WAIAHA WATER SYSTEMS
(TRANSMISSION MAINS AND RESERVOIRS)
NORTH KONA, HAWAII

WAIAHA (NORTH):
TMK (3^{RD}): 7-5-11: 14, 27, 38;
7-5-12: 44, 45, 46, 48
WAIAHA (SOUTH MAUKA):
TMK (3^{RD}): 7-5-16: 15, 16, 17, 29, 88, 89, 90, 91, 92, 93, 94, 95, 102, 103
WAIAHA (SOUTH MAKAI):
TMK (3^{RD}): 7-5-17: 11, 30, 40, 41, 42, 43

DRAFT ENVIRONMENTAL ASSESSMENT

Waiaha Systems, LLC
Waiaha Systems II, LLC

February 2008

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DRAFT ENVIRONMENTAL ASSESSMENT

Prepared for:
Waiaha Systems, LLC
Waiaha Systems II, LLC

Prepared by:
Yukie Ohashi Planning Consultant
PO Box 786
Volcano, Hawaii 96785

February 2008

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1.0 INTRODUCTION

1.1 PROJECT SUMMARY

Project Name: Waiaha Water System (North), Waiaha Water System (South Mauka), and Waiaha Water System (South Makai)
North Kona, Island of Hawaii, Hawaii
Collectively, "Waiaha Water Systems"

Applicant: Waiaha Systems, LLC / Waiaha Systems II, LLC
PO Box 898
Kailua-Kona, Hawaii 96745
Contact: MGMT Corp., Manager

Consultant: Yukie Ohashi
Planning Consultant
PO Box 786
Volcano, HI 96785-0786

Approving Agency: Department of Water Supply
County of Hawaii

Proposed Action: Development of the Waiaha well resource distribution system, including two transmissions mains and three reservoirs, along two routes between Mamahaloa Highway and Hienaloli Road and Mamalahoa Highway and Queen Kaahumanu Highway

Location/District: Kailua-Kona / North Kona District, County and State of Hawaii

Landowner: Various

Affected TMKs:
(North) TMK: 7-5-11: 14, 27, 38; 7-5-12: 44, 45, 46, and 48
(South Mauka) TMK: 7-5-16: 15, 16, 17, 29, 88, 89, 90, 91, 92, 93, 94, 95, 102, and 103
(South Makai) TMK: 7-5-17: 11, 30, 40, 41, 42, and 43

Graded Land Area / Linear Ft: 4.78 acres / 12,670 linear feet (2.41 miles)
(North) 1.88 acres / 4,100 linear feet (0.78 mile)
(South Mauka) 1.45 acres / 4,420 linear feet (0.84 mile)
(South Makai) 1.45 acre / 4,150 linear feet (0.79 mile)

Class of Action: Use of Public Lands (public roadway easements)
Use of Public Funds (for oversizing of project components)

1.2 CHAPTER 343, HRS COMPLIANCE

The Applicant, Waiaha System, LLC and Waiaha System II, LLC, has received the approval of the County of Hawaii Board of Water Supply (Water Board) and formed Agreements with the Water Board to develop the Waiaha Water System (North), and Waiaha Water System (South Mauka and South Makai) – collectively "Waiaha Water Systems". A requirement of both Agreements is the preparation and completion of an Environmental Assessment (EA) pursuant to Chapter 343, Hawaii Revised Statutes and Hawaii Administrative Rules, Title 11, State of Hawaii Department of Health, Chapter 200, Environmental Impact Statement Rules.

The water systems will be designed and constructed with private funds, on privately owned lands. In exchange for the development of the transmission and storage system, the Applicant will receive a total of 1,500 units of water to be used by 2027.

The system will accommodate the parties in the Waiaha System, LLC and Waiaha System II, LLC, and, in addition, the system will be oversized to supplement the overall Department of Water Supply (DWS) North Kona system. The cost to oversize the system will initially be paid by Waiaha System, LLC and Waiaha System II, LLC. The added cost to oversize the system will be paid by the County to Waiaha System, LLC and Waiaha System II, LLC as a reimbursement upon completion; this reimbursement will utilize public funds. Upon its completion the system and the land for the reservoirs will be turned over to the Water Board and dedicated as a public facility.

Construction will also occur within short segments of public roadway easements, primarily for connectivity of the system: Mamalahoa Highway, Hualalai Road, Hienaloli Road, and Queen Kaahumanu Highway.

Triggering actions for Chapter 343, HRS compliance include the following: 1) use of public funds, 2) use of public lands.

This EA describes the proposed water system and its potential impacts.

1.3 IDENTIFICATION OF THE APPLICANT

Since 2004, the Applicant, Waiaha Systems, LLC and Waiaha Systems II, LLC, has been engaged in formal discussion with DWS and the Water Board over its development proposal of the Waiaha Water System transmission and storage facilities. On January 7, 2005 the Water Board officially adopted a Memorandum of Agreement between the Water Board and the Applicant, and, on September 25, 2007, formal Agreements for the Waiaha North and South Water Systems were approved.

The Applicant holds the unique opportunity to assist DWS in the design, development and/or construction of the proposed water system, to connect to the existing DWS system in an expeditious manner within the project area, due to its ownership or control of real property and easements necessary for the water storage and transmission lines and facilities, and /or its agreements with and among its various landowners to mutually develop the proposed system. Tables 1 and 2 below

summarize the Waiaha Systems, LLC and Waiaha Systems II, LLC land parcels and the equivalent number of water units assigned to each parcel.[1]

Table 1. Waiaha Systems, LLC Member Parcels and Allocation of North Water Commitments

TMK Parcels	Number of Water Commitments / Equivalent Units of Water
TMK: (3) 7-5-003: 007, 008, 009	223
TMK: (3) 7-5-010: 066	43
TMK: (3) 7-5-010: 088	6
TMK: (3) 7-5-010: 089	31
TMK: (3) 7-5-011: 014	56
TMK: (3) 7-5-017: 008, 009, 004	99

Table 2.Waiaha Systems II, LLC Member Parcels and Allocation of South Water Commitments

TMK Parcels	Number of Water Commitments / Equivalent Units of Water
TMK: (3) 7-5-003: 005	76
TMK: (3) 7-5-003: 023	50
TMK: (3) 7-5-010: 001	125
TMK: (3) 7-5-010: 013	110
TMK: (3) 7-5-017: 005	170
TMK: (3) 7-5-017: 031, Lot A1 (por.)	12
TMK: (3) 7-5-017: 031, Lot A1 (por.)	22
TMK: (3) 7-5-017: 031, Lot A2	25
TMK: (3) 7-5-017: 040	43
TMK: (3) 7-5-017: 041	44
TMK: (3) 7-5-017: 042	79
TMK: (3) 7-5-017: 043	61
TMK: (3) 7-5-019: 001	225

1.4 PURPOSE OF AND NEED FOR THE PROJECT

The intent of the proposed Waiaha Water System improvements is to transmit the available "upper level" water resource from the existing DWS Waiaha production well and reservoir facility, which was completed in 2006 and is located mauka of the Mamalahoa Highway at the 1,542 ft elevation in the area to the east of the proposed subject water transmission lines. The capacity of this existing well is 2 million gallons per day; however, DWS is currently able to use approximately 25 percent, or half a million gallons per day due to limitations in the existing transmission system.

[1] The Agreements allow the following, water commitments (including any credits towards DWS facilities charges) to remain appurtenant to, and run with the land of the original TMK parcel(s) within the Lands as described in the Agreements, and to successors and assigns in interest to the original TMK parcels. If the original TMK parcels are consolidated with any contiguous parcel, the water commitments may be applied to development on the consolidated parcel without consent or approval by DWS or the Water Board. The Agreements further state that with the prior written consent of the Water Board and DWS, the water commitments granted herein may be assigned to other parcels described within the Lands in Exhibit "A", subject to any and all improvements that may be required by DWS.

As proposed by the Applicant, new water transmission lines and tanks would efficiently transmit the remaining available 75 percent of the water by gravity-flow and would augment the North Kona water supply through two mauka-makai corridors into the high consumption North Kona makai water distribution system. This would provide DWS with greater flexibility in water management and would implement improvement provisions as stated in the 20-Year Master Plan (R.W. Beck, 2006).[2] The Master Plan provides a long-range planning tool that guides the development of the DWS's water service areas and the use of its resources.

The Master Plan identifies the North Kona water system as the highest metered water consumption area due to the area's numerous resort and community areas. Additional growth is anticipated in the next 20 years. Moreover, the Master Plan cautions that "… potential water quality issues can arise with the overuse of the Kahaluu shaft-based water supply sources… ."

DWS has determined that these improvements, as proposed by Waiaha Systems, LLC and Waiaha Systems II, LLC, are necessary to reduce pumping on the Kahaluu System wells which are located approximately three to four miles to the south of the Waiaha project area. The transmission of water from the DWS Waiaha upper-level production well into the North Kona water system is necessary to alleviate the current rate of pumping of the Kahaluu shaft which has resulted in a diminishing supply and may be contributing to reduced water quality.[3]

The Agreements between the Water Board and the Applicant allow the DWS's Waiaha resource to be efficiently added to the North Kona water system to serve the overall North Kona community, and including the lands owned or managed by the member parties of Waiaha System, LLC and Waiaha System II, LLC.

The proposed development of the Waiaha improvements presents a unique opportunity whereby easements on private property and the funding source will be secured by the Applicant. The Applicant has the ability to expedite development within a two year period. In contrast, implementation by DWS would be over a much longer time period to fund the project through the CIP, obtain easements from multiple landowners, and procure services for design and construction.

1.5 AGENCIES CONSULTED

The following agencies or agency documents were consulted in the process of preparing the environmental assessment:

- *County of Hawaii*
  Planning Department
  Department of Public Works
  Department of Water Supply

[2] R.W. Beck, Inc. (June 2006) *20-Year Water Master Plan*. Prepared for the County of Hawaii Department of Water Supply.
[3] Bauer, Glen (2003) A Study of the Ground-water Conditions in North and South Kona and South Kohala Districts, Island of Hawaii 1991-2002. Prepared for the State of Hawaii Commission on Water Resource Management.

1.6 COMMUNITY INTERACTION

Since conceptual inception of the project, the Applicant (and/or its representatives) has followed all procedures established by DWS and the Water Board, including participation in open forum meetings.

The existing utility easements for the North and South alignments traverse numerous properties. All affected property owners have been notified by mail of the Water Board's approval of the Waiaha Water Systems Agreements and the preparation of the environmental assessment.

Through the Chapter 343, HRS process, public comments will be solicited and all inquiries will be addressed.

2.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed project described herein is defined as the Waiaha Water System (North), Waiaha Water System (South Mauka), and Waiaha Water System (South Makai). The North and South systems consist of transmission mains and storage tanks or reservoirs. Collectively, all components are called the "Waiaha Water Systems".

2.1 PROJECT LOCATION / PROJECT LANDS

The project area generally encompasses land which is bounded by Keaolani Drive to the north and Hualalai Road to the south, and Mamalahoa Highway to the East and Queen Kaahumanu Highway to the west at North Kona, Hawaii (the "project area"). The area includes several ahupuaa, including Hienaloli, Auhaukeae, Puaa 1, Puaa 2-3, Waiaha 1-2, Kahului 1-2, and Puapuaa 1 (Figure 1).

The transmission lines and reservoir sites are mainly along existing private roadways and undeveloped land in private ownership as shown in Table 3 and Figures 2A, 2B and 3A, 3B.

Table 3. Affected TMK Parcels

TMK Parcel
North
7-5-11: 14
7-5-11: 27
7-5-11: 38
7-5-12: 44, 45, 46
7-5-12: 48
South Mauka
7-5-16: 15, 16,17, 88, 89, 90, 91, 92, 93, 94, 95
7-5-16: 29
7-5-16: 102
7-5-16: 103
South Makai
7-5-17: 11
7-5-17: 30
7-5-17: 40
7-5-17: 41
7-5-17: 42
7-5-17: 43

Waterline Easements within each affected parcel have been obtained and will be granted in favor of DWS at the time of dedication to the County of Hawaii. Likewise, the three reservoir sites, each consisting of 0.42 acre, will be conveyed to the Water Board, also at the time of dedication.

