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DEPARTMENT OF LAND AND NATURAL RESOURCES

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September 30, 2013

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

Genevieve Salmonson, Interim Director
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 S. Beretania Street, Room 702
Honolulu, Hawai'i 96813

Dear Ms. Salmonson:

With this letter, the Department of Land and Natural Resources (DLNR) hereby transmits the final environmental assessment and finding of no significant impact (FEA-FONSI) for the proposed Wai'anae Valley Ranch Lease by Ka'ala Farm, Inc. and Ho'omau Ke Ola, situated at TMK 8-5-006:004 in the Wai'anae District on the island of O'ahu for publication in the next available edition of the *Environmental Notice*.

The DLNR has included copies of public comments and the corresponding responses from the applicant that were received on the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI).

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

If there are any questions, please contact Barry Cheung of DLNR at 587-0430 or via email at barry.w.cheung@hawaii.gov.

Sincerely,

William J. Aila, Jr.
Chairperson

CC: Applicant
Enclousres: Two (2) hard copies of FEA-FONSI
One (1) electronic copy of FEA-FONSI
One (1) hard copy of OEQC Publication Form
One (1) electronic copy of OEQC Publication Form

APPLICANT ACTIONS
SECTION 343-5(C), HRS
PUBLICATION FORM (JANURARY 2013 REVISION)

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

Project Name: Final Environmental Assessment for the Wai'anae Valley Ranch Application for a General Lease by Ka'ala Farm, Inc. and Ho'omau Ke Ola

Island: O'ahu

District: Wai'anae

TMK: 8-5-006:004 (ranch parcel), (8-5-005:036 for parking lot only)

Permits: City & County Building Permits, Grading/grubbing Permits, Conditional Use Permit; State of Hawaii Archaeological Inventory Surveys (AIS) + historic preservation/data recovery/mitigation plans to SHPD

Approving Agency: Department of Land and Natural Resources, Land Division, 1151 Punchbowl Street, Room 220, Honolulu HI 96813. Contact: Barry Cheung, Land Agent. Telephone: (808) 587-0430, email: barry.w.cheung@hawaii.gov

Applicant: 1. Ka'ala Farm, Inc., PO Box 630, Wai'anae HI 96792. Contact: Eric Enos, Executive Director. Telephone: (808) 696-4954, email: eric@kaala.org
2. Ho'omau Ke Ola, PO Box 837, Wai'anae HI 96792. Contact: Dr. Patti Isaacs, Executive Director. Telephone: (808) 696-4266, email: p.isaacs@hoomaukeola.com

Consultant: Townscape, Inc., 900 Fort Street Mall, Suite 1160, Honolulu HI 96813. Contact: Tina Speed Telephone: (808) 536-6999 Ext. 4, email: tina@townscapeinc.com

Status (check one only):

__DEA-AFNSI — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin.

X FEA-FONSI — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN — Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin.

__Act 172-12 EISPN — Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS — The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS — The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23 Determination — The approving agency simultaneous transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the applicant. No comment period ensues upon publication in the periodic bulletin.

__Statutory hammer Acceptance — The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant's FEIS is deemed accepted as a matter of law.

__Section 11-200-27 Determination — The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

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

Ka'ala Farm, Inc. (KFI) and Ho'omau Ke Ola (HKO), both non-profit organizations, are applying for a joint lease of the property formerly known as Wai'anae Valley Ranch. The Land Board gave preliminary lease approval to KFI pending the results of this Environmental Assessment. For final lease processing, KFI and HKO wish to be added as joint lessees. The use of State lands triggers HRS Section 343-5(a).

The applicants' proposed actions for this DLNR property include four discrete "project areas" 1. "Ranch Headquarters & Organic Farm": Basic site infrastructure improvements for the development of a small organic farm/community garden area with operational facilities. 2. "Cultural Preservation Pilot Project": Heiau maintenance and re-planting of historic dryland fields. 3. "Expansion of Preservation Pilot Project" from a small test area to a larger expanded area. 4. "Road and Firebreak Maintenance, Flood Mitigation": General firebreak maintenance in and around the property and various flood mitigation measures in dry gulches.

The overall goals of the proposed actions are to return part of the parcel to active agricultural use, and protect/preserve the many important cultural sites on the property. The proposed actions are meant to restore pono to the land and the community by perpetuating Native Hawaiian cultural practices and stewardship methods in an educational/healing context.

