of these parcels. Parcel 3-5-4-02:022 surrounds Parcel 008 and is currently undeveloped. As a result of an intensive pedestrian survey of this parcel, no archaeological resources of any kind were observed. Also, there were no resources (landforms, vegetation, etc.) of a traditional cultural nature observed within any of the study parcels. Given the negative findings of the current study, it is concluded that the County of Hawai'i Department of Water Supply Kynnersley Road project will have no effect on any known historic properties. It is therefore recommended that no further historic preservation work or mitigation is needed.

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## INTRODUCTION

At the request of Geometrician Associates, LLC, on behalf of the County of Hawai'i Department of Water Supply (DWS), Rechtman Consulting, LLC conducted an archaeological assessment for the demolition of two small water tanks and the construction of a new 0.3 MG tank/reservoir on three separate parcels in Pūehuehu Ahupua'a, North Kohala District, Island of Hawai'i (Figure 1). The study parcels (TMKs:3-5-4-02:008, 022 and 3-5-4-11:099) together comprise less than 1 acre of land located along Kynnersley Road (Figures 2 and 3). The *makai*-most parcel (Parcel 11-099) is situated at an elevation of roughly 700 feet (213 meters) above sea level, while Parcels 02-008 and 022 are located at about 960 feet (293 meters) above sea level. The soils in the study area are classified as Ainakea silty clay loam (AaC and AaD) (Sato et al. 1973). These are well-drained soils, 24 to 36 inches thick, that formed in highly weathered tholeiitic lava flows that emanated from Kohala Volcano approximately 250,000-700,000 years ago (Wolfe and Morris 1996). Like most of the relatively old Kohala slopes this area is considered an erosional environment, which over the years has been depleted by intensive cultivation.

DWS may seek federal funding for the project under the Drinking Water State Revolving Fund (DWSRF) program administered by the Safe Drinking Water Branch of the State Department of Health. Because allocation of DWSRF funds would constitute a federal undertaking, this study was prepared in support of environmental documentation in compliance with both Chapter 343, Hawai'i Revised Statutes and the National Environmental Policy Act (NEPA). Specifically, with respect to federal compliance, this report is intended to satisfy Section 106 of the National Historic Preservation Act; and with respect to state compliance this report is intended to satisfy Hawai'i Administrative Rules 13§13-275. To these ends this study was performed in accordance with the *Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports* as contained in Hawai'i Administrative Rules 13§13-276. According to 13§13-275-5(b)(5)(A) when no archaeological resources are discovered during an archaeological survey the production of an Archaeological Assessment report is appropriate. Compliance with the above standards is sufficient for meeting the historic preservation review process requirements of both the State Historic Preservation Officer (SHPO) and the Department of Land and Natural Resources–State Historic Preservation Division (DLNR–SHPD).

This report contains background information outlining the project area's physical and cultural contexts, a presentation of prior studies conducted in the vicinity of the current project area, and current survey expectations based on the information obtained from the previous work. Also presented are an explanation of the project's methods, the findings of the archaeological field survey, and conclusions and recommendations.

## BACKGROUND

This section of the report describes and synthesizes prior archaeological, cultural, and historical studies that are relevant to the current project area; and provides a brief culture-historical background.

### Prior Archaeological Studies

There have been a limited number of prior archaeological studies conducted in windward North Kohala; in the late 1980s (Tomonari-Tuggle 1988) and more recently by McCoy and Graves (2007 and 2008) and Dircks Ah Sam and Rechtman (2008, 2009a and 2009b). In 2008, DLNR-SHPD determined that no historic properties would be affected by the development of the new Kohala Public Library (within Pūehuehu Ahupua'a).

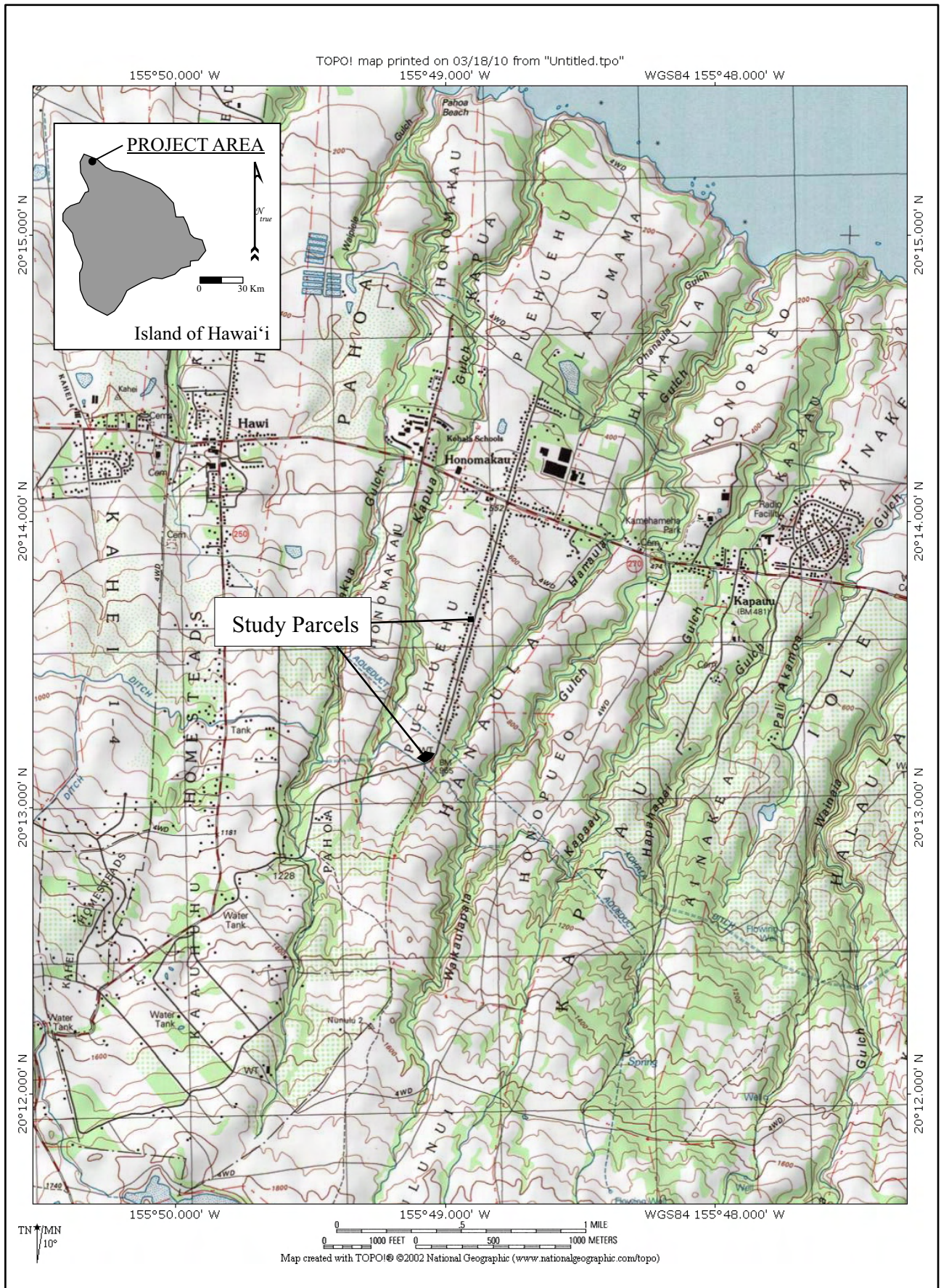


Figure 1. Project area location.