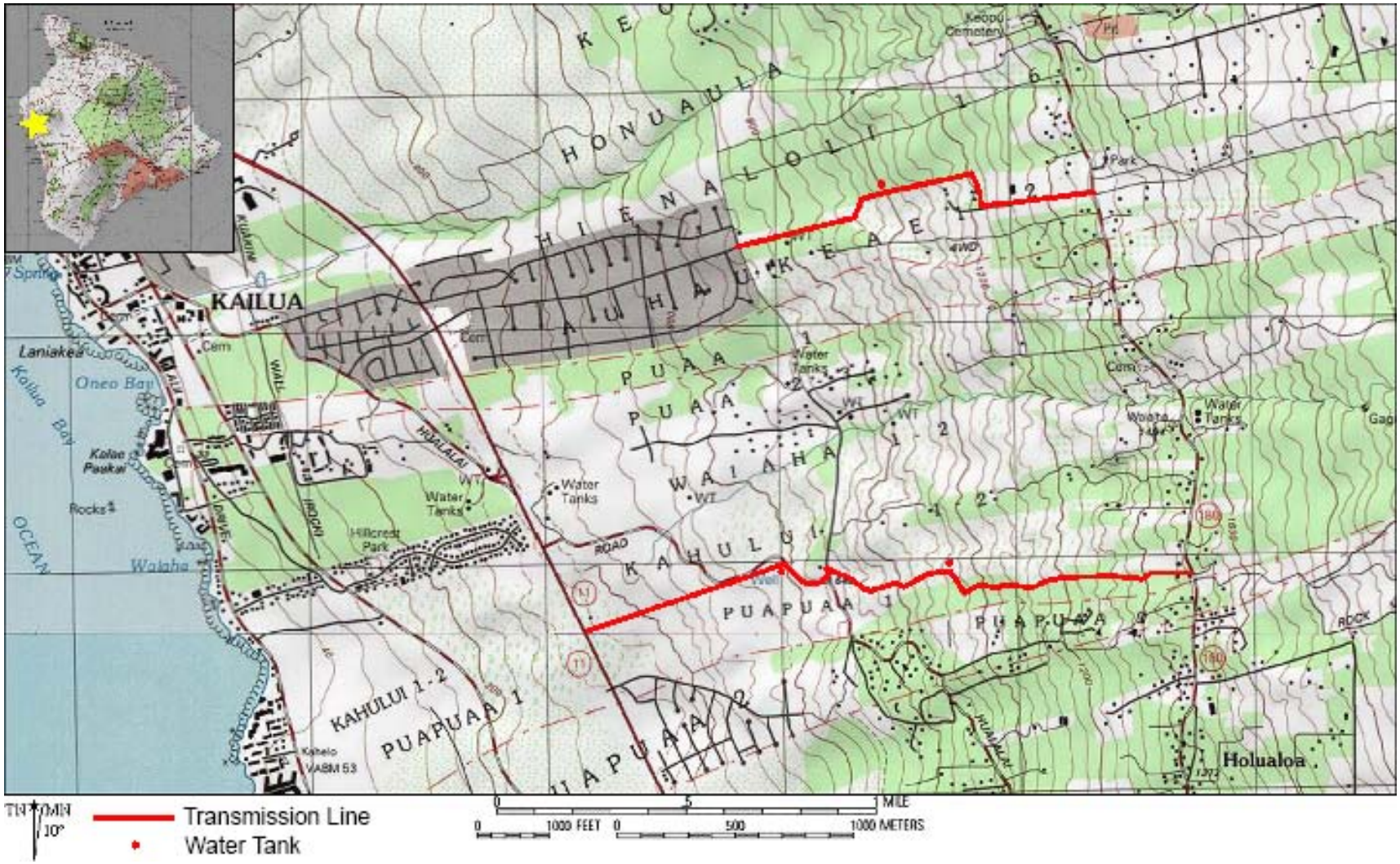


FIGURE 1

Waiaha Water Systems
Location Map

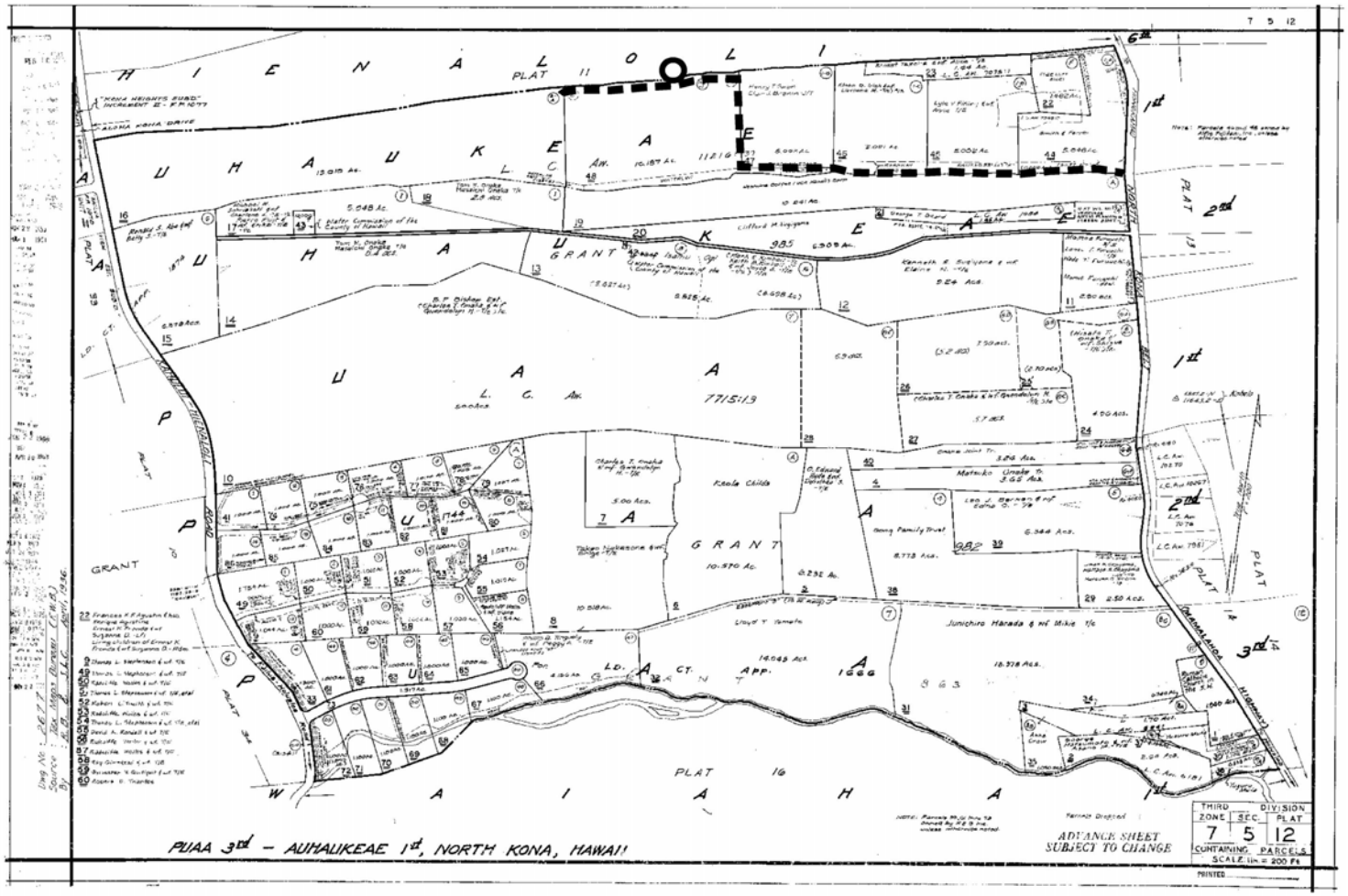
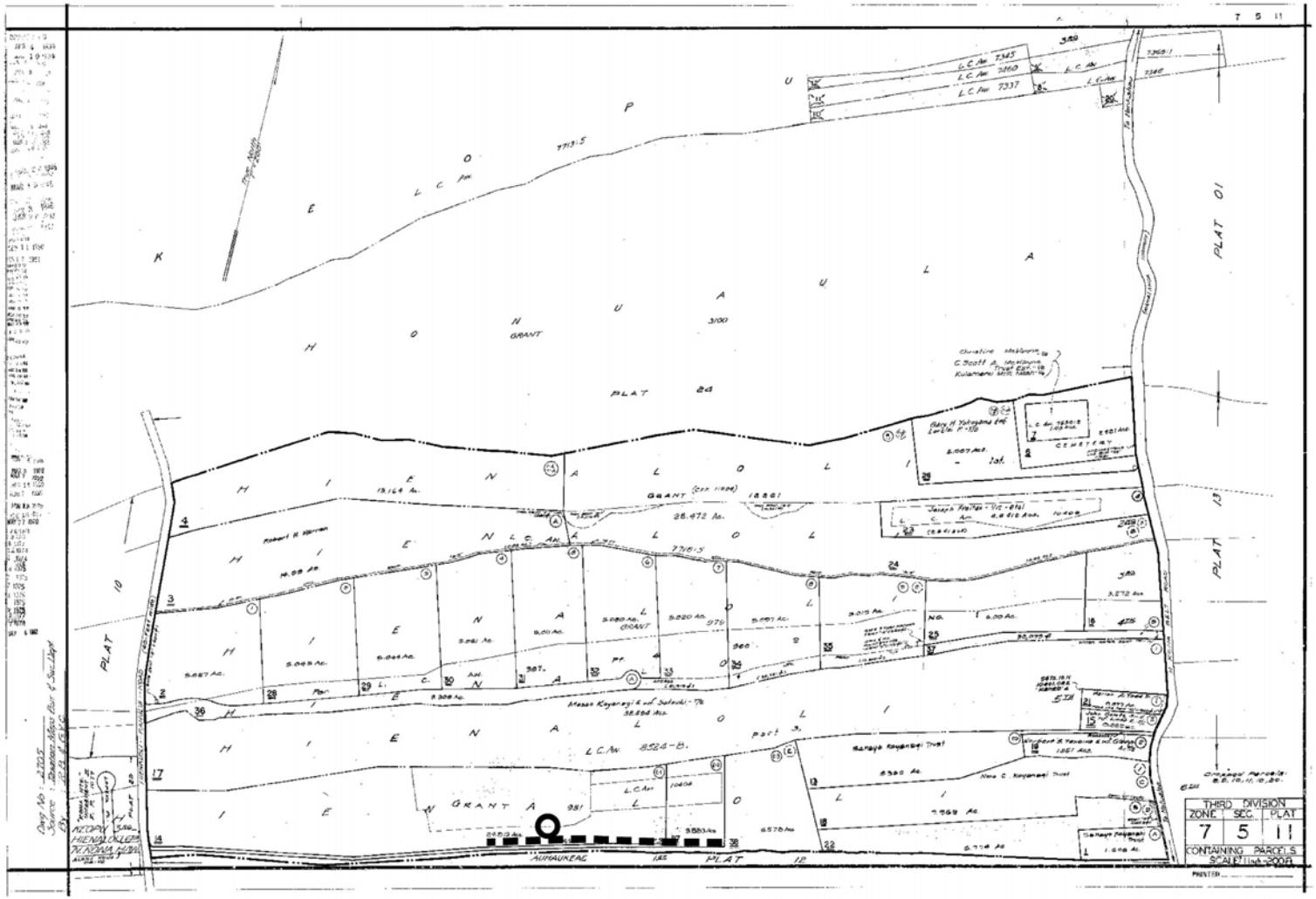