FINAL ENVIRONMENTAL ASSESSMENT FOR

WAIʻANAE VALLEY RANCH

This document prepared pursuant to Chapter 343, HRS

Applicant: Kaʻala Farm, Inc. and Hoʻomau Ke Ola

Approving Agency: Land Division
State of Hawaiʻi Department of Land and Natural Resources

September 2013

FINAL ENVIRONMENTAL ASSESSMENT FOR

WAIʻANAE VALLEY RANCH

This document prepared pursuant to Chapter 343, HRS

Applicant:	Kaʻala Farm, Inc. and Hoʻomau Ke Ola
Approving Agency:	Land Division
	State of Hawaiʻi Department of Land and Natural Resources

September 2013

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Appendix B — Dr. Ross Cordy: Information On Historic Sites, Upper Wai‘anae Valley, January 2011

Appendix C — Comments Received on Draft EA and Response Letter

ACRONYMS

AD	"Anno Domini" = All years since BC ("Before Christ")
ALISH	Agricultural Lands of Importance to the State of Hawai‘i
BMP	Best Management Practice
BWS	Honolulu Board of Water Supply (City)
DHHL	Department of Hawaiian Homelands (State)
DLNR	Department of Land and Natural Resources (State)
DOFAW	Division of Forestry and Wildlife (DLNR)
DOH	Department of Health (State)
HAR	Hawai‘i Administrative Rules
HKO	Ho‘omau Ke Ola
KFI	Ka‘ala Farm, Inc.
LEED	Leadership in Energy and Environmental Design
MGD	Million Gallons per Day
NRCS	Natural Resources Conservation Service
SCP	Sustainable Communities Plan
SHPD	State Historic Preservation Division (DLNR)
TMK	Tax Map Key
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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1. INTRODUCTION

Project Name: Waiʻanae Valley Ranch Application for a General Lease

Applicant: Kaʻala Farm, Inc. & Hoʻomau Ke Ola

Contact: Eric Enos, Kaʻala Farm, Inc.; Dr. Patti Isaacs, Hoʻomau Ke Ola; Tina Speed, Townscape, Inc.

Approving Agency: Department of Land and Natural Resources (DLNR), Land Division

Project Location: Waiʻanae Valley, Oʻahu

Property Owner: State of Hawaiʻi

TMK: 8-5-006:004, (8-5-005:036 for parking lot)

Parcel Size: 1,122.426 acres

State Land Use Classification: Agricultural District

County Zoning: Ag-2 General

Permits required: Building Permits, Grading/grubbing Permits, Conditional Use Permit for non-agricultural uses, Archaeological Inventory Surveys (AIS) + historic preservation/data recovery/mitigation plans to SHPD

Anticipated Determination of Environmental Assessment: Finding of No Significant Impact

Agencies and parties consulted:

Federal: None (N/A)

State: DLNR Land Division
DLNR Historic Preservation Division (SHPD)
DLNR Division of Forestry and Wildlife (DOFAW)
Office of Hawaiian Affairs (OHA)

2. SUMMARY OF PROPOSED ACTIONS

2.1. BACKGROUND AND PROPOSED PROGRAMS

Two well-known and respected non-profit organizations in Waiʻanae have partnered to apply for a joint lease of the property covered by this Environmental Assessment (EA). Kaʻala Farm, Inc. (KFI), a 501(c)(3) non-profit organization has a history of promoting and teaching traditional (agri)cultural and stewardship methods to thousands of children and adults at the Kaʻala Cultural Learning Center, adjacent to Waiʻanae Valley Ranch. They have multiple keiki, adult, and intern programs to strengthen the relationship between people and ʻāina and teach valuable knowledge about traditional agricultural methods, cultural practices and environmental protection (Tapiki LLC, 2012). A quote that illustrates the mission of the organization as found on their website reads

"If you plan for a year, plant kalo. If you plan for ten years, plant koa.
If you plan for a hundred years, teach the children aloha ʻāina ."

KFI's funding comes from a combination of grants, contracts, and donations. The staff of seven dedicated full-time workers has the vision and knowledge to apply similar stewardship practices to the ranch parcel. But they lack the ongoing volunteer workforce needed to make use of this area (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012).