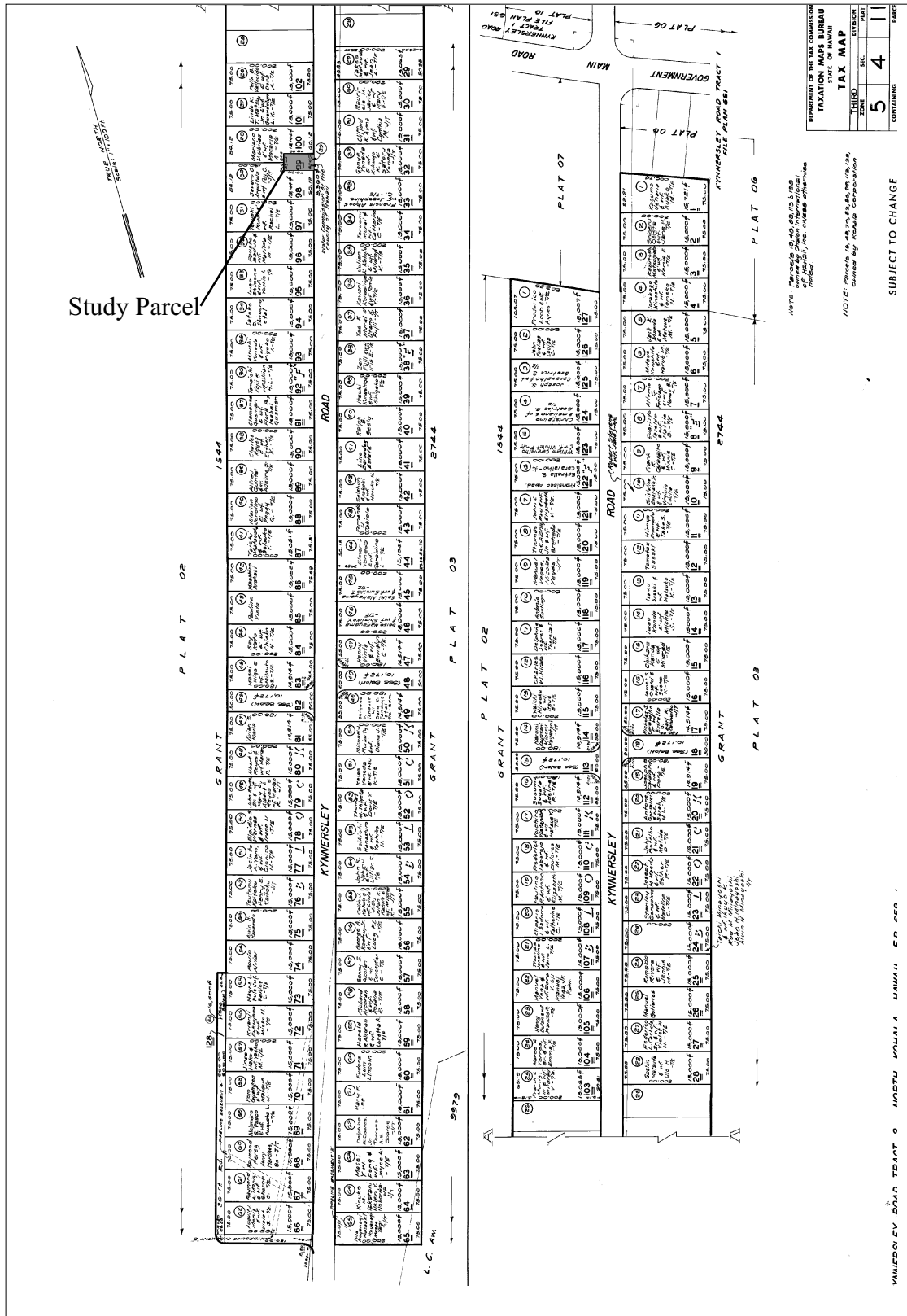


Figure 3. TMK 3-5-4-11 showing study parcel 99.



In 1988 Tomonari-Tuggle completed a study of North Kohala for the Department of Land and Natural Resources (DLNR), Division of State Parks, Outdoor Recreation and Historic Sites. The study included a comprehensive history of North Kohala and an inventory of archeological resources throughout the entire district. The reconnaissance fieldwork was conducted in 1981. As stated by Tomonari-Tuggle (1988:II-2), the goal of the survey was to record the locations of site areas and to identify the varying densities of different feature types within the site areas. This information was to be augmented by sketch maps and written descriptions of the sites. All of the sites were assigned temporary site numbers based on their location within North Kohala (i.e. Windward Valleys, Kula Gulches, Kula Slopes, and Leeward Coast). Along the Windward Kula Gulch Survey, *makai* of the current study parcels, Tomonari-Tuggle surveyed from Hālawā Ahupua‘a on the west to Makanikahio Ahupua‘a on the east, and documented site concentrations within the Makapala, ‘A‘amakāō, and Hālawā *ahupua‘a*. The recorded sites included habitation complexes, agricultural complexes, agricultural field remnants, Historic Period sites, and *heiau*.

In 2007, McCoy and Graves (2007) as part of the Hawai‘i Archaeological Research Project (HARP), conducted an intensive archaeological survey and limited test excavation within Makapala and Hālawā *ahupua‘a*. Their study area (20.79 acres) is located northeast of the current study parcels. They recorded a total of forty-one complexes and 378 individual features comprised mostly of irrigated agricultural terraces. Site complexes include irrigated and non-irrigated terraces, walls, and mounds. The irrigated and non-irrigated terraces also include various feature types, such as, freestanding walls, mounds, and rock shelters. Other sites include enclosures and a Historic bridge. Nine test units and twenty-two shovel test pits were excavated in an effort to recover charcoal (radiocarbon samples), soil samples, and other evidence of prehistoric settlement and agriculture. All materials recovered from test units were saved for future publications.