FIGURE 2A

Waiaha Water Systems
North Alignment - TMK



Transmission Line

Water Tank

FIGURE 2B

Waiaha Water System

North Alignment - TMK

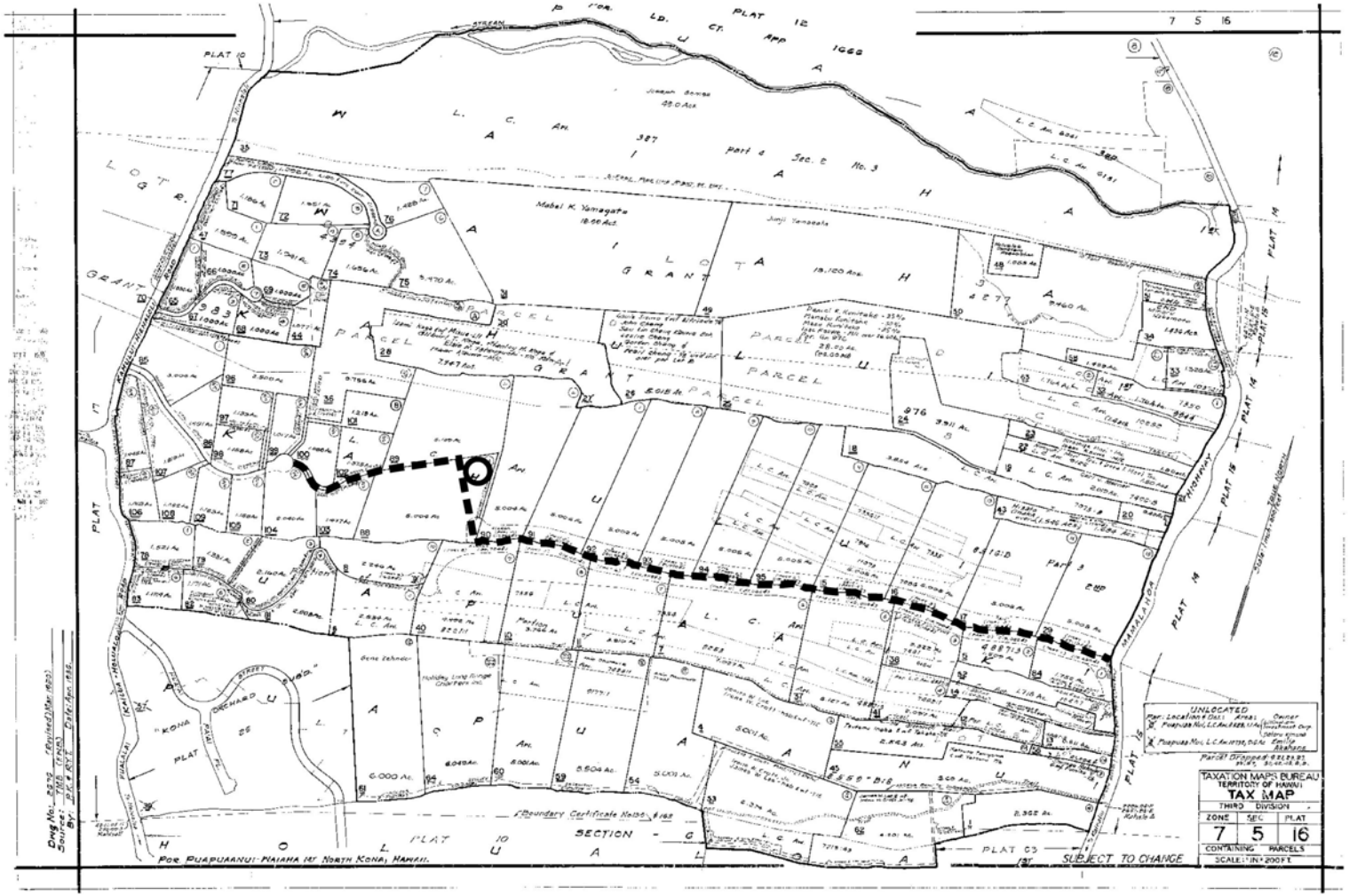


FIGURE 3A

Waiaha Water Systems
South Mauka Alignment - TMK

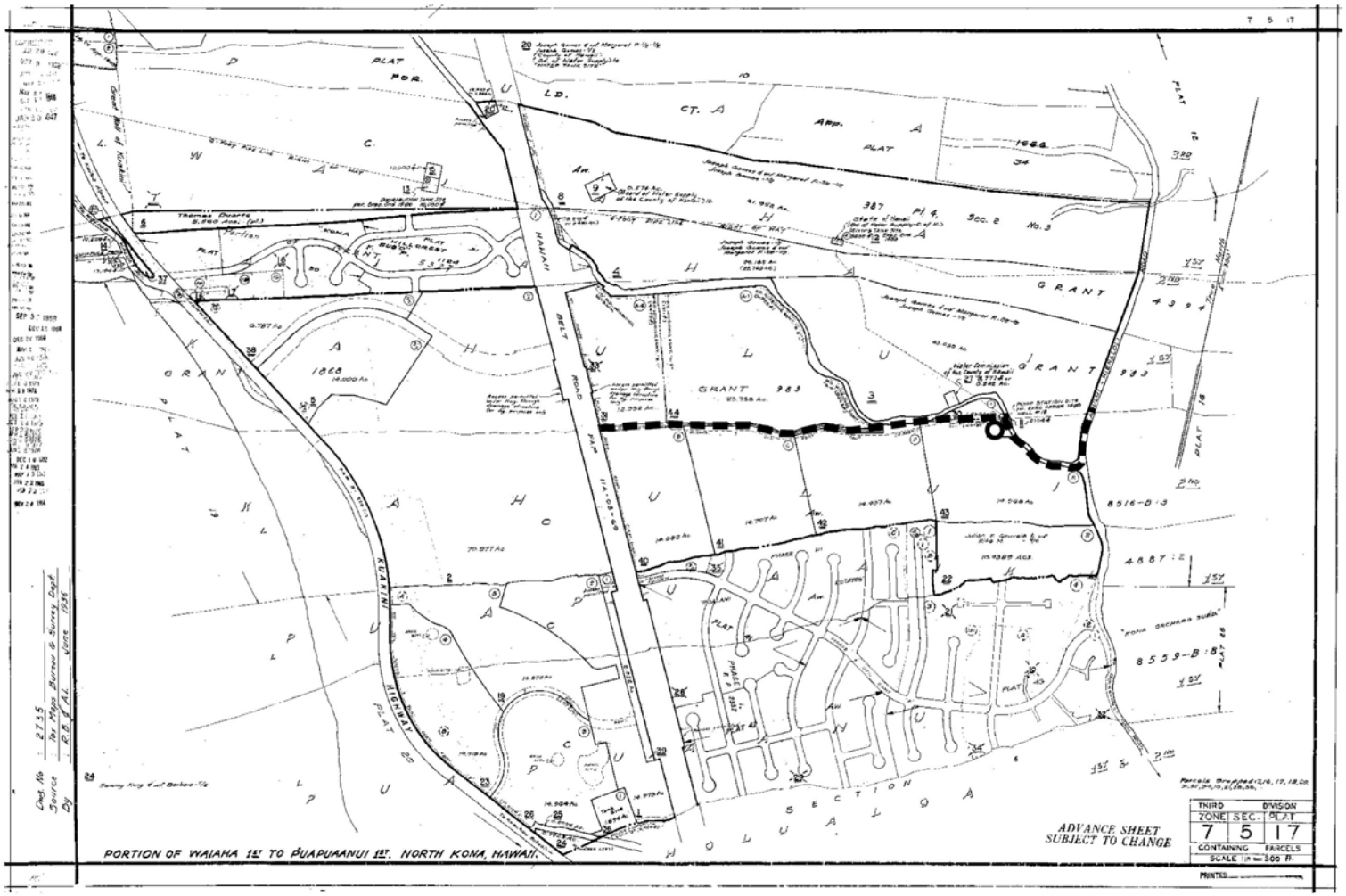


FIGURE 3B

Waiaha Water Systems
South Makai Alignment - TMK

2.2 SURROUNDING USES

The project area is a mile to two miles east southeast of Kailua Town. Land use in the project area consists of residential subdivisions, agricultural uses and pastures, and formerly grazed vacant land.

2.3 EXISTING CONDITIONS

Photographs shown in Figures 4A – 4B depict the alignment routes and the surrounding area.

North: The North system starts at Mamalahoa Highway along the private unnamed access road to the UCC property, and then traverses through undeveloped land along dirt roadways to Hienaloli Road.

South Mauka: The South Mauka system starts at Mamalahoa Highway at Kalipa Place through the existing Iokepa Estates subdivision and connects to an existing system at Pu Hoaloha Place which connects to the DWS main within Hienaloli Road.

South Makai: The South Makai system will connect at the Hienaloli Road and Pu Hoaloha Place main, traverse the Hualalai Road and Hienaloli intersection and run down Hualalai Road for approximately 800 feet. The remaining distance of ½ mile is through vacant formerly grazed pasture land.

2.4 PROJECT DESCRIPTION

The existing DWS Waiaha production potable water well has a capacity of two million gallons per day, however, at the present time, only 25 percent of the available water is utilized due to a lack of transmission lines. The proposed project will allow use of the remaining 75 percent of the water by constructing two new transmission lines and storage tanks to the high demand lower elevation areas of North Kona.

The Applicant has designed and proposes to construct a potable water system that meets DWS standards to serve lands controlled or managed by the Applicant as well as other properties in the North Kona water system.

The proposed water system is intended to be a public facility, and upon final inspection and approval, will be dedicated to the Water Board, including any and all appurtenant interests in real estate for the reservoirs, transmission and distribution infrastructure, via warranty deed, free and clear of all liens and encumbrances, at no cost to DWS and the Water Board (except for oversizing, as described in the paragraph below).

At the request of DWS, the Applicant has agreed to oversize the facilities to accommodate lands other than what is owned or controlled by the Applicant. This will be in accordance with Rule 4-2(2) and 4-2(3) of the Rules and Regulations of the Department of Water Supply to serve property not parties to the Waiaha System, LLC and Waiaha System II, LLC. The oversizing requirements have been determined by DWS and the cost for the oversizing will be reimbursed to the Applicant by DWS upon dedication.

1. 

2. 

3. 

4. 

5. 

Photo 1. The North transmission line alignment begins at Mamalahoa Highway at an unnamed private access road to the UCC property. The utility easement is along the south side of the paved road (left side of photo). View is mauka to makai.
Photo 2. The easement continues makai along older pavement (left side of photo).
Photo 3. The transmission line will turn to the north and run along the east side of a dirt road (right side of photo).
Photo 4. The transmission line again turns west (or makai) along a dirt road and continues on to Hienaloli Road. Easement is on the south side (Left side of photo).
Photo 5. View of the graded water tank site.

FIGURE 4A

Waiaha Water Systems
North Alignment – Site Photographs

6. 

7. 

8. 

9. 

10. 

11. 

Photo 6. The South Mauka transmission line alignment begins at Mamalahoa highway at Kalipa Place through the existing Iokepa Estates subdivision and connects to an existing system at Pu Hoaloha Place which connects to the DWS main within Hienaloli Road. The utility easement is along the south side of the paved road (left side of photo). View is mauka to makai.
Photo 7. The South Makai system will connect at the Hienaloli Road and Pu Hoaloha Place main, traverse the Hualalai Road and Hienaloli intersection and run down Hualalai Road for approximately 800 feet. The remaining distance of ½ mile is through vacant formerly grazed pasture land.
Photo 8. The South Makai transmission line along a portion of Hualalai Road. View is mauka to makai.
Photos 9 and10. Views of pasture land along the alignment.
Photo11. Cattle ranching era rock walls are present along portions of the South Makai alignment.

FIGURE 4B

Waiaha Water Systems
South Alignment – Site Photographs

The new 16-inch water transmission mains would be installed underground with a 15-ft wide waterline easement and 10-ft wide paved access road over them. The new reservoir sites would have asphalt concrete pavement driveways; perimeter fencing and appurtenances; and associated water mains to connect the reservoirs to the water distribution system. In general, trenches will be 24 to 36 inches by four feet deep (Figure 5).

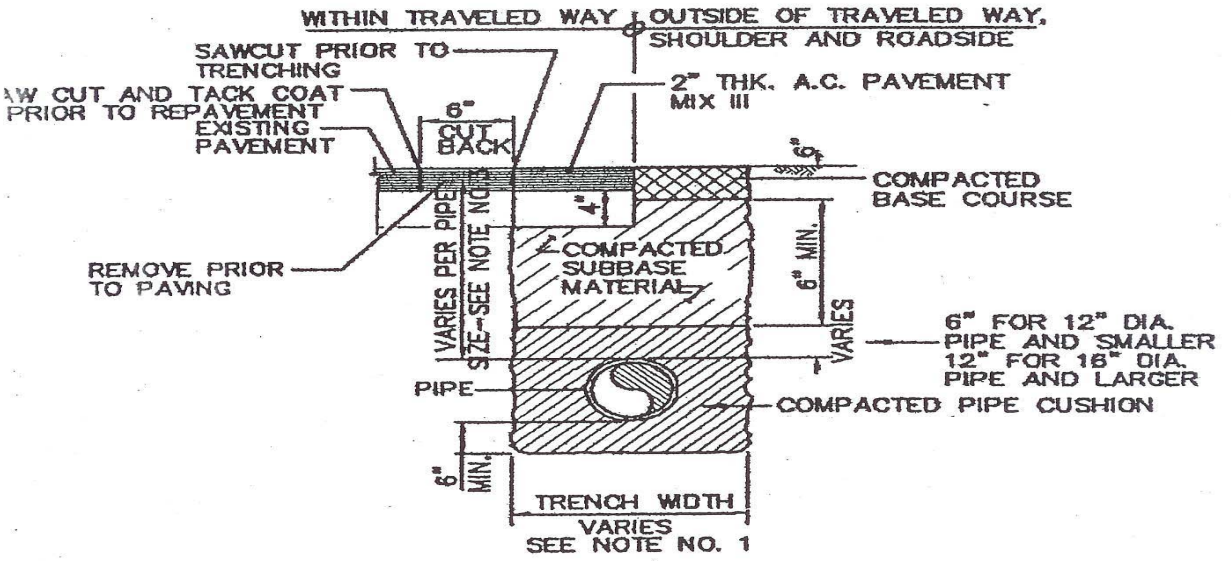


FIGURE 5
Waiaha Water Systems
Trench Section

North alignment. The proposed north route runs from Mamalahoa Highway (Highway 180, County roadway), down an unnamed paved one lane private road (address is 75-5564 Mamalahoa Hwy), which becomes unpaved and takes a jog to the north and then continues west to Hienaloli Road.

South alignment. The proposed south route (mauka and makai) runs from Mamalahoa Highway (Highway 180, County roadway), down Kalipa Place, a private roadway through the Iokepa Estates Subdivision, and connects to Hualalai Road (County roadway), and finally through private undeveloped land and terminates at Queen Kaahumanu Highway (Hwy 19, State roadway).

Table 4. Project Components

Component	Linear Feet	Reservoir
North	4,100	One 1-MG tank
South Mauka	4,420	One 1-MG tank
South Makai	4,150	One 1-MG tank

2.5 PROJECT SCHEDULE AND COST

The construction is expected to occur upon receipt of all required permits and will be completed within two years. The anticipated total cost of development of the North alignment is $4.1 million, the South Mauka alignment is $4.87 million, and South Makai alignment is $4.52 million, for a total of $13.5 million. The cost to upgrade the system to serve the overall North Kona community is approximately 31 percent of the total cost. Included in the cost of the reservoir (or tank) sites is 0.42 acre of land for each tank, which will become County of Hawaii property upon the dedication of the facilities.

Table 5. Project Costs

	Waiaha System **12-inch Pipe** **Tank & Site**	**Oversize Cost** **16-inch Pipe** **1 M Gal Tank & Site**	**Difference to Upgrade**
North			
Construction Cost: 4,100 L.F.	1,064,874	1,659,374	594,500
Reservoir	(500,000 gallon) 1,760,000	2,450,000	690,000
Subtotal	**2,824,874**	**4,109,374**	**1,284,500**
South Mauka			
Construction Cost: 4,420 L.F.	1,813,026	2,418,283	605,257
Reservoir	(500,000 gallons) 1,760,000	2,450,000	690,000
Subtotal	**3,573,026**	**4,868,283**	**1,295,257**
South Makai			
Construction Cost: 4,150 L.F.	1,420,593	2,022,343	601,750
Reservoir	(100,000 gallon) 1,465,000	2,500,000	1,035,000
Subtotal	**2,885,593**	**4,522,343**	**1,636,750**
PROJECT TOTALS	**9,283,493**	**13,500,000**	**4,216,507**

2.6 REGULATORY REQUIREMENTS

2.6.1 Chapter 343, Hawaii Revised Statutes Compliance

This environmental assessment process is being conducted in accordance with Chapter 343, Hawaii Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, Hawaii Administrative Rules (HAR), is the basis for the environmental impact review process in Hawaii. 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 the thirteen specific criteria. Section 5 of this report states that anticipated finding of no significant impacts are expected to occur, and discusses each criteria and presents the preliminary findings for each. If, after considering comments to the Draft EA, DWS, the approving agency, concludes that no significant impacts would be expected to occur, a FONSI determination would be issued, and the action will be permitted to occur. If DWS concludes that significant impacts are expected to occur as a result of the proposed action, and an environmental impact statement (EIS) would be required, and may be prepared at the sole discretion of the Applicant.

The use of public lands and funds are criteria for Chapter 343, HRS compliance. Although the proposed system will be developed on private lands, tie-ins to existing waterlines within Mamalahoa Highway, Hienaloli Road, and Queen Kaahumanu Highway will be necessary. The Applicant will fund the development privately, but will be reimbursed by the County for the over-sizing of the project upon dedication.

2.6.2 Land Use Designations

The land use designations of the project area are summarized in Table 6.

Table 6. Land Use Designations for the Project Area

	Land Use Designation
State Land Use	Agricultural
County General Plan	Urban Expansion, Important Agricultural Land
County Zoning	Agriculture (A-5a, A-1a)
Special Management Area	Project area is not in the SMA

2.6.3 State and County Permits and Approvals

The processing of State and County permits are prerequisites to construction, as shown in Table 7. Private and public utilities (including water system improvements) are permitted within any zoning district.[4]

[4] Hawaii County Zoning Code, Section 25-4-11

Table 7. Required State and County Permits and Approvals

Permit or Approval	Authority	Approving Agency
State of Hawaii		
State Historic Sites Compliance	Chapter 6E, HRS	State Historic Preservation Division
National Pollutant Discharge Elimination System (NPDES) Permit	Clean Water Act, Section 402, NPDES	State Department of Health
Right-of-Way work approval	(Rights of Way Department)	State Department of Transportation
County of Hawaii		
Grading Permit, Permit to construct within a ROW	Hawaii County Code, Chapter 10	Department of Public Works
Building Permit (including DOH wastewater permit, water collection system approval)	Hawaii County Code, Chapter 5	Building Division, Department of Public Works

2.6.4 Consistency with Government Plans and Policies

2.6.4.1 Hawaii State Plan and Land Use District

The Hawaii State Plan was adopted in 1978 and last revised in 1991 (Hawaii Revised Statutes, Chapter 26, as amended). The Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-range growth and development activities. The three themes that express the basic purpose of the Hawaii 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 improving water service for the North Kona District.

The project is within the State Land Use Agricultural district. Water system improvements are permitted uses within this district.

2.6.4.2 Hawaii County General Plan and Zoning

The General Plan for the County of Hawaii is a policy document expressing the broad goals and policies for the long-range development of the island of Hawaii. The General Plan was revised and adopted in 2005. The Plan is organized into 13 elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to each of the nine judicial districts comprising the County of Hawaii. Most relevant to the proposed project is the following goal and standard:

J. Public Facilities (1) Water Policies:
   - Water system improvements shall correlate with the County's desired land use pattern.
   - Improve and replace inadequate systems.