This problem was resolved through a marvelous partnership with Hoʻomau Ke Ola (HKO), another Waiʻanae-based non-profit organization (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012). HKO provides substance abuse treatment programs that utilize Hawaiian cultural practices. The programs focus on "ʻāina-based treatment" as a method of healing by re-connecting people with the land (Hoʻomau Ke Ola, 2012). The vision of HKO for Waiʻanae Valley Ranch is aligned with KFI's vision as a place of healing for individuals and families caught in a reoccurring cycle of substance abuse and domestic violence. HKO has forty staff members and receives funding from contracts with the State and County, private insurance and various grants (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012). The success of programs like Hoʻomau Ke Ola in reversing the cycle of abuse, and its devastating effect on families, is grounded in utilization of the land to connect the clients and their families to what a healthy community looks and feels like. In this case, both the land and the people will be restored to health and HKO's continuing rotation of clients will provide the workforce for sustainably utilizing and restoring the land formerly known as Waiʻanae Valley Ranch (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012).

The requested lease term for the property is 30 years and a preliminary approval has been given by the Land Board to KFI, pending the results of this Environmental Assessment. For final lease processing, KFI and HKO wish to be recognized as joint lessees.

2.2. PROPOSED ACTIONS BY PROJECT

The general goals for the parcel are to engage in meaningful ʻāina-based work that will restore balance to the land and people. The major objectives include 1) Organic farming and associated activities such as value-added food processing, 2) Cultural preservation and restoration focused on heiau and dryland field/loʻi restoration, 3) General preparation and maintenance of the property with emphasis on hazard mitigation.

HKO and KFI wish to eliminate the use of chemicals (e.g. pesticides) on the land and all facilities are proposed with various water and energy-efficient fixtures and renewable energy such as solar panels. This will make them eligible for participation in the Hawaiʻi Green Business Program, which recognizes and assists businesses that operate in an environmentally and socially responsible manner.

The short-term goals (3-5 years) for the parcel are focused on preparing, beautifying and maintaining the existing ranch headquarters area for future KFI and HKO operations as well as some initial preservation of the heiau and preparation for re-planting the dryland fields. This will include activities such as planting and road maintenance, as well as construction of a limited number of facilities. After HKO clients have prepared the site for future agricultural and therapeutic programs, programmatic activities can be expanded to make use of the limited acreage of "prime farmland" located around the headquarters area, and the significant cultural sites and historic field systems throughout the ranch. Before ground disturbance can take place, Archaeological Inventory Surveys (AIS) will need to be completed for the areas to be used. As part of this EA process, Townscape, Inc. met with staff of the State Historic Preservation Division (SHPD) to discuss the requirements of the AIS. Since "phasing" of AIS is not allowed and completing an AIS for the entire parcel would require an unfeasible amount of time and money, SHPD recommended outlining discrete "projects", where activities will take place and completing AIS only for those project areas, while leaving the rest of the parcel undisturbed. Following this recommendation, the proposed activities for the land were organized into four discrete projects:

Project # 1: Ranch Headquarters (Farm and facilities area, ~ 25 acres)

Project # 2: Cultural Preservation Pilot Project (Heiau maintenance and dryland field re-planting, streambank planting, ~ 5 acres)

Project # 3: Expansion of Preservationn Pilot Project (expansion of pilot project activities, ~ 20 acres)

Project # 4: Road and Firebreak Maintenance, Flood Mitigation (several miles of firebreaks and roads along perimeter and throughout the parcel, various flood mitigation measures along dry gulches)

The four projects are detailed in the following sub-sections.

2.2.1. Project # 1 - Ranch Headquarters (Farm and facilities)

The former ranch headquarters area is the corner portion of the property inside the entry gate. Currently, the dilapidated remains of the former ranch are still in place, including the ranch house and a smaller house, as well as several support structures, such as carports, sheds and corrals. The house structures are in a severely deteriorated condition, with extreme termite damage and rat infestations. Part of Project # 1 will be the demolition of most of these existing old structures. There are also random remains of former ranching activities spread throughout the ranch, as well as trash found in drainages right outside the parcel along Waiʻanae Valley Road. A field inspection of major streams and gulches throughout the parcel revealed excessive trash, including car parts, dead animals and metal debris in the drainages and culverts of Punanaʻula and Kūmaipō Streams. HKO is committed to providing labor for clean-up of the land. The Ka Ipu ʻĀina Program run by Matson provides Matson containers for site cleanup and delivers the containers to a disposal facility. This will be one of the first steps in preparing the land for future uses.