In their continuing HARP study of North Kohala, in 2008 McCoy and Graves (2008), conducted an intensive archaeological survey and limited test excavation within Hālawā and Waiapuka *ahupua‘a*. The Hālawā study area is located east of the current project. The purpose of their survey and excavation was to broaden their view of the nature of traditional Hawaiian irrigated agriculture and gain a new appreciation for the long-term history in North Kohala. In the Hālawā Study Area, they uncovered deeply buried agricultural deposits that likely represent some of the earliest direct evidence of farming on the island. They came across intact terraces, walls, and deposits. Their initial reading of site stratigraphy is that it reflects three periods of gardening: (1) Earlier Prehistoric, (2) Later Prehistoric, and the (3) Historic Era. A total of sixteen shovel test pits were excavated in the lower Hālawā Gulch, which documented significant soil deposition.

Dircks Ah Sam and Rechtman (2008) conducted an archaeological inventory survey and limited cultural assessment of an approximately 18 acre portion of a 24.6 acre parcel (TMK:3-5-2-01:por. 25) in the extreme coastal portions of Niuli‘i and Makapala *ahupua‘a*. As a result of their inventory survey nine sites were identified. The sites include a push pile containing Historic debris from a nearby cemetery (Site 26686), five Historic dump areas (Sites 26687, 26688, 26690, 26691, and 26692), a Historic outflow pipe section from the Niuli‘i Mill (Site 26689), two World War II era foxholes (Site 26693), and a *hala* grove (Site 26694) (considered in its entirety as a traditional cultural property that was utilized in the past and is currently accessed by cultural practitioners). In an interview conducted as part of their study with the late Clyde “Kindy” Sproat, he spoke of the *hala* groves that once extended from Hāpu‘u through their study property southeast to Makanikahio Ahupua‘a.

Dircks Ah Sam and Rechtman (2009a) conducted an archaeological inventory survey and limited cultural assessment of an approximately 32-acre parcel (TMKs:3-5-3-07:022, 032 and 033) in the coastal portions of Hālawā *ahupua‘a*. As a result of that inventory survey, one previously recorded archaeological site was identified. This site is known as Hale o Kā‘ili Heiau and was previously assigned State Inventory of Historic Places (SIHP) Site 2332. No new archaeological sites were discovered during their study.

Dircks Ah Sam and Rechtman (2009b) also conducted an archaeological and limited cultural assessment of a parcel situated *makai* of the current study parcels within Pūehuehe and Kapu‘a *ahupua‘a*. As a result of that study, no archaeological sites were encountered as the bulk of the project area had been subject to years of intensive cultivation and later ranching related activities.

In 2008 the State Historic Preservation Division made a series of determinations (DOC NO: 0803MD65; 0805MD04; 0807MD58) that no historic properties would be affected by the development of the new Kohala Public Library, on a 3.5-acre parcel (TMK:3-5-4-008:002) in Pūehuehu Ahupua‘a. Their determination was based on the conclusion that both intensive cultivation and previous grubbing/grading had already altered the land.

## Culture-Historical Context

### A Generalized Model of Hawaiian Prehistory

The generalized cultural sequence that follows is based on Kirch's (1985) model. The Settlement Period is believed to have occurred in Hawai'i between AD 300–600 from the southern Marquesas Islands. This was a period of great exploitation and environmental modification, when early Hawaiian farmers developed new subsistence strategies by adapting their familiar patterns and traditional tools to their new environment (Kirch 1985; Pogue 1978). Their ancient and ingrained philosophy of life tied them to their environment and kept order. Order was further assured by the conical clan principle of genealogical seniority (Kirch 1984). According to Fornander (1969), the Hawaiians brought from their homeland certain universal Polynesian customs: the major gods *Kane*, *Ku*, and *Lono*; the *kapu* system of law and order; cities of refuge; the *'aumakua* concept; various superstitions; and the concept of *mana*.

The Development Period (A.D. 600–1100) brought about a uniquely Hawaiian culture. The portable artifacts found in archaeological sites of this period reflect not only an evolution of the traditional tools, but some distinctly Hawaiian inventions. The adze (*ko'i*) evolved from the typical Polynesian variations of plano-convex, trapezoidal, and reverse-triangular cross-section to a very standard Hawaiian rectangular quadrangular tanged adze. A few areas in Hawai'i produced quality basalt for adze production. Mauna Kea on the island of Hawai'i was a well-known adze quarry. The two-piece fishhook and the octopus-lure breadloaf sinker are Hawaiian inventions of this period, as are *'ulu maika* stones and *lei niho palaoa*. The later was a status item worn by those of high rank, indicating a trend toward greater status differentiation (Kirch 1985).

The Expansion Period (A.D. 1100–1650) is characterized by the greatest social stratification, major socioeconomic changes, and intensive land modification. Most of the ecologically favorable zones of the windward and coastal regions of all major islands were settled and the more marginal leeward areas were being developed. Early dates from windward Kohala were reported by Cordy (2000); these sites are believed to have been utilized in the early 1200s. The greatest population growth occurred during the Expansion Period.

It was during the Expansion Period that a second major migration settled in Hawai'i, this time from Tahiti in the Society Islands. According to Kamakau (1976) the *kahuna* Pā'ao settled in the islands during the 13<sup>th</sup> century. Pā'ao was the keeper of the god Kū'kā'ilimoku, who had fought bitterly with his older brother, the high priest Lonopele. After much tragedy on both sides, Pā'ao escaped Lonopele's wrath by fleeing in a canoe. Kamakau (1991:100–102) told the following story in 1866:

Puna on Hawai'i Island was the first land reached by Pa'ao, and here in Puna he built his first *heiau* for his god Aha'ula and named it Aha'ula [Waha'ula]. It was a *luakini*. From Puna, Pa'ao went on to land in Kohala, at Pu'uēpa. He built a *heiau* there called Mo'okini, a *luakini*. It is thought that Pa'ao came to Hawai'i in the time of the *ali'i* La'au because Pili ruled as *mo'i* after La'au. You will see Pili there in the line of succession, the *mo'o kū'auhau*, of Hanala'anui. It was said that Hawai'i Island was without a chief, and so a chief was brought from Kahiki; this is according to chiefly genealogies. Hawai'i Island had been without a chief for a long time, and the chiefs of Hawai'i were *ali'i maka'āinana* or just commoners. There were seventeen generations during which Hawai'i Island was without chiefs—some eight hundred years.

There are several versions of this story that are discussed by Beckwith (1976), including the version where Mo'okini and Kaluawilinau, two *kāhuna* of Moikeha, decide to stay on at Kohala. The bones of the *kahuna* Pā'ao are said to be deposited in a burial cave in Kohala in Pu'uēpa [possibly Pu'uēpa?] (Kamakau 1964:41).