Courses of Action: North Kona: Public Facilities: Water
Continue to evaluate growth conditions to coordinate improvements as required to the existing water system in accordance with the North Kona Water System Master Plan.

The proposed project satisfies relevant goals, objectives, and courses of action related to water systems in the North Kona District.

The Hawaii 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 facilities and safety features, and transportation corridors. The North and South alignments traverses Urban Expansion and Important Agricultural Land areas in the LUPAG.[5]

The proposed Waiaha water system is consistent with the General Plan.

Hawaii County Zoning. The county zoning districts for the properties in the project include Agriculture A-5a and A-1a (5-acres and 1-acre minimum).

The proposed project is a permitted use within these districts. None of the properties that constitute the project are in the Special Management Area (SMA).

[5] General Plan LUPAG map.

3.0 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

3.1 PHYSICAL CHARACTERISTICS

The transmission routes and the reservoir sites are referred to as the "project site". The term "project area" is used to describe the general environs of the area between the two transmission line alignments to the north and south and Mamalahoa Highway (to the west) and Queen Kaahumanu Highway (to the east).

3.1.1 Climate

Setting

Located on the western leeward coast of the island of Hawaii, the project area is between the 200 ft and 1,500 ft elevations, thus the microclimate of each area varies. Generally, temperatures of the project area are moderate, ranging from winter lows in the 60's to summer highs in the 80's at the higher elevations, and, at the lower elevations the winter lows are in the 70's and summer highs in the higher 80's.

Rainfall patterns are also seasonal, drier in the winter months (November being the driest), with most rain falling during the summer months (generally, June). Annual rainfall amounts in inches range from the mid-50's to low-60's. Tradewind patterns are predominantly from the northeast (University of Hawaii at Hilo, 1998).

Impacts and Mitigation Measures

The project will not have any effect on the microclimate of the area.

3.1.2 Geology

Setting

Geologically, the project area consists of 3,000 year old lava flows from Hualalai Volcano which last erupted in 1800-1801 (Moore and Trusdell 1991, and Wolf and Morris 1996).

The island of Hawaii is associated with volcanic eruptions and earthquakes. The US Geological Survey (USGS) has developed Lava-Flow Hazard Zones with a numerical rating of 1 to 9 (Zone 1 has the most severe hazard).[6] The volcanic hazard zone of the general area and the subject property is Zone 4 which is associated with Mt. Hualalai. Approximately 5 percent of the land area in Zone 4 has been covered by lava since 1800, and 15 percent has been covered by lava in the last 750 years. Hualalai's flanks do not have a distinctly lower hazard than its rift zones because the distance from the vents to the coast is short and the slopes are steep. Hualalai erupts less often than Kilauea and Mauna

[6] Heliker, C. Volcanic and Seismic Hazards on the Island of Hawaii, U.S. Geological Survey, 1991.

Loa, but flows typically cover large areas. Other direct hazards from eruptions, such as tephra fallout and ground cracking and settling, tend to be the greatest in the areas of highest hazard from lava flows.

Impacts and Mitigation Measures

The construction of the project will not exacerbate any hazard conditions. The project will be constructed in accordance with County requirements for specific hazards, including seismic tremors and will comply with the Uniform Building Code adopted by the County of Hawaii. The water tanks are designed in accordance with applicable American Water Works Association and American Concrete Institute standards for Seismic Zone 3, as well as all applicable County Building Department requirements. The wall of each tank will be steel wired with seismic cables.

3.1.3 Topography and Soils

The topography of the Site is uneven terrain with elevations ranging from 200 ft at Queen Kaahumanu Highway to 800 ft at Hienaloli Road to 1,500 ft at Mamalahoa Highway. The vegetation of most of the project area has been extensively modified for roadways, house sites, farming, and ranching activities. The project site is along existing roadways or vacant agricultural lands.

The natural soils along the North and South alignments are of the Kainaliu and Punaluu series. However, for those segments of the alignments along existing roadways, the soils are composed of fill material. The following descriptions are from the *Soil Survey of the Island of Hawaii* (Sato, et al. 1973)[7].

North Alignment: Kainaliu extremely stony clay loam (KEC), 12 to 20 percent slopes. The Kainaliu series consists of well-drained silty clay loams that formed in volcanic ash. These are moderately sloping to moderately steep soils on uplands at an elevation ranging from 800 to 1,200 feet. The annual rainfall is 40 to 60 inches, and most of it falls during the summer months. The mean annual soil temperature is between 71° and 73° F. The natural vegetation consists of guava, lantana, koa haole, and guinea grass. These soils and Honuaulu, Kaimu, Punaluu, and Waiaha soils are in the same general area. This soil is at low elevations on Mauna Loa and Hualalai. In a representative profile the surface layer is very dark brown extremely stony silty clay loam about 10 inches thick. The subsoil consists of dark-brown very stony silty clay loam and silt loam. It is about 16 inches thick and is underlain by fragmental a‘a lava. The surface layer is medium acid, and the subsoil is neutral. Kainaliu soils are used mostly for pasture, coffee, and macadamia nuts. A small acreage is used for truck crops.

South Alignment: Punaluu extremely rocky peat (rPYD), 6 to 20 percent slopes. The Punaluu series consists of well-drained, thin organic soils over pahoehoe lava bedrock. These soils are gently sloping to moderately steep. They are on uplands at an elevation ranging from near sea level to 1,000 feet and receive from 60 to 90 inches of rainfall annually. The mean annual soil temperature is between 72° and 74° F. The natural vegetation consists of koa haole, Christmas berry, guinea grass, natal redtop, and sand bur. These soils and Kaalualu, Kaimu, Kainaliu, Malama, Pakini, and Waiaha soils are in the same general area. Punaluu soils are used for pasture.

[7] http://www.ctahr.hawaii.edu/soilsurvey/Hawaii/hawaii.htm

Impacts and Mitigation Measures

The transmission line alignments will generally be beneath existing roadbeds or roadway shoulders; thus, trenching will likely be in roadway fill material. At the vacant parcels, the topographic and soil conditions impose no constraints on the installation and operation of the water system.

During construction and until any open exposed soil surfaces are stabilized with vegetation, erosion control measures will be taken, including the installation of a silt curtains or sand bags at the makai boundary.

3.1.4 Hydrology

The hydrologic conditions for the project area have been described in detail in the Final EA for the *Waiaha Production Well and Reservoir* (Planning Solutions 2003)[8] which describes the water source which will feed into the proposed transmission system.

Setting

Surface Water. Surface water in the vicinity of the project is limited to the intermittent Waiaha Stream which is classified as Class 2 Inland Waters (DOH 2000b). There are no wetland conditions along the alignments of the proposed transmission lines and reservoir sites.

Flooding. Waiaha Stream traverses the project area between the North and South transmission lines and terminates on vacant land near the Hualalai Road and Queen Kaahumanu Highway intersection. The area of the project near Queen Kaahumanu Highway is designated as Zone "X" and "AE" by the Federal Emergency Management Agency, Flood Insurance Rate Map, Community-Panel Number 155166 0713 D, Map Revised Date: May 16, 1994. Zone X consists of areas that are outside the 500-year flood plain. Zone AE consists of areas where base flood elevations have been determined.

Ground Water. The project area overlies the Keauhou Aquifer System of the Hualalai Sector. The State Commission on Water Resource Management (CWRM) has determined that the Keauhou System has a sustainable yield of 38 million gallons per day (MGD), while the entire Hualalai Sector sustainable yield is 56 million gallons per day (MGD) (CWRM 1995 in Planning Solutions 2003).

The DWS system for Kona can be divided into the North Kona and South Kona systems. These systems are interconnected, and it is possible to transport water from one system to the other. However, this is done only during emergencies and on a very limited basis. The Kahaluu wells and shaft currently provide the bulk of the water for the North Kona system. The present average water usage is 8.5 MGD.

Impacts and Mitigation Measures

Construction Phase Impacts: Installation of the new transmission mains along the 0.78 mile North and 1.63 miles South segments, and the three 1 MG gallon tanks will cause minimal changes to

[8] Waiaha Production Well and Reservoir Final Environmental Assessment, April 2003, Prepared for the Department of Water Supply, County of Hawaii, by Planning Solutions.

impermeable surfaces and only marginally reduce storm water runoff. Storm water drainage will essentially be unchanged and will not alter the existing drainage patterns. Use of sand bags and other sediment containing devices will be utilized for erosion control at open trenches.

Impacts on Surface Waters: Waiaha Stream is in the vicinity of the project, traversing between the North and South transmission lines. At the location of the South Makai alignment, stream flow is through a culvert at Hualalai Road and onto the vacant parcels near Queen Kaahumanu Highway. Construction in this area will be during the dry months. The installation of the transmission lines is not expected to affect the stream.

Impacts on Groundwater: The installation of the transmission lines and reservoirs near or at the ground surface will have no effect on groundwater. These facilities will transport the available high-level water resource (from the underlying aquifer) into the DWS system. Moreover, the infusion of the Waiaha well water into the North Kona water system will reduce pumpage of the Kahaluu shaft which is currently over-pumped.

3.1.5 Botanical Resources

Setting

A botanical survey of the project site was conducted and is attached as Appendix A.[9] Both the North and South alignments and the Water Tank sites are in areas that have been greatly altered by past human activities.

North Alignment

Approximately half of the North alignment is along a well manicured roadway with sides which are grassed and mechanically tended. The remaining portions consist of roadside herbaceous vegetation common to the leeward side such as Guinea grass (*Panicum maximum*), kikuyu grass (*Pennisetum clandestinum*), and California grass (*Brachiaria mutica*).

South Mauka Alignment – Between Mamalahoa Highway and Hienaloli Road

The South Mauka alignment follows two private residential subdivision paved roadways. The vegetation on the roadside is mechanically cleared and poisoned. The vegetation in the vacant areas consist of exotic species such as buffalo grass (*Pennisetum purpureum*), false mallow (*Malvastrum coromandelianum)* and Guinea grass.

South Makai Alignment – Between Hienaloli Road and Queen Kaahumanu Highway

The dominant vegetation in the pastureland is Guinea grass with other species of plants found on or next to the rock wall. One native plant, *Peperomia leptostachya*, was found. This species was seen in two separate discrete populations, growing alongside or on rock walls. This commonly found species has been collected and identified in other areas along the Queen Kaahumanu Highway. Other

[9] Yoshida, L., Flora of the Waiaha Water Systems Project Area

indigenous species located within the study site are weedy species such as uhaloa (*Waltheria indica*), morning glory (*Ipomoea indica*), Huehue (*Cocculus trilobus*), and Popolo (*Solanum americanum*).

Water Tank Sites. Three sites have been mechanically cleared in preparation for the construction of water tanks along the proposed pipeline. The vegetation reflects aggressive weedy species.

Rare, Threatened, or Endangered Species. The study area does not contain any rare, threatened, or endangered plants as listed under Federal or State of Hawaii regulations.

Impacts and Mitigation Measures

Construction of the project will involve trenching within existing roadways (or shoulders of roadways) with the exception of the South Makai segment which is through pastureland. The plants that constitute the area are generally weedy roadside exotic species and introduced landscape plants, with a few commonly found native species. The native plants include pepperomia, uhaloa, Huehue, and popolo which are commonly found in the Kona landscape. The affected area is not habitat for any rare, threatened, or endangered species, and will therefore, have no substantial impacts on the flora of the project area.

3.1.6 Wildlife Resources

Setting

The natural vegetation of the project area has been altered over many decades and does not contain habitat suitable for native wildlife species.

Commonly found species that occur within the Kailua-Kona area are also found in the project area. These include rodents, mongoose, and feral cats. Commonly found bird species include the zebra dove (*Geopelia striata*), spotted dove (*Streptopelia chinensis*), rock doves (*Columba livis*), nutmeg manikin (*Lonchura punctulata*), house finch (*Carpodacus mexicanus*), English sparrow (*Passer domesticus*), Japanese white eye (*Zosterops japonica*), northern cardinal (*Cardinalis cardinalis*), melodius laughing thrush (*Garrulux canorus*), as well as other non-native species.

The native Hawaiian Hawk or ‘Io (*Buteo solitarius*) may possibly use the off-site mauka wooded areas at a higher elevation that the project and the Hawaiian Hoary Bat (*Lasiurus cinerus semotus*), a native mammal, are not known to be in the project area. The Pacific golden plover (*Pluvialis fulva*), a protected migratory species, may utilize the open mowed grassy areas during the months from August to May.

Impacts and Mitigation Measures

There may be temporary disruption to the Pacific golden plover which may feed along roadsides during August through May. Otherwise, there is no native habitat that would support native wildlife species within the project area, therefore no adverse effects to native fauna is expected to result from the construction of the project.

3.1.7 Historic / Archaeological Resources

The project components, which consist of linear corridors for transmission lines and water tanks, occur within or alongside existing roadway rights-of way, with the exception of the South Makai alignment which traverses undeveloped pasture lands. Archaeological inventory survey reports have been completed for these undeveloped lands (TMK: 7-5-017: 40, 41, 42, and 43) (Table 8), in accordance with State of Hawaii historic preservation regulatory review inventory requirements, as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules. The State Historic Preservation Division (SHPD) has approved the survey reports for Parcels 42 and 43 and is in the process of reviewing the report for Parcels 40 and 41. SHPD correspondence are included in Appendix B.

Table 8. South Makai System: Archaeological Inventory Surveys for Undeveloped Parcels

TMK Parcel No.	Preparer / Date	Date	Prepared for
7-5-017: 40, 41	Wolforth and Wilson, SCS Archaeology October 2006	An Inventory Survey for 29.389 Acres in Kahului 2nd, North Kona District, Island of Hawaii: Investigations into Settlement Patterns in the Kula Zone of the Kona Field System Near Kailua	Brian R. Cook
7-5-017: 42	Bulgrin and Rechtman November 2005	An Archaeological Inventory Survey of TMK: 3-7-5-017:042 Kahului 2nd Ahupuaa, North Kona District, Island of Hawaii	Hualalai Partners of Kona, LLC
7-5-017: 43	Bulgrin and Rechtman August 2005	An Archaeological Inventory Survey of TMK: 3-7-5-017:043 Kahului 2nd Ahupuaa, North Kona District, Island of Hawaii	Hualalai Partners of Kona, LLC

Setting

From a macro perspective, the undeveloped lands (TMK: 7-5-017: 40, 41, 42, and 43) comprise a small area of the Kona Field System which is extensive within North and South Kona, from Kau Ahupuaa to the north to Honaunau to the south and west from the coastline and east to the forested slopes of Hualalai (Cordy 1995 in Bulgrin and Rechtman 2005). A large portion of this field system is designated as State Inventory of Historic Places (SIHP) Site 50-10-37-6601 and has been eligible for inclusion in the National Register of Historic Places.