Parking, Access and Entry

One of the ongoing problems in the back of the valley is uncontrolled access. This has led to people trespassing for hunting and trash dumping. Since the only properties mauka of the ranch gate are State land, KFI and a few private properties, KFI wishes to monitor access by providing a guard shack manned by a "Conservation Officer", a KFI or HKO employee who can educate people entering the valley about the proper protocols regarding treatment of the land, trash disposal, use of hunting dogs, etc. This guard shack will likely be located across the street from the entry gate on the DHHL land (TMK 8-5-005:036) already under license to KFI. Details about funding for the conservation officer position and potential collaboration possibilities with other nearby landowners are still being worked out.

The DHHL parcel is also proposed for a gravel parking lot to accommodate about 30-40 vehicles (visitors and staff). The idea is to keep vehicles off the ranch parcel as much as possible. Preferably, people driving up Waiʻanae Valley Road would pull into the gravel parking lot to the right and check in with the Conservation Officer. They can then use the restroom, perform spiritual protocols at the nearby ahu and walk across to the entry gate.

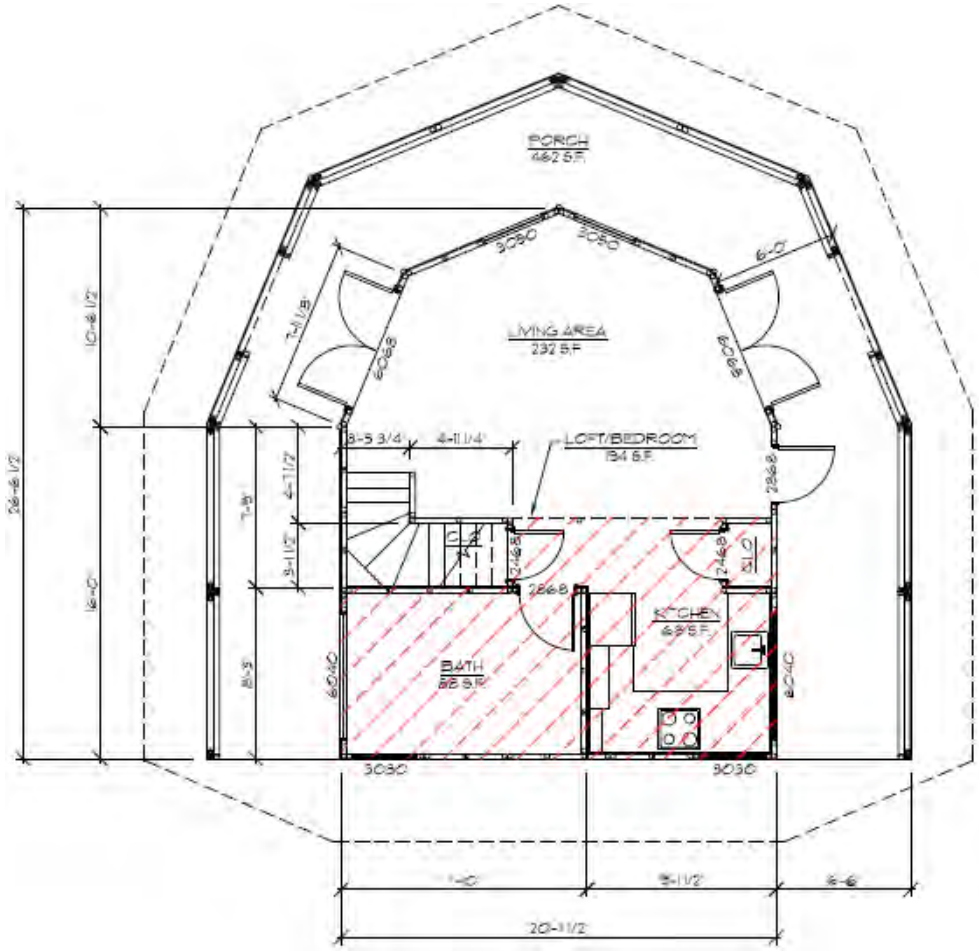
The existing dirt driveway will be expanded and improved with gravel. The sides will be planted with ornamental plants (Nā meakanu) and ti to create an inviting entry experience, along with a stone wall extending along the fenceline, built by HKO clients learning traditional Hawaiian stonemasonry. This wall will stretch for approximately 180 feet from the corner of the property at Waiʻanae Valley Road to the entry driveway. From the driveway, it will extend approximately 100 more feet towards the mountains. For any landscaping/ornamental plants, landscape irrigation conservation BMPs endorsed by the Landscape Industry Council of Hawaiʻi will be used.