The concept of the *ahupua'a* was established during the A.D. 1400s (Kirch 1985), adding another component to a then well-stratified society. This land unit became the equivalent of a local community, with its own social, economic, and political significance. *Ahupua'a* were ruled by *ali'i 'ai ahupua'a* or lesser chiefs; who, for the most part, had complete autonomy over this generally economically self-supporting piece of land, which was managed by a *konohiki*. *Ahupua'a* were usually wedge or pie-shaped, incorporating all of the eco-zones from the mountains to the sea and for several hundred yards beyond the shore, assuring a diverse subsistence resource base (Hommon 1986).

The *ali'i* and the *maka'āinana* (commoners) were not confined to the boundaries of the *ahupua'a*; when there was a perceived need, they also shared with their neighbor *ahupua'a ohana* (Hono-ko-hou 1974). The *ahupua'a* was further divided into smaller sections such as the *'ili*, *mo'o'aina*, *pauku'aina*, *kihapai*, *koele*, *hakuone*, and *kuakua* (Hommon 1986, Pogue 1978). The chiefs of these land units gave their allegiance to a territorial chief or *mo'i* (king). *Heiau* building flourished during this period as religion became more complex and embedded in a sociopolitical climate of territorial competition. Monumental architecture, such as *heiau*, “played a key role as visual markers of chiefly dominance” (Kirch 1990:206).

The Proto-Historic Period (A.D. 1650–1795) is marked by both intensification and stress. Wars occurred between intra-island and inter-island polities. Sometime between A.D. 1736 and 1758, in the reign of Kalani'ōpu'u, Kamehameha I was born in the *ahupua'a* of Kokoiki, North Kohala near the Mo'okini Heiau [there is some controversy about his birth year, see Kamakau 1992:66–68]. It has been related that at the time of his birth an army was encamped on the leeward Kohala shore, between the *ahupua'a* of Koai'e and Pu'uwepa, preparing for an attack on Maui (Kamakau 1964:67; Tomonari-Tuggle 1988:I-57). The birth event is said to have occurred on a stormy night of rain, thunder, and lightning, signified the night before by a very bright, ominous star, thought by some to be Halley's comet [this is also controversial] (Kamakau 1992). Kamehameha's ancestral homeland was in Hālawā, North Kohala (Williams 1919).

This period was one of continual conquest by the reigning *ali'i*. Ke'eumoku, son of Keawepoepoe, set up a fort at Pololu and Honokane; he was attacked there by Kalani'ōpu'u, so he moved to Maui. About A.D. 1759 Kalani'ōpu'u conquered East Maui, defeating his wife's brother, the Maui king Kamehamehanui, by using Hana's prominent Pu'u Kau'iki as his fortress. He appointed one of his Hawai'i chiefs, Puna, as governor of Hana and Kipahulu. Kahekili became king of Maui in A.D. 1766 when Kamehamehanui died following an illness. Ke'eumoku took his widow, Namahana, a cousin of Kamehameha I, as his wife. Their daughter, Ka'ahumanu, the future favorite wife of Kamehameha I, was born in a cave at the base of Pu'u Kau'iki, Hana, Maui in A.D. 1768 (Kamakau 1992). In A.D. 1775 Kalani'ōpu'u and his Hana forces raided and destroyed the neighboring Kaupo district, then launched several more raids on Molokai, Lanai, Kaho'olawe, and parts of West Maui. It was at the battle of Kalaeoka'ilio that Kamehameha, a favorite of Kalani'ōpu'u, was first recognized as a great warrior and given the name of Pai'ea (hard-shelled crab) by the Maui chiefs and warriors (Kamakau 1992). During the battles between Kalani'ōpu'u and Kahekili (1777–1779), Ka'ahumanu and her parents left Maui to live on the island of Hawai'i (Kamakau 1992).

### History After Contact

Captain James Cook landed in the Hawaiian Islands on January 18, 1778. Ten months later, on a return trip to Hawaiian waters, Kalani'ōpu'u, who was at war with Kahekili, visited Cook on board the *Resolution* off the East coast of Maui. Kamehameha observed this meeting, but chose not to participate. The following January [1779], Cook and Kalani'ōpu'u met again in Kealahakua Bay and exchanged gifts. In February, Cook set sail; however, a severe storm off the Kohala coast damaged a mast and they had to return to Kealahakua. Cook's return occurred at an inopportune time, and this misfortune cost him his life (Kuykendall and Day 1976, Sahlins 1985).

In 1779 King of the Cook expedition explored the North Kohala country and reported:

As far as the eye could reach, seemed fruitful and well inhabited. [Three and four miles inland, plantations of taro and potatoes and *wauke*] neatly set out in rows. The walls that separate them are made of the loose burnt stone, which are got in clearing the ground; and being entirely concealed by sugar-canes planted close on each side, make the most beautiful fences that can be conceived. [The exploring party stopped six or seven miles from the sea.] To the left a continuous range of villages, interspersed with groves of coconut trees spreading along the sea-shore; a thick wood behind this; and to the right, an extent of ground laid out in regular and well-cultivated plantations . . . as they passed, they did not observe a single foot of ground, that was capable of improvement, left unplanted. (Handy and Handy 1972:528)

Around A.D. 1780 Kalani'ōpu'u proclaimed that his son Kiwalao would be his successor, and he gave the guardianship of the war god Kū'kā'ilimoku to Kamehameha. Kamehameha and a few other chiefs were concerned about their land claims, which Kiwalao did not seem to honor, so after usurping Kiwalao's authority with a sacrificial ritual, Kamehameha retreated to his district of Kohala. While in Kohala, Kamehameha farmed

the land, growing taro and sweet potatoes (Handy and Handy 1972). After Kalani'ōpu'u died in A.D. 1782 civil war broke out: Kiwalao was killed. The wars between Maui and Hawaii continued until A.D. 1795 (Kuykendall and Day 1976; Handy and Handy 1972).

In A.D. 1790 two American vessels, the *Eleanora* and *Fair American*, were in Hawaiian waters. Following an altercation between his crew and natives, the Captain of the *Eleanora* massacred more than 100 natives at Olowalu [Maui], then sailed away leaving one of its crew, John Young, on land. The other vessel, the *Fair American*, was captured and its crew killed except for one member, Issac Davis. Kamehameha also observed this but did not participate, although he did prevent Young and Davis from leaving. He also kept the vessel as part of his fleet. Young eventually became governor of the island of Hawai'i. By 1796 Kamehameha had conquered all the island kingdoms except Kaua'i. It wasn't until 1810, when Kaumuali'i of Kauai gave his allegiance to Kamehameha, that the Hawaiian Islands were unified under one ruler (Kuykendall and Day 1976).

Demographic trends during this period indicate population reduction in some areas, due to war and disease, yet increases in others, with relatively little change in material culture. However, there was a continued trend toward craft and status specialization, intensification of agriculture, *ali'i* controlled aquaculture, upland residential sites, and the enhancement of traditional oral history. The Kū cult, *luakini heiau*, and the *kapu* system were at their peaks, although western influence was already altering the cultural fabric of the Islands (Kirch 1985; Kent 1983); foreigners had introduced the concept of trade for profit (Kent 1983). This marked the end of the Proto-Historic Period and the end of an era of uniquely Hawaiian culture.