The parcels (TMK: 7-5-017: 40, 41, 42, and 43) contain several sites associated with the precontact Kona Field System and some sites associated with the more recent Ranch era. None of the precontact sites will be affected by the construction of the Waiaha Water System and most in fact, require “no further work”.

In 1927, Manuel Gomes acquired the Kahului and Waiaha ahupuaa from the Kona Development Company, a sugar cane plantation company. The land became part of the Gomes Ranch and was actively used for cattle grazing and stockading. Most of the stone walls seen in the study area today are most likely a legacy of the Gomes Ranch (Bulgrin and Rechtman, 2005 and Kona Historical Society “A Guide to Old Kona”).

In general, the South Makai transmission line will be parallel to the rock walls; however, small segments of walls may be breached to construct the transmission line. The affected sites as summarized in Table 9.

Table 9. Archaeological Sites Affected by the Construction of the South Makai Water Transmission Line.[10]

Site No. Form Type	TMK	Age	Description	Criteria of Significance	Recommended Treatment
TS-1 Roadside Wall	7-5-17:40	1980 (approx. year built)	Cattle Barrier core-filled wall forms makai border of parcel and forms right angle with TS-15 at its eastern terminus. TS-1 parallels and is adjacent to Queen Kaahumanu Highway, suggesting that the wall was built when the highway was built, and the pasture mauka of the highway was reconfigured for the new highway.	D	No further work
TS-15 Wall	7-5-17:40, 41	1920's Ranch	Cattle barrier core-filled rock wall. Has been breached mid-way by a dirt road.	D	No further work
Site 24555 Wall	7-5-17: 42, 43	Historic 1891-1904	Cattle barrier core-filled wall likely constructed by Kona Development Company and Gomes Ranch as a parcel boundary marker and livestock control.	D	No further work
Site 24556 Wall	7-5-17:43	Historic/modern	Core-filled retaining wall running parallel to and along Hualalai Road. Portions of the wall have been reconstructed as evidenced by a truck tire incorporated into the base of the wall at the intersection with Hienaloli Road	D	No further work
Site 24557 Enclosure	7-5-17:43	Historic Ranch	Ranch related rock wall enclosure augmented with metal fence and wooden gate. Area also contains a riveted steel water tank and concrete water trough.	D	No further work

The North alignment is through existing paved and dirt roadways. The more recently graded segments have received County grading permits which have received DLNR sign-off. These documents are attached as Appendix C.

The South Mauka alignment is through existing residential subdivisions, which completed historic preservation / archaeological review at the time of their construction.

Impacts and Mitigation Measures

The Waiaha Water Systems South Makai improvements (transmission line and reservoir) are spatially separated from the Kona Field System precontact sites which occur on the various parcels. The construction and long-term operation of the system will therefore, have no effect on any of the precontact sites. The construction of the South Makai water system may, however, require breaching portions of the walls and enclosure that are associated with cattle ranching. These walls and one

[10] Information is summarized from archaeological studies of TMK: 7-5-17: 40, 41, 42, 43 by Wolforth and Wilson October 2005, Bulgrin and Rechtman November 2005 and August 2005. Site Numbers are labeled as noted in the reports.

enclosure, identified as Site 24555, Site 24556, Site 24557, TS-2, and TS-1 have been documented in the respective studies (Bulgrin and Rechtman 2005, and Wolforth and Wilson 2006) and the Recommended Treatment of "No further work" has been assigned. Where practicable, the breaches will be repaired and the openings will be rebuilt.

Prior to construction, any sites which are outside the construction footprint but within 20 feet of the construction area, will be marked with orange construction fencing.

During construction, should any unexpected cultural features, deposits, or burials, be encountered, work in the area will be suspended and the State Historic Preservation Division office will be immediately notified to determine an appropriate course of action.

3.1.8 Cultural Resources

A cultural resources assessment is intended to be informational for the purpose of disclosing any impacts to native rights and practices the proposed project might have on Hawaiian culture and to address Act 50. The thrust of Act 50 is to consider the effects of the project on native Hawaiians pertaining to the practice of traditional customs. In addition, the Hawaii State Constitution, Article XII, Section 7 protects all rights of native Hawaiians that are "customarily and traditionally exercised for subsistence, cultural, and religious purposes".

In addition, the Kapa'akai o ka Aina decision established an analytical framework independent of, but consistent with, the cultural impact assessment requirements of Act 50. The specific findings and conclusions required in three areas include the following:

- The identity and scope of "valued cultural, historical, or natural resources, including the extent to which traditional and customary native Hawaiian rights are exercised there;
- The extent to which those resources – including traditional and customary native Hawaiian rights will be affected or impaired by the proposed action;
- The feasible action, if any, to be taken by the Land Use Commission to reasonably protect native Hawaiian rights if they are found to exist.

<u>Setting</u>

While the general area of the undeveloped parcels (TMK: 7-5-17: 40, 41, 42, 43) contain precontact sites and features associated with the Kona Field System, the construction of the proposed water system improvements will have no effect on these sites because of the spatial separation of 180 meters or more or any sites which require follow-up (TS 11, 40, 41, 42). All other sites require "No further work".

Short segments of the Ranch-age related walls that are within the South Makai alignment may be breached during construction but would regain their integrity upon repair at the conclusion of construction.

Most of the general environs of the proposed North and South Mauka alignments have been extensively modified and developed during historic times, with the exception of the undeveloped parcels of the South Makai alignment. This is described above in Section 3.1.7 Historic /

Archaeological Resources. The proposed water system improvements will focus on a narrow linear easement along the north boundary of the undeveloped parcels, thus, the cultural impact assessment focuses on the Ranch-age features.

In assessing the impacts to Hawaii's culture and traditional and customary rights, we review the studies for the natural and the archaeological resources. Relevant points include the following topics:

- *Agricultural, Gathering and other Cultural Uses*: In general, the Kona Field System integrated Hawaiian agricultural zones, as well as habitation uses, and other cultural uses.

- *Religious or spiritual customs*. Though it is possible that religious or spiritual customs may have been practiced within the project area, no evidence of these customs was found.

Interview: Mr. Stanley Gomes

An interview was conducted with Stanley Gomes at Kahaluu at a location overlooking the undeveloped parcels. Stanley was born at Kahuluu, Kailua-Kona, on December 24, 1935, and is the son of Joseph Gomes and the grandson of Manuel Gomes.

Manuel Gomes (b. circa 1870 – d. circa 1958) was a 13- year old stow-away on a ship heading to Hawaii from Portugal. Three days out of Portugal, he was discovered but it was too late for the ship to turn around. Young Manuel was made the "Captain's boy" to pay for his passage. In Hawaii, Manuel met and married Maria, also from Portugal. They had 12 children, Joseph being the youngest. In 1927, Manuel Gomes purchased the Kahuluu and Waiaha ahupuaa from the Kona Development Company (previously, Kona Sugar Company), Kailua's only sugar cane company which operated briefly in the early 1900's to 1926.

Manuel established the Gomes Ranch within these two ahupuaa, which extended from the sea coast to the mountains. The land where sugar cane was formerly raised was now actively used for cattle grazing and stockading until the late 1990's. Today, a small portion of the land is still used for a few head of cattle.

During World War II, the Kona Mill site, built in 1901, was used by the US Army as a training camp. The Mill smoke stack was dismantled and sold as scrap metal. Remnants of the Kona Sugar Mill are still present at Hienaloli Road near Hualalai Road.

Stanley Gomes grew up on the Ranch and has been a rancher since his childhood and youth. Throughout the years, Stanley estimates that he has built 10 – 15 miles of "dry" rock walls. As an adult he served on the Hawaii Police Department for 25 years. Stanley was asked for any references of individuals who might have any cultural or traditional ties with the property. Stanley was not able to identify any persons who had ties with the property.

Impacts and Mitigation Measures

The construction of the Waiaha Water System – North and South alignments would temporarily affect access through portions of the property. Upon its completion, however, the sub-grade transmission line and restoration of the surface conditions would allow resumption of access. Although no traditional and customary uses have been identified, it is believed that after completion of construction and over the long-term, any uses of the project area could be resumed and no significant negative effects on Hawaii's culture or individual's traditional and customary rights would result.

3.1.9 Air Quality

Setting

The regional and local climate, together with the amount of human activity, generally dictates the air quality of a given location. The climate of Kona is warm and humid, with average annual rainfall of 55 to 60 inches. Winds are dominated by light but persistent northeast trade winds, especially in summer.

Air quality in the project area is currently affected by periodic volcanic emissions of sulfur dioxide convert into particulate sulfate that causes a volcanic haze (vog) that blankets the area during occasional episodes when tradewinds are not present.[11]

Impacts and Mitigation Measures

The project will entail some grading and trenching over 0.78 mile for the North alignment, 0.84 mile for the South Mauka alignment, and 0.79 South Makai alignments. The construction activities over a period of two years are not expected to affect air quality. Measures will be taken to minimize the following: 1) fugitive dust from vehicle movement and soil excavation, and 2) excessive emissions from on-site construction equipment.

Construction activities will comply with provisions of Hawaii Administrative Rules, Chapter 11-60.1, Air Pollution Control and Section 11-60.33, Fugitive Dust.

Over the long-term, the proposed water transmission lines and reservoirs are situated to allow gravity flow from the existing DWS Waiaha production well and reservoir source which is situated at the 1,500 ft elevation. Pumping from the source will be minimal, thereby, minimizing electrical consumption locally at the project, as well as at the HELCO generating source. Power usage, therefore, is minimized and impacts to air quality will be negligible.

[11] Hollingshead, Annette T., Steven Businger, Roland Draxler, John Porter, Duane Stevens (August 2002) *Dispersion Modeling of the Kilauea Plume*. University of Hawaii, Honolulu, HI 96822, USA. Vog paper http://www.soest.hawaii.edu/MET/Faculty/businger/PDF/VOGPAPER.pdf

3.1.10 Noise

Setting
The neighborhood through which the transmission lines will traverse is a mix of rural, low density residential, and pastureland. There are no known noise generators, with the exception of traffic on the roadways.

Impacts and Mitigation Measures

The dominant noise sources during construction will result from using earth moving equipment, such as bulldozers and diesel-powered equipment, and generators for power tools. Noise from construction activities would be limited to daylight hours and weekdays. There will be no long-term noise effects on the surrounding neighborhood upon completion of the project.

3.1.11 Scenic Resources

Setting

The Kona districts have long attracted people because of their natural beauty. Although man-made structures are in some places dominant, the vast expanse of the Kona landscape is still the area's most striking feature.

Part of Kona's natural beauty is also due to the wide range of climatic conditions in a relatively short distance. Such variations extending from the coastal areas to the higher elevations are evidenced by changes in vegetation, producing a wide scope of different physical environments. The County *General Plan* does not identify any locations within the project area that are notable for its natural beauty, however, it notes that this area is dominated by Hualalai, with its steep slopes providing a green backdrop when viewed from the coast, or spectacular views of the coastline, ocean and horizon from higher elevations. [12]

Impacts and Mitigation Measures

Most of the project upon completion will not impact upon any natural beauty areas identified in the *General Plan*. The three new water tanks will be 23 feet high and will impact views from elevations above them.

3.2 SOCIOECONOMIC CHARACTERISTICS

Setting

The population of Hawaii County has grown steadily since 1980. According to the 2000 U.S. Census, the County's population increased 23 per cent between 1990 and 2000. During the same period, the State's population grew by 9 per cent. The district of Puna saw the largest increase at 51 percent, followed by South Kohala (44 percent), North Kohala (41 percent), Kau (31 percent), North Kona (28

[12] County of Hawaii General Plan.

percent), South Kona (12 percent), North Hilo (12 percent), Hamakua (10 percent), and South Hilo (6 percent). Table 10 depicts the population growth in North Kona between 1980 – 2000.

Table 10. Population growth in North Kona between 1980 -2000

District	1980	1990	2000	1980 – 1990 % Change	1990 – 2000 % Change
North Kona	13,748	22,284	28,543	62.1	28.1

In North Kona, spurred primarily by the employment opportunities created by the expanding visitor industry, population has greatly increased over the last 30 years. The growth of the visitor industry in recent years can be largely attributed to the expansion of runway and terminal facilities at Kona International Airport at Keahole, which now permits the arrival of national and international direct flights.[13]

Impacts and Mitigation Measures

The current DWS infrastructure will not sustain growth in North Kona. The implementation of the subject Waiaha Water Systems as proposed herein is consistent with the County of Hawaii General Plan.

There will be construction related jobs for a period of approximately two years, followed by increased property tax revenue to the County as surrounding lands are built out in the future to accommodate the projected growth, as evidenced in the county General Plan LUPAG designation of Urban Expansion Area for much of the project area..

3.3 INFRASTRUCTURE

3.3.1 Roadways

Setting
The project area is accessed by several roadways.

Table 11. Affected Roadways in the Project Area

Project Segment	Roadway	Ownership
North		
	Mamalahoa Highway	County
	Unnamed (UCC) Road	Private
	Hienaloli Road	County
South Mauka		
	Mamalahoa Highway	County
	Kalipa Place	Private (Iokepa Estates)
	Pu Hoala Place (connect to)	Private
South Makai		
	Hienaloli Road	County
	Hualalai Road	County

[13] County of Hawaii General Plan.

Impacts and Mitigative Measures

The proposed action will require construction vehicles to access the sites during a period of several months for grading, excavation of the trench for the transmission lines, hauling building materials, pipe installation, and paving over the installation, as well as construction of the three reservoirs.

Construction will be phased over a two-year period with the initial construction of the North alignment, followed by the South Mauka alignment, and finally the South Makai alignment.

Construction in the right-of-way of roads will disrupt traffic flow and induce short delays for motorists. The connection to the DWS existing transmission main within the Mamalahoa Highway right-of-way will occur at the top of the North and South Mauka alignments. In general, the work within the County roadways (Mamalahoa Highway, Hienaloli Road, and Hualalai Road) will experience the most delays.

While most of the construction will be on private roadways with limited traffic, there will be increased traffic flow on connecting roadways that could cause disruptions in traffic flow. Thus, a Traffic Control Plan will be prepared and will include, but not be limited, to the following guidelines and measures:

- Specify a circulation plan for each of the three transmission alignments
- Limit roadwork on major thoroughfares to off-peak hours
- Prior to construction on major thoroughfares, notify the County Traffic Division and Police Department
- Traffic control personnel will be hired, as needed

Upon the completion of construction, and over the long-term, the installation of this water system will have no negative impacts to traffic.

3.3.2 Utilities

Setting

Electrical power to the facilities is supplied by Hawaii Electric Light Company (HELCO), a privately-owned utility company, via its network of overhead lines in the project area.

Telephone service is available from Hawaiian telcom along area roadways but is not required for the project. There are no public wastewater systems in the project area; but such systems are not necessary for the project.

Impacts and Mitigative Measures

The project will potentially have a significant beneficial impact on existing electrical facilities and HELCO's ability to provide electricity. First, the DWS Waiaha production well, located upslope of the North and South transmission alignments, has sufficient head at Mamalahoa Highway to allow gravity flow into both proposed transmission lines. Thus, the three proposed reservoirs are designed as gravity

flow pressure reducing tanks and pump stations will not be required, thereby significantly mitigating energy consumption. Secondly, the DWS existing North Kona system relies on several pump stations to transmit the low-level aquifer resource (Kahaluu shaft) to service its customer base along the higher elevation slopes of Mt. Hualalai. Upon completion of the subject project, the Waiaha water resource will replace the Kahaluu resource, and DWS would potentially be able to reduce pumping to some of its customers, and reduce its energy consumption.

3.4 SECONDARY AND CUMULATIVE IMPACTS

The development of the Waiaha Water Systems North and South transmission lines and reservoirs fulfills a mandate of the Department of Water Supply to provide high-quality service to its customers in existing service areas. The implementation of these improvements, whether constructed by the DWS or a private developer (as proposed) serves the overall North Kona community.

The installation of new transmission lines (as proposed) would efficiently utilize the available high-level Waiaha water and will allow DWS to reduce (or cease) pumping of the Kahaluu shaft

While Waiaha System, LLC and Waiaha System II, LLC are allowed 1,500 units of water as described in the Agreements, the allocations will be over a period of 20 years and will be synchronized with the overall growth of North Kona, as articulated in the General Plan's classification of Urban Expansion Area for a portion of the project area. Any future land development actions would be subject to all existing land use laws

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, the construction of a water system, would have very minor and temporary disturbance to air quality, noise, visual resources, water service, and traffic flow during construction are very limited in severity, nature, and geographic scale.

4.0 ALTERNATIVES CONSIDERED

The provisions of Title 11, Environmental Impact Statement Rules, Section 11-200-17(f) require an analysis of the alternatives which could attain the objectives of the action, while minimizing potential adverse environmental impacts.

4.1 NO ACTION

This alternative would involve no near-term use of the available Waiaha production well water resource. This available high-level water resource would remain untapped until such time when the Water Board and DWS fund the transmission facilities through the capital improvement projects program, secure appropriate easements through private lands, and contract for the design and construction of a comparable system.

The County would also forgo the unique opportunity of a private developer funding the $13.5 million project and obtaining the requisite easements through private property to complete the installation of the facilities at approximately 30 percent of the projected cost.

The delay of adding the Waiaha water resource to supplement the North Kona water system would require continued demand on and potentially further compromise the Kahaluu Shaft wells, and thereby adversely affect the North Kona community drinking water supply.

4.2 COUNTY DEVELOPMENT OF THE WAIAHA TRANSMISSION AND STORAGE SYSTEM

Postponing the construction of a comparable water transmission and storage system solely by the DWS would delay bringing the Waiaha high-level resource on-line to DWS customers by several years. The continued overpumping of the Kahaluu shaft wells would result in declining water quality and the potential inability to meet peak demand, including fireflow requirements.

5.0 DETERMINATION WITH SUPPORTING FINDINGS AND REASONS

To determine whether the proposed action may have a significant impact on the environment, every phase and expected consequences, both primary and secondary, and the cumulative as well as short- and long-term effects have been evaluated. Based on the studies conducted and research evaluated, a finding of no significant impact is anticipated as summarized in this section.

5.1 SIGNIFICANCE CRITERIA

According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact will occur. According to the Rules, an action shall be determined to have a significant impact on the environment if it meets any one of the following criteria:

(1) Irrevocable loss or destruction of valuable resources.

The North and South Mauka alignments are within graded roadways, and the South Makai alignment is within grazed pastureland. Botanical resources consist primarily of alien roadside grasses and pasture grass with the exception of a few commonly occurring native species. The archaeological resources that may be affected include a Ranch-era enclosure and short segments of walls within the undeveloped South Makai alignment. The State Historic Preservation Division has approved the completed archaeological inventory surveys for two of the vacant parcels (TMK: 7-5-017: 42, 43) and concurred that "no further work" is required for the Ranch-era affected sites beyond what is recorded in the inventory surveys. The surveys for parcels TMK: 7-5-017: 40 and 41 are presently under review.

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

No restriction of beneficial uses of the alignments would occur. Upon the completion of construction, the existing roadways would be re-paved and continue to be utilized as roadways. The pipe of the South Makai segment would be sub-grade with a new paved roadway, and would not curtail any future uses.

(3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS.

The proposed project is consistent with the environmental policies set forth in the State Plan and Chapter 344, Hawaii Revised Statutes. The broad goal of this policy is to conserve the natural resources and enhance the quality of life. Utilizing the high-level Waiaha production well water resource will greatly reduce risk to the Kahaluu resource which is currently being overpumped. The

infusion of the Waiaha resource into the North Kona Water System will reduce salt-water infiltration at the lower elevation. Fire flow capacity will be established, water quality will improve, and overall quality of life will be enhanced.

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

The proposed transmission lines and storage reservoirs are intended to provide a continuing supply of water to existing residents of North Kona and to accommodate the growth provided for in the County of Hawaii General Plan. It will not have an adverse effect on economic or social welfare except that it allows DWS to assure its customers that they are receiving the best quality water at the lowest cost, consistent with the maintenance of environmental quality.

(5) Substantially affects public health.

The overall public health will be improved by the infusion of quality high-level potable water into the North Kona Water System. The project will not adversely affect air or surface water quality, nor will it generate solid waste or produce other emissions that would significantly affect public health. Noise levels attributed to construction would be abated by measures that the County will require.

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

The project will not produce significant secondary impacts. Rather, the project implements the existing plans and policies of the DWS and the County of Hawaii.

(7) Involves a substantial degradation of environmental quality.

The limited construction period will involve grading, noise, and some congestion on the roadways; however, mitigation measures will minimize those impacts. Over the long-term, the new water source will improve environmental quality to the overall water resource in North Kona.

(8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions.

Development of the Waiaha Water System allows the existing Waiaha production well resource to be utilized as intended by County of Hawaii and DWS plans and policies. Presently only 25 percent of the available 2 million gallons per day is pumped into existing DWS transmission lines. The proposed action involves the installation of infrastructure to by private parties, through private lands, and using private funds. This represents a unique opportunity to bring the remaining 75 percent of the available water resource online at a significantly reduced cost to the public.

The Waiaha water would be committed over a maximum period of 20 years and would accommodate growth as defined by the General Plan LUPAG designation of Urban Expansion Area.
All future land development actions would be subject to existing land use laws.

The proposed action is intended primarily to replace existing water withdrawals from low-level sources. Continued withdrawals from these low-level sources at the current rates have the potential of harming the potable water quality in the system and even irreparably damaging the aquifer.

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

The North and South alignments contain no rare, threatened, or endangered species or habitat, and will have no effect on the biological resources of the area.

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

Development and operation of the project will not have a measurable effect on air and water quality. Noise levels during construction will be regulated through the building plan process, but will have no long-term effects at completion.

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

The island of Hawaii as a whole is subject to geologic hazards such as earthquakes and lava flows. However, the project area is not any more subject to earthquakes and lava flows than any other prospective sites in the region. All construction will conform to the Uniform Building Code for Earthquake Zone 3.

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

The proposed facilities are not within any scenic areas designated by the General Plan. The reservoirs will be 23 feet tall, but will not obstruct view planes due to the natural slope of the corridors.

(13) Requires substantial energy consumption.

The long-term operation would reduce energy consumption because the new Waiaha system facilities are downslope of the water resource and will be served by gravity flow. In addition, when the Waiaha system is integrated into the North Kona distribution system, DWS would have the option to reduce pumping the low-level water to customers located at higher elevations, thereby reducing energy consumption.

5.2 ANTICIPATED DETERMINATION

In accordance with Chapter 343, Hawaii Revised Statutes, this EA has examined the environmental and technical aspects of the proposed project. In considering the significance of potential environmental effects, the sum of effects on the quality of the environment was considered and the overall and cumulative effects of the action were evaluated. Every phase of the proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short- and long-term effects of the action were considered.

As a result of these considerations, it is determined that the proposed action will not significantly impact the environment, based on the significance criteria listed in 11-200-12 of the Environmental Impact Statement Rules and addressed below. Therefore, a "Finding of No Significant Impact" (FONSI) is anticipated for this project.

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FLORA OF THE WAIAHA WATER SYSTEM PROJECT AREA
Prepared by: Layne Yoshida, Botanist

The approximate broader area of this floristic study is bounded by the Queen Kaahumanu Highway on the makai (ocean) side and the old Mamalahoa Highway on the mauka (mountain) side. The area is generally bounded by the Waiaha Gulch on the north side and by Hualalai Road on the south.

Transmission Line Segments

The study area can be divided into three discreet sections, all of which have been greatly altered due to human activity.

- The first segment is the northern alignment and starts at the old Mamalahoa Highway and terminates at Hienaloli Road. The mauka side of this segment follows a paved private road and the makai portion of the segment follows a cleared but not yet paved road in a developing subdivision.

- The second segment is the southern mauka segment and it again starts from the old Mamalahoa Highway and the segment terminates at a subdivision that borders Hienaloli Road. This segment follows an extension of the subdivision road and the area has been cleared and herbicide had been sprayed prior to the time of the field survey.

- The third segment in the study area is the southern makai alignment, this alignment runs from Hienaloli Road to the Queen Kaahumanu Highway. This segment follows the shoulder of Hienaloli Road and Hualalai Road for a distance, then crosses through a pasture.

The three segments are in an area that has been greatly altered by human activities and the north alignment, the south mauka alignment and a portion of the south makai alignment have all been mechanically cleared and are subject to periodic maintenance with the plants being either cut or sprayed with herbicide. Table 1 includes a plant list for the corridors of the north and south alignments of the transmission lines.

It should be noted that when the fieldwork for this report was done several of the areas had only seedlings and new growth sprouting in the area due to the use of herbicide.

Segment #3, the southern makai alignment that crosses the pasture is the only area in this study that does not appear to have been completely mechanically cleared at some point in time. However, even in this area the vegetation has been greatly altered due to human activity. Even though the pasture was not subject to active grazing at the time of the field work it is clear that the vegetation in the area is not a native type of floristic community.

The vegetation along segment #1, the north alignment, is dominated by aggressive, weedy species that are the first colonizers of cleared land or seen along the side of the highways on the leeward side of the island. Exotics such as Guinea grass (*Panicum maximum*), Kikuyu grass (*Pennisetum clandestinum*)

and California grass (*Brachiaria mutica*) are common in this type of transient floristic community. The area following the side of the paved road is composed of a lawn that is mowed and well tended.

The vegetation along segment #2, the south mauka alignment, is also dominated by aggressive, exotic species such as Buffalo grass (*Pennisetum purpureum*), False Mallow (*Malvastrum coromandelianum*) and Guinea grass (*Panicum maximum*).

The south makai alignment, segment #3, is dominated by Guinea grass in the pasture and by weeds like Desmodium (*Desmodium tortuosum*) and Partridge Pea *Chamaecrista nictitans*) along the side of Hualalai Road and Hienaloli Road. Escaped ornamental plants such White Mulberry (*Morus alba*) can also be seen in this area.

For the most part the few indigenous species observed in the area are also aggressive and weedy species such as Morning Glory (*Ipomoea indica*) and Uhaloa (*Waltheria indica*). Other indigenous species observed in the study were Popolo (*Solanum americanum*), Huehue (*Cocculus trilobus*) and Cuba Jute (*Sida rhombifolia*). There is some uncertainty concerning whether Cuba Jute is indigenous to Hawaii or not but for this report it is listed as being indigenous.

One native species that is common on the leeward side of Hawaii but not weedy was also located within the study area, this is *Peperomia leptostachya*. This species was seen in two discrete populations growing either within or adjacent to the study area. Both populations were observed to be growing along the side of or on a stonewall. One population was located along the north alignment and the second population was located on a stonewall adjacent to Hualalai Road in the southern makai alignment.

Water Tank Sites

Three sites that have been mechanically cleared for placement of water tanks were also inspected in preparation for this report. The two water tank sites that are located along the north alignment have been recently bulldozed and so the vegetation consists of primarily herbaceous, weedy pioneer species that are common on the leeward side of the island. The third water tank site is located on the southern mauka alignment, this site was bulldozed at one time but since the plot has had a longer time for the vegetation to grow, the site includes trees such as Kukui (*Aleurites mollucana*) and African Tulip (*Spathodea campanulata*) that have grown to about 20 ft in height. The dominant plant communities on the three water tank sites are primarily a mixture of exotic species. Also, since the communities are still young, it can be expected that they will change over time but still be dominated by exotics.

In the attached plant list (Table 2) the water tank site on the south mauka alignment is listed as #1. The mauka tank site along the northern alignment is tank #2 and the makai tank on the northern alignment is #3.

A number of species that were seen in the study area were not included in the list attached to this report since these are ornamental species that have been planted and are clearly being tended as landscaping. Some of these plants are Manila Palm (*Veitchia sp*.), Snake Plant (*Sansevieria sp*.), Bougainvillea (*Bougainvillea sp*.) and Rheo (*Tradescantia sp*.)

RARE AND/OR ENDANGERED SPECIES:

The study area does not contain any Endangered, Threatened, or Rare species as listed under the Federal or State of Hawaii regulations. Further none of the plants recorded during this study are at present being proposed for placement on the Federal or State Registry for Rare or Endangered Plants.

CONCLUSION AND SUMMARY:

The species and plant communities observed in the study area encompassed in this report are dominated by exotic, aggressive and weedy species. The few indigenous species seen in the area are common throughout the leeward side of the island of Hawaii and for the most part aggressive colonizers that are able to compete with exotic species.

Since the area has been so greatly altered by human activity there does not appear to be any plant communities or species that are unique or that should be considered for preservation. Moreover, since the study area is predominately urban and is currently being maintained by mowing, clearing, or herbicides, the area is an artificial assemblage of species that will change over time, if not maintained.