Hawai'i's culture and economy continued to change drastically as capitalism and industry established a firm foothold. The sandalwood (*Santalum ellipticum*) trade, established by Euro-Americans in 1790 and turned into a viable commercial enterprise by 1805 (Oliver 1961), was flourishing by 1810. This added to the breakdown of the traditional subsistence system, as farmers and fishermen were ordered to spend most of their time logging, resulting in food shortages and famine that led to a population decline. Kamehameha did manage to maintain some control over the trade (Kuykendall and Day 1976; Kent 1983).

Kamehameha I died on May 8, 1819 at Kamakahonu in Kailua-Kona, and once again the culture of Hawai'i was to change radically. Following the death of a prominent chief, it was customary to remove all of the regular *kapu* that maintained social order and the separation of men and women and elite and commoner. Thus, following Kamehameha's death a period of *'ai noa* (free eating) was observed along with the relaxation of other traditional *kapu*. It was for the new ruler and *kahuna* to re-establish *kapu* and restore social order, but at this point in history traditional customs saw a change:

The death of Kamehameha was the first step in the ending of the tabus; the second was the modifying of the mourning ceremonies; the third, the ending of the tabu of the chief; the fourth, the ending of carrying the tabu chiefs in the arms and feeding them; the fifth, the ruling chief's decision to introduce free eating (*'ainoa*) after the death of Kamehameha; the sixth, the cooperation of his aunts, Ka-ahu-manu and Ka-heihei-malie; the seventh, the joint action of the chiefs in eating together at the suggestion of the ruling chief, so that free eating became an established fact and the credit of establishing the custom went to the ruling chief. This custom was not so much of an innovation as might be supposed. In old days the period of mourning at the death of a ruling chief who had been greatly beloved was a time of license. The women were allowed to enter the heiau, to eat bananas, coconuts, and pork, and to climb over the sacred places. You will find record of this in the history of Ka-ula-hea-nui-o-kamoku, in that of Ku-ali'i, and in most of the histories of ancient rulers. Free eating followed the death of the ruling chief; after the period of mourning was over the new ruler placed the land under a new tabu following old lines. (Kamakau 1992: 222)

Immediately upon the death of Kamehameha I, Liholiho (his son and to be successor) was sent away to Kawaihae to keep him safe from the impurities of Kamakahonu brought about from the death of Kamehameha. After purification ceremonies Liholiho returned to Kamakahonu:

Then Liholiho on this first night of his arrival ate some of the tabu dog meat free only to the chiefesses; he entered the *lauhala* house free only to them; whatever he desired he reached out for; everything was supplied, even those things generally to be found only in a tabu house. The people saw the men drinking rum with the women *kahu* and smoking tobacco, and thought it was to mark the ending of the tabu of a chief. The chiefs saw with satisfaction the

ending of the chief's tabu and the freeing of the eating tabu. The *kahu* said to the chief, "Make eating free over the whole kingdom from Hawaii to Oahu and let it be extended to Kauai!" and Liholiho consented. Then pork to be eaten free was taken to the country districts and given to commoners, both men and women, and free eating was introduced all over the group. Messengers were sent to Maui, Molokai, Oahu and all the way to Kauai, Ka-umu-ali'i consented to the free eating and it was accepted on Kauai. (Kamakau 1992: 225)

When Liholiho, Kamehameha II, ate the *kapu* dog meat, entered the *lauhala* house and did whatever he desired it was still during a time when he had not reinstated the eating *kapu* but others appear to have thought otherwise. Kekuaokalani, caretaker of the war god *Ku-Kailimoku*, was dismayed by his cousin's (Liholiho) actions and revolted against him, but was defeated.

With an indefinite period of free-eating and the lack of the reinstatement of other *kapu* extending from Hawai'i to Kaua'i, and the arrival of the Christian missionaries shortly thereafter, the traditional religion had been officially replaced by Christianity within a year following the death of Kamehameha I. By December of 1819 Kamehameha II had sent edicts throughout the kingdom renouncing the ancient state religion, ordering the destruction of the *heiau* images, and ordering that the *heiau* structures be destroyed or abandoned and left to deteriorate. He did, however, allow the personal family religion, the *'aumakua* worship, to continue (Oliver 1961; Kamakau 1992).

With the end of the *kapu* system changes in the social and economic patterns began to affect the lives of the common people. Liholiho moved his court to O'ahu, lessening the burden of resource procurement for the chiefly class on the residents of Hawai'i Island. Some of the work of the commoners shifted from subsistence agriculture to the production of foods and goods that they could trade with early Western visitors. Introduced foods often grown for trade included yams, coffee, melons, Irish potatoes, Indian corn, beans, figs, oranges, guavas, and grapes (Wilkes 1845).

In October of 1819, seventeen Protestant missionaries set sail from Boston to Hawai'i. They arrived in Kailua-Kona on March 30, 1820 to a society with a religious void to fill. Many of the *ali'i*, who were already exposed to western material culture, welcomed the opportunity to become educated in a western style and adopt their dress and religion. Soon they were rewarding their teachers with land and positions in the Hawaiian government. During this period, the sandalwood trade was wreaking havoc on the commoners, who were weakening with the heavy production, exposure, and famine just to fill the coffers of the *ali'i* who were no longer under any traditional constraints (Oliver 1961; Kuykendall and Day 1976). On a stopover in the Kohala district Ellis wrote:

About eleven at night we reached Towaihae [Kawaihae], where we were kindly received by Mr. Young. . . . Before daylight on the 22nd, we were roused by vast multitudes of people passing through the district from Waimea with sandal-wood, which had been cut in the adjacent mountains for Karaimoku, by the people of Waimea, and which the people of Kohala, as far as the north point, had been ordered to bring down to his storehouse on the beach, for the purpose of its being shipped to Oahu. There were between two and three thousand men, carrying each from one to six pieces of sandal-wood, according to their size and weight. It was generally tied on their backs by bands of ti leaves, passed over the shoulders and under the arms, and fastened across their breasts. (Ellis 2004:405-406)

The lack of control of the sandalwood trade was to soon lead to the first Hawaiian national debt as promissory notes and levies were initiated by American traders and enforced by American warships (Oliver 1961). The Hawaiian culture was well on its way towards Western assimilation as industry in Hawai'i went from the sandalwood trade, to a short-lived whaling industry, to the more lucrative, but environmentally destructive sugar industry. The windward portions of North Kohala became a center of sugarcane production, although sugarcane cultivation in Kohala had its origins in prehistory.

Pukui (1983) cites a proverb that reference Kohala. She provides an explanation and notes that Hawaiian proverbs have layers of meaning that are best left to the imagination of the reader:

*I ike 'ia no o Kohala i ka pae kō, a o ka pae kō ia kole ai ka waha.*

One can recognize Kohala by her rows of sugar cane which can make the mouth raw when chewed.

Pukui interprets this proverb as follows:

When one wanted to fight a Kohala warrior, he would have to be a very good warrior to succeed. Kohala men were vigorous, brave, and strong (1983:127).

Sugarcane (*Saccharum officinarum*) was a Polynesian introduction and served a variety of uses. The *kō kea* or white cane was the most common, usually planted near Hawaiian homes for medicinal purposes, and to counteract bad tastes (Handy and Handy. 1972:185). Sugarcane was a snack, condiment, famine food; fed to nursing babies, and helped to strengthen children's teeth by chewing on it (Handy and Handy. 1972:187). It was used to thatch houses when *pili* grass (*Heteropogon contortus*) or *lau hala* (*Pandanus odoratissimus*) were not abundant (Malo 1903). Sugarcane was also used in relation to taro and sweet potato. Handy and Handy. explain:

In wet-taro farming, cane was planted along the embankments separating the flooded terraces and flats. In dry-taro and sweet-potato fields on the sloping *kula* or in the lower forest zone, cane was planted as hedges along the lines of stone and rubbish thrown up between the fields. Thus it helped the planter to utilize to the maximum his soil and water, and acted as a windbreak against the gusty breezes which blow in most valley bottoms, along the coasts, and on the uplands where taro is grown. (Handy and Handy 1972:186)

Sugarcane was grown on all islands, and when Cook arrived he wrote of seeing sugarcane plantations. The Chinese on Lāna'i are credited with producing sugar first, as early as 1802. However, it was not until 1835 that sugar became established commercially, replacing the waning sandalwood industry (Oliver 1961, Kuykendall and Day 1976).

Kohala became a land in transition and eventually a major force in the sugar industry with the arrival of American missionary Elias Bond (KTF 1975). In her comprehensive study of North Kohala, Tomonari-Tuggle relates this transition:

The arrival in 1841 of Elias Bond, of the Protestant American Board of Commissioners for Foreign Missions, to Kohala marked the beginning of a 22-year period of transition in the district's history. In those years a new religion, a new land tenure system, and a changing economy altered the lifestyles and worldview of the indigenous population of the district. The Kohala community was in flux, attempting to find a firm footing in a changing world, in a much larger network of social, political, and economic interactions than had previously existed. (Tomonari-Tuggle 1988:I-23)

When Elias Bond directed his efforts to initiating sugar as a major agricultural industry in Kohala, he could not have foreseen the incredible success of his modest venture. His primary concern was to develop a means for the Hawaiian people of the district to compete successfully in the market economy that had evolved in Hawaii. What resulted was a vigorous, stable, and competitive industry which survived over a century of changing economic situations. For the Hawaiian people, however, the impact was not what Bond anticipated. (Tomonari-Tuggle 1988:I-39)

In 1860 Rev. Bond engaged Samuel N. Castle in founding the Kohala Sugar Company on lands owned by Bond and his neighbor Dr. James Wight. The first crop was harvested in January 1865 (KTF 1975). Kohala's transition was a reflection of what was happening elsewhere in Hawai'i as the sugar industry grew. The industry brought in tens of thousands of laborers from Asia, Europe, the Americas, Oceania, and Africa to work on the many plantations and mills that were being established on all major islands (Oliver 1961). By 1904 six sugar mills were operating in North Kohala (Tomonari-Tuggle 1988:I-40-42). This influx not only radically changed the culture, but also drastically altered agricultural lands and destroyed traditional architectural features in the process. The rise of the sugar industry in North Kohala stimulated the growth of other economic enterprises in the region. A primary harbor was built at Māhukona in the 1880s in order to economically export the raw sugar to market (Wulzen and Goodfellow 1995). By 1883 the Hawaiian Railway Company had laid twenty miles of track along the Kohala coast to carry processed sugar from the mills to the harbor (Tomonari-Tuggle 1988:I-42). By 1906 construction of the Kohala Ditch was completed, bringing a reliable source of water to the sugarcane fields, which were subject to periodic drought (Tomonari-Tuggle 1988:42). The drier leeward portions of Kohala were not suited for cane cultivation and thus became vast pasturelands for grazing cattle.

Prior to the 1880s, the sugar companies hauled their product by ox-cart to landings at Hāpu‘u, Kauhola Point, and Honoipu (Tomonari-Tuggle 1988:42). With the completion of the North Kohala Railroad in 1883, all but one of the sugar companies began shipping the processed sugar to the newly improved Māhukona Harbor facility. The lone exception was the Hāwī Mill and Plantation Company and its two sugar growing subsidiaries, Puakea and Homestead Plantations, started by Robert and John Hind in 1881. The Hāwī Mill, for economic reasons, continued shipping its sugar from Honoipu Landing until 1912 (Tomonari-Tuggle 1988:I-42).

In July of 1880 Samuel G. Wilder, the then Minister of the Interior in the king’s cabinet, was granted a charter of incorporation for the Hawaiian Railway Company. Wilder’s railroad project began with improvements to the harbor at Māhukona including the construction of a storehouse and numerous wharf facilities (Schweitzer 2003). He then hired one hundred Chinese workers and twenty Caucasian supervisors who began laying track in March of 1881. The Chinese workers were paid seventeen dollars a month, and they camped in eight-man tents along the route of the railroad (Schweitzer 2003). By 1883 the railroad had reached its full twenty-mile length, crossing seventeen trestles, and running from Māhukona to Niuli‘i (three *ahupua‘a* southeast of the current study area) (Tomonari-Tuggle 1988:42). In 1884, the railroad carried 20,000 tons of freight and 6,000 passengers (Best 1978:43).

Despite the success of the railroad and the growth of the sugar industry, not all the residents of North Kohala were happy. An 1882 letter from a disgruntled Hawaiian farmer relates that his property was being

...ruthlessly destroyed by railroad overseers of S. G. Wilder. This act is equal to that of plain murder, because the livelihood of myself and my family is reduced to nothing, that is. My plants and that of my family are covered with dirt, the taro, banana, ti leaves, coffee, mango, orange, bamboo, and other plants. My property is filled with fruits, but these days it is reduced to naught. (Conde 1971:40; [in Tomonari-Tuggle 1988:50])

Construction of the Kohala Ditch, which runs in an east/west direction just south of the *mauka*-most study parcel, began in 1904 and was completed two years later. Tomonari-Tuggle notes that, “its construction marked the virtual end of the frontier period; it was the last major effort by the sugar pioneers in fully developing their industry in Kohala” (1988:42). The ditch was conceived of by John Hind who, with the financial help of Sam Parker and the irrigation knowledge of J. T. McCrosson and M. M. O’Shaughnessy, formed the Kohala Ditch Company (Bergin 2004:161). They hired Japanese laborers for wages of seventy-five cents to a dollar and a half a day to construct the twenty-one mile long ditch from the headwaters of the Kohala valleys to Puakea Plantation (in upland Kukuipahu *ahupua‘a*) (Bergin 2004:161). The ditch ran through miles of ridge terrain, valleys, and forty-four tunnels. Seventeen laborers died during the construction of the Kohala Ditch (Schweitzer 2003). The venture was successful, however, carrying twenty million gallons of water a day at the outset, with a projected maximum of seventy million gallons a day, to the sugar fields and ranch lands of North Kohala (Tomonari-Tuggle 1988:I-42).