APPENDIX A

Botanical Survey

Table 1. Waiaha Water System Transmission Lines Plant List

* Status Codes: A = Alien, I = Indigenous, End = Federal/State listed Endangered Species

Scientific Name	Family	Common Name	Life Form	Status*	Segment #1	Segment #2	Segment #3
Abutilon grandfolium	Malvaceae	Hairy Abutilon	Shrub	A			3
Acacia farnesiana	Fabaceae	Klu	Shrub	A			3
Ageratum conyzoides	Asteraceae	Maile Hohono	Herb	A	1		
Ageratum houstonianum	Asteraceae	Maile Hohono	Herb	A	1		
Aleurites moluccana	Euphorbiaceae	Kukui	Tree	A	1		3
Allamanda blanchetii	Apocynaceae	Purple Allamanda	Shrub	A			3
Amaranthus spinosus	Amaranthaceae	Amaranthus	Herb	A	1	2	3
Amaranthus viridus	Amaranthaceae	Amaranthus	Herb	A	1		3
Ambrosia artemisiifolia	Asteraceae	Ragweed	Herb	A	1		
Artocarpus altilis	Moraceae	Ulu	Tree	A		2	
Asclepias physocarpa	Asclepiadaceae	Balloon Plant	Herb	A		2	
Asystasia gangetica	Acanthaceae	Chinese Violet	Herb	A	1		
Bauhinia sp.	Fabaceae	Bauhinia	Tree	A			3
Begonia hirtella	Begoniaceae	Begonia	Herb	A	1	2	
Bidens af. Cynapiifolia	Asteraceae	Bidens	Herb	A		2	3
Bidens pilosa	Asteraceae	Beggartick	Herb	A	1	2	3
Boerhavia coccinea	Nyctaginaceae	Boerhavia	Herb	A			3
Brachiaria mutica	Poaceae	California Grass	Herb	A	1		
Buddleia asiatica	Buddleiaceae	Butterfly Bush	Shrub	A	1	2	
Carica papaya	Caricaceae	Papaya	Shrub	A	1		3
Catharanthus roseus	Apocynaceae	Madagascar Periwinkle	Herb	A	1		
Chamaecrista nictitans	Fabaceae	Partridge Pea	Herb	A	1	2	3
Chamaescye hirta	Euphorbiaceae	Hairy Spurge	Herb	A			3
Chamaescye hypericifolia	Euphorbiaceae	Graceful Spurge	Herb	A	1	2	3
Chamaescye prostrate	Euphorbiaceae	Prostrate Spurge	Herb	A	1	2	3
Chloris sp.	Poaceae	Fingergrass	Herb	A	1	2	3

Scientific Name	Family	Common Name	Life Form	Status*	Segment #1	Segment #2	Segment #3
Christella sp.	Thelypterida-ceae	Maiden Fern	Fern	A	1	2	
Chrysopogon aciculatus	Poaceae	Golden Beardgrass	Herb	I?	1		
Cleome gynandra	Capparaceae	Spider Plant	Herb	A			3
Coccinia grandis	Cucurbitaceae	Ivy Gourd	Vine	A			3
Cocculus trilobus	Menisperma-ceae	Huehue	Vine	I	1		
Coffea Arabica	Rubiaceae	Coffee	Shrub	A	1		3
Commelina benghalensis	Commelinaceae	Hairy Honohono	Herb	A			3
Commelina diffusa	Commelinaceae	Honohono	Herb	A	1		
Conyza bonariensis	Asteraceae	Hairy Horseweed	Herb	A	1	2	
Cordyline fruticosa	Agavaceae	Ki	Shrub	A	1	2	
Crotalaria sp.	Fabaceae	Crotalaria	Herb	A	1	2	3
Cucumis dipsaceus	Cucurbitaceae	Teasel Gourd	Vine	A			3
Cuphea carthagenensis	Lythraceae	Tarweed	Herb	A	1		
Cynodon dactylon	Poaceae	Bermuda Grass	Herb	A	1	2	3
Cyperus af. Compressus	Cyperaceae	Cyperus	Herb	A			3
Desmanthus virgatus	Fabaceae	Slender Mimosa	Herb	A			3
Desmodium sandwicense	Fabaceae	Desmodium	Herb	A	1	2	3
Desmodium tortuosum	Fabaceae	Florida Beggarweed	Herb	A	1	2	3
Desmodium triflorum	Fabaceae	Desmodium	Herb	A	1		
Digitaria insularis	Poaceae	Sourgrass	Herb	A		2	3
Digitaria sp.	Poaceae	Crabgrass	Herb	A	1		3
Dioscorea sp.	Dioscoreaceae	Hoi	Vine	A	1		
Drymaria cordata	Caryophyllaceae	Pipili	Herb	A	1		
Eleusine indica	Poaceae	Goosegrass	Herb	A	1	2	3
Emilia fosbergii	Asteraceae	Pualele	Herb	A	1	2	3
Emilia sonchifolia	Asteraceae	Pualele	Herb	A	1		3
Eragrostis sp.	Poaceae	Eragrostis	Herb	A			3
Eragrostis tenella	Poaceae	Lovegrass	Herb	A			3
Erechtites hieracifolia	Asteraceae	Fireweed	Herb	A	1		

Scientific Name	Family	Common Name	Life Form	Status*	Segment #1	Segment #2	Segment #3
Euphorbia heterophylla	Euphorbiaceae	Kaliko	Herb	A	1		3
Euphorbia sp.	Euphorbiaceae	Euphoriba	Shrub	A	1	2	
Ficus microcarpa	Moraceae	Chinese Banyan	Tree	A			3
Galinsoga sp.	Asteraceae	Galinsoga	Herb	A		2	
Hedyotis corymbosa	Rubiaceae	Hedyotis	Herb	A		2	
Hyptis pectinata	Lamiaceae	Comb Hyptis	Shrub	A	1	2	3
Indigofera suffruticosa	Fabaceae	Indigo	Herb	A		2	3
Ipomoea alba	Convolvulaceae	Ipomoea	Vine	A	1	2	
Ipomoea indica	Convolvulaceae	Morning Glory	Vine	I		2	3
Ipomoea obscura	Convolvulaceae	Ipomoea	Vine	A			3
Ipomoea triloba	Convolvulaceae	Little Bell	Vine	A	1		3
Kalanchoe pinnata	Crassulaceae	Kalanchoe	Herb	A	1		3
Kyllinga brevifolia	Cyperaceae	Kyllinga	Herb	A	1		3
Kyllinga nemoralis	Cyperaceae	Kyllinga	Herb	A	1	2	3
Lantana camara	Verbenaceae	Lantana	Shrub	A			3
Leonotis nepetifolia	Lamiaceae	Lion’s Ear	Herb	A			3
Leucaena leucocephala	Fabaceae	Haole Koa	Shrub	A	1	2	3
Lycopersicon sp.	Solonaceae	Tomato	Herb	A	1		
Macroptilium atropurpureum	Fabaceae	Macroptili-um	Vine	A	1	2	3
Macroptilium lathyroides	Fabaceae	Cow Pea	Herb	A	1	2	
Magifera indica	Anacardiaceae	Mango	Tree	A		2	
Malvastrum coromandelian-um	Malvaceae	False Mallow	Herb	A	1	2	3
Medicago sp.	Fabaceae	Medicago	Herb	A	1		
Mentha sp.	Lamiaceae	Mint	Herb	A	1		
Michelia sp.	Magnoliaceae	Michelia	Tree	A		2	
Mimosa pudica	Fabaceae	Sleeping Grass	Herb	A	1	2	3
Momordica charantia	Cucurbitaceae	Bitter Melon	Vine	A	1	2	3
Morus alba	Moraceae	White Mulberry	Tree	A			3
Nephrolepis exaltata	Nephrolepida-ceae	Sword Fern	Fern	I	1		

Scientific Name	Family	Common Name	Life Form	Status*	Segment #1	Segment #2	Segment #3
Nephrolepis multiflora	Nephrolepida-ceae	Sword Fern	Fern	A	1		
Nicandra sp.	Solonaceae	Nicandra	Herb	A	1		3
Oplismenus sp.	Poaceae	Oplismenus	Herb	A	1		
Opuntia sp.	Cactaceae	Opuntia	Shrub	A			3
Oxalis corniculata	Oxalidaceae	Wood Sorrel	Herb	A	1	2	3
Oxalis corymbosa	Oxalidaceae	Wood Sorrel	Herb	A	1		
Panicum maximum	Poaceae	Guinea Grass	Herb	A	1	2	3
Paspalum conjugatum	Poaceae	Hilo Grass	Herb	A	1	2	3
Paspalum sp.	Poaceae	Paspalum	Herb	A			3
Passiflora edulis	Passifloraceae	Lilikoi	Vine	A	1	2	
Pennisetum clandestinum	Poaceae	Kikuyu Grass	Herb	A	1		
Pennisetum purpureum	Poaceae	Elephant Grass	Herb	A	1	2	
Peperomia leptostachya	Piperaceae	Peperomia	Herb	I	1		3
Persea americana	Lauraceae	Avacado	Tree	A	1	2	
Phlebodium aureum	Polypodiaceae	Hare's Foot Fern	Fern	A	1		
Phyllantus sp.	Euphorbiaceae	Phyllantus	Herb	A		2	3
Phymatosorus scolopendria	Polypodiaceae	Maile Scented Fern	Fern	A	1		
Pithecellobium dulce	Fabaceae	Dulce	Tree	A			3
Pityrogramma calomelanos	Hemionitida-ceae	Silver Fern	Fern	A	1		
Plantago lanceolata	Plantaginaceae	English Plantain	Herb	A	1		
Pluchea symphytifolia	Asteraceae	Sourbush	Shrub	A	1	2	
Polygala paniculata	Polygalaceae	Polygala	Herb	A	1	2	3
Portulaca oleracea	Portulaceae	Pigweed	Herb	A			3
Portulaca pilosa	Portulacaeae	Portulaca	Herb	A			3
Prosopis pallida	Fabaceae	Kiawe	Tree	A			3
Psidium guajava	Myrtaceae	Guava	Tree	A	1	2	
Pycreus polystachyos	Cyperaceae	Cyperus	Herb	A		2	
Rhynchelytrum repens	Poaceae	Natal Redtop	Herb	A	1		3

Scientific Name	Family	Common Name	Life Form	Status*	Segment #1	Segment #2	Segment #3
Ricinus communis	Euphorbiaceae	Castor Bean	Shrub	A	1	2	3
Rubus rosifolius	Rosaceae	Thimbleber-ry	Herb	A	1		
Sacciolepis indica	Poaceae	Glenwood Grass	Herb	A	1		
Samanea saman	Fabaceae	Monkey Pod	Tree	A			3
Schinus terebinthifol-ius	Anacardiaceae	Christmas Berry	Tree	A	1	2	
Senecio sp.	Asteraceae	Senecio	Herb	A	1		
Senna occidentalis	Fabaceae	Coffee Senna	Herb	A		2	3
Senna pendula	Fabaceae	Senna	Shrub	A	1		3
Setaria sp.	Poaceae	Setaria	Herb	A	1		3
Sida rhombifolia	Malvaceae	Cuba Jute	Herb	A	1	2	3
Sida spinosa	Malvaceae	Prickly Sida	Herb	A	1	2	3
Sigesbeckia orientalis	Asteraceae	Sigesbeckia	Herb	A	1		3
Silene gallica	Caryophyllaceae	Catchfly	Herb	A	1		
Solanum americanum	Solanaceae	Popolo	Herb	I	1		3
Sonchus oleraceus	Asteraceae	Sonchus	Herb	A	1	2	3
Spathodea campanulata	Bignoniaceae	African Tulip	Tree	A		2	
Spermacoce sp.	Rubiaceae	Buttonweed	Herb	A	1		3
Sporobolus sp.	Poaceae	Sporobolus	Herb	A		2	
Stachytarpheta sp.	Verbenaceae	Vervain	Herb	A	1	2	3
Synedrella nodiflora	Asteraceae	Nodeweed	Herb	A	1		
Talinum sp.	Portulaceae	Fameflower	Herb	A		2	3
Thevetia peruviana	Apocynaceae	Be-Still Tree	Shrub	A	1		
Tridax procumbens	Asteraceae	Coat Buttons	Herb	A			3
Triumfetta sp.	Tiliaceae	Bur Bush	Herb	A	1	2	3
Waltheria indica	Sterculiaceae	Uhaloa	Herb	I			3
Youngia japonica	Asteraceae	Oriental Hawksbeard	Herb	A	1		
Zingiber zerumbet	Zingiberaceae	Awapuhi	Herb	A	1		

* Status Codes: A = Alien, I = Indigenous, End = Federal/State listed Endangered Species

Table 2. Waiaha Water Tank Sites Plant List

* Status Codes: A = Alien, I = Indigenous, End = Federal/State listed Endangered Species

Scientific Name	Family	Common Name	Life Form	Status*	Tank #1	Tank #2	Tank #3
Ageratum conyzoides	Asteraceae	Maile Hohono	Herb	A		2	
Ageratum houstonianum	Asteraceae	Maile Hohono	Herb	A		2	3
Aleurites moluccana	Euphorbiaceae	Kukui	Tree	A	1		
Ambrosia artemisiifolia	Asteraceae	Ragweed	Herb	A			3
Asclepias physocarpa	Asclepiadaceae	Balloon Plant	Herb	A	1		
Bidens cynapiifolia	Asteraceae	Bidens	Herb	A		2	
Bidens pilosa	Asteraceae	Beggar's Tick	Herb	A		2	
Buddleia asiatica	Buddleiaceae	Dog Tail	Shrub	A	1		3
Canna sp.	Cannaceae	Canna	Herb	A		2	
Chamaecrista nictitans	Fabaceae	Partridge Pea	Herb	A	1	2	3
Chamaesyce hirta	Euphorbiaceae	Garden Spurge	Herb	A			3
Chamaesyce hypericifolia	Euphorbiaceae	Graceful Spurge	Herb	A			3
Chloris sp.	Poaceae	Chloris	Herb	A			3
Conyza bonariensis	Asteraceae	Hairy Horseweed	Herb	A		2	
Crotalaria sp.	Fabaceae	Rattlebox	Herb	A	1	2	3
Cuphea carthagenensis	Lythraceae	Tarweed	Herb	A		2	
Desmodium sandwicense	Fabaceae	Desmodium	Herb	A	1		
Desmodium tortuosum	Fabaceae	Desmodium	Herb	A			3
Digitaria sp.	Poaceae	Crabgrass	Herb	A	1	2	3
Drymaria cordata	Caryophylla-ceae	Drymaria	Herb	A			3
Eleusine indica	Poaceae	Goosegrass	Herb	A	1		3
Hyptis pectinata	Lamiaceae	Comb Hyptis	Shrub	A			3
Indigofera suffruticosa	Fabaceae	Indigo	Herb	A	1		3
Ipomoea alba	Convolvulaceae	Ipomoea	Vine	A			3
Kyllinga brevifolia	Cyperaceae	Kyllinga	Herb	A		2	3
Kyllinga nemoralis	Cyperaceae	Kyllinga	Herb	A		2	3
Leucaena leucocephala	Fabaceae	Haole Koa	Shrub	A	1		
Malvastrum coromandelianum	Malvaceae	False Mallow	Herb	A			3
Mimosa pudica	Fabaceae	Sleeping Grass	Herb	A	1		3
Momordica charantia	Cucurbitaceae	Bitter Melon	Vine	A	1		
Morus alba	Moraceae	White Mulberry	Tree	A	1		