During the 1940s the global effects of World War II were felt in North Kohala. In 1941 Māhukona Harbor was closed for security reasons (Tomonari-Tuggle 1988:I-59). The railroad continued to operate, hauling unprocessed cane from the fields to the mills, but that too shutdown in October of 1945 (Schweitzer 2003).

### **A Generalized Settlement Model for Windward North Kohala**

Evidence for early occupation of Kohala has been collected from Kapa’anui. Dunn and Rosendahl (1989) recovered radiocarbon samples that potentially date to as early as A.D. 461 (Site 12444). This early date may be related to the establishment of small, short-term camps to exploit seasonal, coastal resources. Data recovered from Māhukona suggest initial occupation there by A.D. 1280 (Burgett and Rosendahl 1993:36). The earliest date range for permanent settlement in Kohala (A.D. 1300) was obtained from Koai‘e, a coastal settlement where subsistence primarily derived from marine resources. According to Tomonari-Tuggle (1988:I-13), these resources were probably supplemented by small-scale agriculture.

The period from A.D. 1300–1500 was characterized by population growth and expanded efforts to increase upland agriculture. Rosendahl (1972) has proposed that settlement at this time was related to seasonal, recurrent occupation in which coastal sites were occupied in the summer to exploit marine resources, and upland sites were occupied during the winter months, with a focus on agriculture. An increasing reliance on agricultural

products may have caused a shift in social networks as well, according to Hommon (1976). Hommon argues that kinship links between coastal settlements disintegrated as those links within the *mauka-makai* settlements expanded to accommodate exchange of agricultural products for marine resources. This shift is believed to have resulted in the establishment of the *ahupua'a* system. The implications of this model include a shift in residential patterns from seasonal, temporary occupation, to permanent dispersed occupation of both coastal and upland areas.

This pattern continued to intensify from A.D. 1500 to Contact (A.D. 1778), and there is evidence that suggests that there were substantial changes to the political system as well. Within Kohala, the Great Wall complex at Koai'e is organized with platforms in the complex apart from contemporaneous features. Griffin et al. (1971) interpret this as symbolizing class stratification. By A.D. 1600, there is island-wide evidence to suggest that growing conflicts between independent chiefdoms were resolved through warfare, culminating in a unified political structure at the district level. It has been suggested that this unification resulted in a partial abandonment of portions of leeward Hawai'i, with people moving to more favorable agricultural areas (Barrera 1971; Schilt and Sinoto 1980).

By the time of contact, numerous coastal villages and extensive dry land and wetland agricultural systems were in place in North Kohala. The *ahupua'a* system of social organization was also firmly established by this time, with wedge-shaped land units extending from the mountains to the sea. The *ahupua'a* were controlled by local chiefs, and were integrated at the district level. Districts were ruled by paramount chiefs through a system of taxation and redistribution. Social stratification was defined by a class separation between the ruling *ali'i* (chiefs) at one end, and the *maka'ainana* (commoners) at the other. Kamehameha I eventually united the Island of Hawai'i, and ultimately all of the Hawaiian Islands, and freely participated in the European-introduced market economy.

Traditional land use patterns saw a rapid shift after the *Māhele* in 1848. At this time, land ownership was defined by grants and awards by the king (Kamehameha III) to the chiefs and other retainers. By 1850 laws were enacted under which commoners could also own land (*kuleana*) if they could prove that they actually occupied those lands. The *Māhele* paved the way for land to be sold to foreigners.

By the mid-19th century, leeward settlement shifted to the windward side of North Kohala as the leeward, agriculturally marginal, areas were abandoned in favor of more productive and wetter sugarcane lands. In addition, native populations were decimated by disease and a depressed birth rate. According to Tomonari-Tuggle (1988:I-37), the remnant leeward population nucleated into a few small coastal communities and dispersed upland settlements. Settlements were no longer based on traditional subsistence patterns, largely because of the loss of access to the full range of necessary resources. At this point most communities were centered on sugar mills and became part of the plantation social hierarchy.

### **Pūehuehu Ahupua'a: The *Māhele* Period**

In 1848, the traditional Hawaiian land tenure system was changed by what is commonly known as the "Māhele". The *Māhele* defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the *konohiki*. As a result of the *Māhele*, all land in the Kingdom of Hawai'i came to be placed in one of three categories: (a) Crown Lands (for the occupant of the throne); (b) Government Lands; and (c) *Konohiki* Lands. Laws enacted at the time of the *Māhele* record that ownership rights to all lands in the kingdom were "subject to the rights of the native tenants;" those individuals who lived on the land and worked it for their subsistence and the welfare of the chiefs (Sinoto and Kelly 1970).

As a result of the *Māhele*, Pūehuehu Ahupua'a was held as Government land. A review of the Waihona 'Āina database reveals that two Land Commission claims were made within Pūehuehu Ahupua'a, neither of which were awarded.

Beginning in the 1850s portions of Pūehuehu Ahupua'a were divided and sold by the government as land grants. One such grant (Grant No. 1544 totaling 487.5 acres) was purchased by M & K Makanoanoa in 1855; all three study parcels seem to fall within the boundary of this former land grant. While the land uses associated with Makanoanoa grant were not discovered, it is likely that the *kula* portions of the grant were used to graze cattle.



### **Pūehuehu Ahupua‘a: Foreign Influences and the Plantation Era**

In 1873 the English born Robert Robson Hind moved to Kohala from Maui to invest in the booming sugar industry. He purchased land in the flat plains of Pūehuehu west of Kohala Sugar Company, although rainfall was less than ideal (Schweitzer 2003), and established the Union Mill. Months prior to formal opening in 1874, a fire broke out destroying the mill. The mill (Figure 4) was rebuilt just in time to harvest and process its first crops. Again in 1878, another fire broke out, destroying the rebuilt mill. Shortly thereafter, Hind sold the mill to James Renton, Daniel Vida, Theo H. Davies & Co., and the brothers Clement (Cecil) and Ralph Sneyd Kynnersley (Schweitzer 2003). These independent growers organized themselves and started the Pūehuehu Plantation Company, and were later joined by the Pūehuehu Agricultural Company in 1910. In 1905, Henry Renton took over management of the mill. Most of the mill’s 280 employees were of Japanese descent. During this time the mill was harvesting 1,260 acres of cultivated sugar. In 1932, the Union Mill was joined with the Niuli‘i Mill and Plantation, under Robert Lindsey. At its peak the mill cultivated three thousand acres, only one-fifth of which was leased (Schweitzer 2003). The Union Mill was purchased by the Kohala Mill in 1937, the cane harvested from the former Union Mill planting fields was then transferred to Hala‘ula for processing .

During the 1930s, the Union Mill had seven camps consisting of approximately 100 houses that the immigrant workers lived in surrounding the Mill (Schweitzer 2003). These camps included the New Camp, Old Camp, Japanese Camp, Puerto Rican Camp, and Haole Camp. Plantations would build and manage stores that would supply canned foods, household goods, and various supplies used by the plantation workers. The Chai Chee Store was operated by Union Mill from 1929 to 1935, Kenichi Hayashi took over and remained open until 1945 (Stevenson 1977). In 1933, the Union Market was opened by Bushita Higa to service the camps surrounding the mill (this structure still remains along the main Highway in Kapa‘au). Nakahara store, W.O. Kim Store, and a pharmacy were located at Union Mill. There was a swimming hole in a pasture near Union Mill as well as a large park that maintained by the plantation and used for recreation purposes for the plantation workers and their families. There was also a movie theater near Union Mill. One of six places in Kohala that had a Portuguese bread oven is located in a pasture below Union Mill subdivision (Stevenson 1977). Pratt Road, which runs from the lower section of ‘Upolu to Niuli‘i, was the main cane hauling road used by the plantations.



Figure 4. One of the earliest known photographs of Union Mill (from Schweitzer 2003:107).

## CURRENT PROJECT EXPECTATIONS

Proposed settlement patterns for the area (Erkelens and Athens 1994) indicate that the *mauka* regions of the north Kohala *ahupua'a* were loci for pondfield (*lo'i*) taro cultivation and associated dense settlement. The coastal *heiau* data also support this predictive model. However, the locations of such activity were dependent on the presence of well-watered gulches; no such topographic features exist within the current project area. Also, given the history of sugarcane cultivation and later residential development specific to the current project area, it is likely that if any Precontact features ever did exist they are no longer extant. Additionally, no resources (landforms, vegetation, etc.) of a traditional cultural nature are expected to exist within the current study area boundary.

## ARCHAEOLOGICAL FIELDWORK

Robert B. Rechtman, Ph. D. and Matthew R. Clark, B.A. conducted a field inspection of all three study parcels on March 11, 2010. Parcel 3-5-4-11:099 is a fenced and fully developed lot with an existing water tank and exposed soil surface (Figure 5), as is Parcel 3-5-4-02:008 (Figure 6). No archaeological resources were observed on either of these parcels. Parcel 3-5-4-02:022 surrounds Parcel 008 and is currently undeveloped with a low ground covering of grasses and weeds (Figure 7) and a small stand of trees on its southern side along Kynnersley Road and the Kohala Ditch (Figure 8). An open water line trench (Figure 9) was present along the western boundary of this parcel. As a result of an intensive pedestrian survey of this parcel, no archaeological resources of any kind were observed on the surface of this parcel or in the open trench. Also, there were no resources (landforms, vegetation, etc.) of a traditional cultural nature observed within any of the study parcels.

## CONCLUSION AND RECOMMENDATIONS

Given the negative findings of the current study, it is concluded that the County of Hawai'i Department of Water Supply Kynnersley Road project will have no effect on any known historic properties. It is therefore recommended that no further historic preservation work or mitigation is needed.



Figure 5. Existing tank on Parcel 3-5-4-11:099, view to the west.



Figure 6. Existing tank on Parcel 3-5-4-02:008, view to the west.



Figure 7. Typical vegetation cover on Parcel 3-5-4-02:022, view to the east.



Figure 8. Parcel 3-5-4-02:022, view to the south, note tree cover in background.



Figure 9. Open trench along the western boundary of Parcel 3-5-4-02:022, view to the northeast.

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**ENVIRONMENTAL ASSESSMENT**

**CONSTRUCTION OF THE KYNNERSLEY NO. 1 RESERVOIR**  
**0.3 MG REPLACEMENT**

**TMKs: (3rd) 5-4-002:008 and 022, and 5-4-011:099**  
**Pūehuehu, North Kohala District, Hawai'i Island, State of Hawai'i**

**APPENDIX 4**  
**Preliminary Geotechnical Letter**



# MEMORANDUM



Hirata & Associates

Geotechnical  
Engineering

Hirata & Associates, Inc.

99-1433 Koaha Pl  
Aiea, HI 96701  
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April 28, 2010  
W.O. 10-4911

**TO:** Jason Inaba  
Inaba Engineering, Inc.  
Email: inabaeng@hawaii.rr.com

**FROM:** Stephen Jo

**RE:** Preliminary Recommendations  
Emergency Tank Repair/Replacement  
Kynnersley Road 0.3 MG Reservoir

## General Description

Our fieldwork for the subject project was completed on April 16, 2010, by drilling two test borings to depths of about 19.5 and 25.5 feet below existing grade. Laboratory testing is still in progress.

## Soil Conditions

The surface soil encountered was classified as mottled brown clayey silt derived from volcanic ash. The clayey silt was in a medium stiff to stiff condition, extending to depths of about 3.5 and 4 feet. Initial laboratory testing of the clayey silt resulted in relatively high in-situ moisture contents and low dry densities. Our past experience also indicates that the clayey silt/volcanic ash is moderately to highly compressible.

Underlying the clayey silt was mottled brown completely weathered basalt. The basalt was in a medium stiff to stiff condition extending to maximum depths drilled.

Neither groundwater nor seepage water was encountered in the borings.

## Preliminary Recommendations

Based on the proposed finish floor elevation and the existing topography of the site, grading will primarily consist of cuts with maximum cut depths of about 2 to 3 feet. As a result, we expect that foundation excavations will expose both the surface clayey silt and the underlying completely weathered basalt. Conventional shallow foundations may be used to support the proposed tank. Due to the poor workability and compressible nature of the onsite clayey silt/volcanic ash, we recommend that the clayey silt beneath the tank footprint be completely removed down to the underlying weathered basalt. Footings may then be founded directly on the medium stiff to stiff weathered basalt. The excavated clayey silt beneath the tank slab should be replaced with granular fill. The upper six inches of granular fill should consist of aggregate base course. The remainder of the fill section should consist of granular structural fill.

- Allowable bearing value = 2,500 psf
- Coefficient of friction = 0.4
- Passive pressure = 300 pcf

Please feel free to call if you have any questions or need any additional information.