Scientific Name	Family	Common Name	Life Form	Status*	Tank #1	Tank #2	Tank #3
Nephrolepis multiflora	Nephrolepida-ceae	Sword Fern	Fern	A			3
Oxalis corniculata	Oxalidaceae	Wood Sorrel	Herb	A	1		
Panicum maximum	Poaceae	Guinea Grass	Herb	A	1	2	
Pennisetum purpureum	Poaceae	Elephant Grass	Herb	A		2	
Phyllanthus sp.	Euphorbiaceae	Phyllanthus	Herb	A	1	2	
Pityrogramma calomelanos	Hemionitida-ceae	Silver Fern	Fern	A			3
Polygala paniculata	Polygalaceae	Polygala	Herb	A		2	3
Pteris cretica	Pteridaceae	Cretan Break	Fern	I			3
Rhynchelytrum repens	Poaceae	Natal Redtop	Herb	A		2	
Ricinus communis	Euphorbiaceae	Castor Bean	Shrub	A	1		
Schinus terebinthifolius	Anacardiaceae	Christmas Berry	Shrub	A		2	
Senecio sp.	Asteraceae	Senecio	Herb	A			3
Sida rhombifolia	Malvaceae	Cuba Jute	Herb	A	1		3
Sida spinosa	Malvaceae	Prickly Sida	Herb	A	1		3
Sigesbeckia orientalis	Asteraceae	Sigesbeckia	Herb	A	1	2	
Silene gallica	Caryophylla-ceae	Catchfly	Herb	A			3
Spathodea campanulata	Bignoniaceae	African Tulip	Tree	A	1		
Stachytarpheta jamaicensis	Verbenaceae	Vervain	Herb	A	1		
Synedrella nodiflora	Asteraceae	Nodeweed	Herb	A		2	
Triumfetta sp.	Tiliaceae	Bur Bush	Herb	A	1	2	
Waltheria indica	Sterculiaceae	Uhaloa	Herb	I			3
Zingiber zerumbet	Zingiberaceae	Awapuhi	Herb	A	1		

* Status Codes: A = Alien, I = Indigenous, End = Federal/State listed Endangered Species

APPENDIX B

State Historic Preservation Division Correspondence

B-1 January 25, 2006
TMK: (3) 7-5-017: 043

B-2 October 4, 2006
TMK: (3) 7-5-017: 042

B-3 October 17, 2006
TMK: (3) 7-5-017: 040, 041

APPENDIX B-1

SHPD Correspondence
January 25, 2006
TMK: (3) 7-5-017: 043

0285c

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
DEPUTY DIRECTOR - LAND

DEAN NAKANO
ACTING DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

January 25, 2006

Dr. Robert Rechtman
Rechtman Consulting, LLC
HC 1 Box 4149
Kea'au, Hawaii 96749-9710

LOG NO: 2006.0116
DOC NO: 0601MM18
Archaeology

Dear Dr. Rechtman:

SUBJECT: **Chapter 6E-42 Historic Preservation Review [County/Planning] – Inventory Survey Report (RC-0285)**
Kahului 2nd Ahupua'a, North Kona District, Island of Hawai'i
TMK: (3) 7-5-017:043

Thank you for your cover letter dated August 17, 2005 and a copy of the report titled *Archaeological Inventory Survey of TMK: 3-7-5-017:043* (Bulgrin and Rechtman, August 2005) for our review. We apologize for the delay in providing our comments and for any inconvenience to you or your client, Mr. Phil Tinguely.

The report summarizes the results of an inventory survey on approximately 15-acre parcel situated along Hualalai Road near its intersection with the Kahului-Hienaloli Road. The historic background section is sufficient to predict the types of historic properties that might be present, and to evaluate their significance. Evidence of habitation and agriculture both prior to and following Western contact is expected. The parcel was in ranching use by the Gomes family from 1927 to the 1960's, so impacts from cattle and ranching activities are also expected. Evidence of intensive cultivation from the short-lived late nineteenth and early twentieth century sugar cane industry may also be present.

We believe that given the methodology described, all historic sites on the parcel have been identified. Six (6) archaeological sites are identified in the survey. These are historic walls which functioned as boundaries or in ranching (Sites 24553-24556), a ranching enclosure (Site 24557) and a terraced outcrop interpreted as a temporary habitation site in use prior to Western contact (Site 24558). Test excavations within terracing at Site 24558 yielded small amounts of marine shell, pig bone, volcanic glass flakes, and an adze fragment, suggesting temporary habitation use.

We agree with your recommended site treatments and the functional interpretations in all cases but one (Site 24588). All six (6) sites are assessed as significant under Criterion D for information on prehistory or history they have yielded, or are likely to yield. No further work is recommended for Sites 24553-24557. Data recovery is recommended for Site 24558, with a specific interest in the location of this site at the elevation transition from the *kula* to *kalu'ulu* traditional agricultural planting zone.

If your current interpretation of Site 24588 as a temporary habitation site relies solely on artifact frequency and does not account for all the dimensions of variability; "the diverse traces that formation processes "map onto" cultural materials" (Schiffer 1996:15), then it may be erroneous. "Persistent ambiguities [a propos site interpretation] have resulted from archaeologists' failure to keep conceptually and operationally distinct the various contexts of cultural remains in which traces are produced," and the inherent failure to recognize the four dimensions of artifact variability and the formation processes of the archaeological record (Schiffer 1996:15; see Reid 1985). We ask that you consider alternative site terminologies that convey duration information regarding the actual occupational patterns, rather than relying on loose and ambiguous terminologies such as short-term, long-term, temporary, etc. (See Schiffer 1996:100-103).

The report satisfies the conditions of HAR 13 §13-276 and is therefore considered adequate. We look forward to reviewing a data recovery plan.

If you have any questions regarding this review, please contact MaryAnne Maigret, Hawaii Island Section, at (808) 327-3690.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

MM:dlb

APPENDIX B-2

SHPD Correspondence
October 4, 2006
TMK: (3) 7-5-017: 042

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
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CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

October 4, 2006

Dr. Robert Rechtman
Rechtman Consulting, LLC
HC 1 Box 4149
Kea'au, HI 96749

LOG NO: 2006.3276
DOC NO: 0610JT17
Archaeology

Dear Dr. Rechtman:

SUBJECT: **National Historic Preservation Act (NHPA) Section 106 Review –**
An Archaeological Inventory Survey of TMK 3-7-5-017:042
Kahului 2nd Ahupua'a, North Kona District, Island of Hawai'i
TMK: (3) 7-5-017: 042

Thank you for submitting the revised report by Bulgrin & Rechtman (2005), your report RC-0285, for our review and comment. We apologize for the delay in our response. The report summarizes the results of an archaeological inventory survey of 15 acres for Mr. Phil Tinguely of Hualalai Partners, LLC. The survey identified six previously unrecorded sites and two previously identified sites. Rechtman Consulting LLC assessed all of the sites as significant under criterion d, and recommended that no further work was necessary at seven of the sites and that data recovery was appropriate for the eight sites.

The report has satisfied our concerns expressed in the earlier review. Therefore, we agree with your assessments and find sites 24553, 24555, 24562, 24563, 24564, 24565, and 24566 to be significant under criterion d. We also agree that site 24567 does not meet the criteria for significance, and therefore no further work on this site is necessary. We further agree that sufficient information has been collected and no further work is required at sites 24553, 24555, 24563, 24564, 24565, and 24566. And finally, we agree that data recovery at site 24562 will mitigate the effects of development on this historic property. The report is therefore accepted.

Thank you for your time and attention. We look forward to reviewing the data recovery plan for site 24562. If you have any comments or question please do not hesitate to contact Dr. Julie Taomia of the Hawai'i Island office at (808) 327-3691.

Aloha,

Peter Young, Chair
State Historic Preservation Officer

JT:gvf

APPENDIX B-3

SHPD Correspondence
October 17, 2006
TMK: (3) 7-5-017: 040 and 041

648

Date: 10-17 RECEIVED HIST. PRES. DIV. DEPT OF LAND & NATURAL RESOURCES

2006 OCT 18 A 12:43

Submittal Sheet for Historic Preservation Review Filing Fees

State Historic Preservation Division
Department Land and Natural Resources

Agency/Firm (Requesting Review): SCS Archaeology

Contact: JON WILSON

Phone: 597-1182 Fax: 597-1193 E-Mail: jonwilson@rocketmail.com

Address: 711 KAPIOLANI Blvd. Ste. 975 HON, HI 96813

Title of Report/Plan: An Inv. Surv. for 29.389 acres in North Kona District, Island of HAWAII TMK 7-5-017: 40 + 41

Island: _____ District: _____ Ahupua`a: _____

TMK [(1) 1-1-001:001]: _____

Submitted Plan/Report Fee & Type: (All reports or plans submitted to the SHPD for review shall be accompanied by the appropriate fee in accordance with HAR §13-275-4 and §284-4).

Check if Report is a Re-Submittal (no fee charged)

$50	Archaeological Assessment
$150	Archaeological Inventory Survey Plan
$450	Archaeological, Architectural or Ethnographic Survey Report
$150	Preservation Plan
$25	Monitoring Plan
$150	Archaeological Data Recovery Plan
$250	Burial Treatment Plan
$100	Archaeological Monitoring Report, if resources reported
$450	Archaeological Data Recovery Report
$450	Ethnographic Documentation Report
$25	Burial Disinterment Report
$50	Osteological Analysis Report

Public Comment Due: Nov 17, 2006
Review Due: Dec 2, 2006

Fee Total: $ 450 (Make check payable to "Hawaii Historic Preservation Special Fund")

For Office Use Only:

Date Received: OCT 18 2006	Receipt No.: 1796
	Payment Method:
	Cash _____ $ 450.00
	Check: ✓ Check No.: 3687
Log. No.: 2006.3530	Receipt Issued by: S. James
	Treasury Deposit Receipt No:

Note: A copy of this form will be mailed or faxed back to you and will serve as your receipt.

APPENDIX C

Grading Permits for North Alignment

County of Hawaii

DEPARTMENT OF PUBLIC WORKS

GRADING PERMIT NO. 91367

Fee: $ 17.00

Owner: C.L. AND D SIX LLC. Address: Po Box 898 KAILUA-KONA, HI. 96745 Phone: 329-8242

Civil Eng. / Surveyor: LEO FLEMING C.E. Address: Po Box 396 KAILUA-KONA, HI. 96745 Phone: 329-7141

License No.: 2308-C

Contractor: BOLTON INC. Address: Po Box 898 KAILUA-KONA, HI 96745 Phone: 329-8242

License No.: ABC-14458

Location: HIENALOLI - KAHULUI RD. KAILUA-KONA, HI. Tax Map Key: (3) 7-5-11:14 Cut(cy): 2750

Area Graded (acre): .42 Disposal Site:

Estimated Starting Date: 6-13-2005 Estimated Completion Date: 6-8-2006 Fill(cy): 220

(minimum 2 working days after issuance date) Borrow Site:

Remarks:

Phone: 327-3690 Fax: 327-3693

Firm X

1. ☒ STATE DLNR - HISTORIC PRESERVATION DIVISION

Received By: M. Mag Date: 6/1/05

Listed on the Hawaii or National Register of Historic Places

Approved: Date: 6/7/05

☐ Yes ☐ No

2. ☒ PLANNING DEPARTMENT

Received By: Date: 6/8/05

Approved: B. Mark Date: 6/8/05

3. ☒ DEPARTMENT OF PUBLIC WORKS

Received By: Joe Bogfalo Date: 6/9/05

Approved for Permit Issuance: Ronald L Fluit Date: 6-9-05

I hereby certify that all work as requested above will conform to Chapter 10 of the Hawaii County Code.

Owner: Date: 6/7/05

Return to the Department of Public Works, Engineering Division, upon completion of work.

Certification

Accepted by: Date:

(DPW inspector / engineer)

County of Hawaii

DEPARTMENT OF PUBLIC WORKS

STOCKPILING PERMIT NO. 91366

Fee: $ 9.00

Owner: C.L. AND D. SIX. LLC. Address: Po Box 898 KAILUA-KONA, HI. 96745 Phone: 329-824

Contractor: BOLTON INC. Address: Po Box 898 KAILUA-KONA, HI. 96745 Phone: 329-824

License No. ABC-14458

Location: HIENALOLI - KAHULUA RD. KAILUA-KONA, HI. 96745 Tax Map Key: (3) 7-5-11:14 Quantity (cy): 2530

Estimated Starting Date: 6-15-2005 Reference Grubbing/Grading Permit No.:

(2 working days minimum after issuance date) Expiration Date: 6-15-2006

Remarks:

Marc Smith - Phone: 933-0482

1. ☒ STATE DLNR - HISTORIC PRESERVATION

Received By: M. Ma Date: 6/1/05

Listed on the Hawaii or National Register of Historic Places.

Approved for Permit Issuance: Date: 6/7/05

☐ Yes ☐ No

2. ☒ PLANNING DEPARTMENT

Received By: Date: 6/8/05

Approved for Permit Issuance: Date: 6/8/05

3. ☒ DEPARTMENT OF PUBLIC WORKS

Received By: Date: 6/8/05

Approved for Permit Issuance: Date: 6/9/05

I hereby certify that all work as requested above will conform to Chapter 10 of the Hawaii County Code.

Owner: Date: 6/7/05

Return to the Department of Public Works, Engineering Division, upon completion of work.

Certification

Accepted by: Date:

(DPW inspector / engineer)

Stockpiling.wpd-December 9 1999