Inside the entry gate there will be a small security office that will be manned 24/7. This strategic site allows for monitoring of activities throughout much of the ranch. At a later time, there may be

a need for a second security office on the mauka side of the property. For ease of construction and environmental sustainability, a pre-fabricated bamboo structure by Bamboo Living from the Big Island will be used. The model picked for the security office is the "Pacific 612", a 492 sf 1 bedroom, 1 bathroom facility. The applicants wish to use environmentally friendly and pesticide-free materials throughout the ranch. Bamboo homes purchased from Bamboo Living contribute to environmental sustainability because the bamboo is fast growing and sustainably harvested, not treated with pesticides and it stores carbon for 150 years. The structures are also very durable and can withstand hurricane force winds. The design is well-suited for the Hawaiian Islands and blends into the landscape very nicely. This structure will have solar panels covering the roof.

<u>Security office details</u>
Implementation schedule: Immediately
Permitting requirements: Building permit
Cost: $54,444 (pre-fab kit) $107,055 with basic finish
Plus solar: ($2,000 per 50W panel)

Floor plan (security office, Pacific 612):



Final appearance (security office, Pacific 612):

Farm and Accessory Structures

There are approximately 18 acres of "prime farmland" located in the headquarters area, containing soils that are suitable for modern agricultural methods and non-traditional crops, such as vegetables and tropical fruits (State of Hawaii Office of Planning, 2012). This prime farm area is proposed for organic produce farming as part of HKO's ʻāina-based therapeutic programs. Native Hawaiians did not consider land as something to be "owned" by people, but rather something held collectively to nurture the people and be cared for by the people. From this philosophy comes the practice of "Aloha ʻĀina" (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012). This philosophy is an integral part of HKO's therapy program, which is extremely successful at promoting and sustaining substance abuse and mental health recovery by re-connecting people with the land. Small-scale organic agriculture will help make great use of the land and the people and provide benefits for both. This may eventually lead to a related food service business which can add value to the agricultural products produced. A preliminary conceptual layout of the farm is shown in Figure 1. However, the layout is yet to be refined. Fields and facilities will likely be arranged in a layout that can make use of the crops as a firebreak.

KFI and HKO have strong ties to the local community and believe in sharing access to their ancestral lands for the benefit of the community. In addition to the organic farming activities proposed previously, KFI and HKO want to reserve some parts of the prime agricultural lands for community members and their families. This would include small garden plots to grow vegetables and possibly areas for raising rabbits and fowl. In addition, this would incorporate gathering/picnic areas to prepare food and spend quality time together to enhance families.

Part of HKO's cultural therapy program involves teaching traditional lei-making techniques. To obtain the flowers and plants needed, HKO proposes to plant a lei and tropical flower garden to teach clients skills in growing flowers, flower arrangement, and lei making. Some parts of the prime agricultural land may also be used for fruit orchards such as avocado trees.

The applicants wish to limit chemical use on the land and engage in organic growing methods. To accomplish this, crop rotation, the use of earth worms and organic mulch, and strategic use of farm animals is recommended (Bush-Brown & Bush-Brown, 1996; Pollan, 2006). Farming accessory structures such as a nursery, large worm bin, mulch shed and small animal enclosures will be located just outside the prime soil area with easy access to the fields. The dirt road leading mauka through the property will be improved with gravel to allow for better access of farm vehicles. Small animals such as poultry, rabbits, goats and pigs can be raised for crop fertilization, eggs and meat. In the future, HKO may receive horses as donations, which will be used for various programmatic purposes, including a therapeutic horsemanship program, and to help control some of the pasture grasses along with a few head of cattle. Horses would also offer an excellent mode of transportation perfectly suited to the terrain to access the mauka areas of the property.

The use of worms for composting is useful in any agricultural environment as worms produce high quality compost for fertilizing and soil conditioning. A large worm bin will be used to dispose of vegetable, fruit and other plant scraps and produce high quality compost for use in gardens and

receive their cafeteria food scraps, which can feed the worms and contribute to fertilizing the farm without the use of synthetic fertilizers. (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012) In addition to the school scraps, the worm bin will be fed by scraps from the on-site community kitchen.

Large quantities of mulch may be needed eventually once agricultural and community garden operations are expanded. Therefore, a storage shed for mulch will be needed with easy access to dirt roads and fields.

Mulch shed/worm bin details
Implementation schedule: Long-term
Permitting requirements: None – Agricultural accessory
Cost: $1,000 or less

In addition to growing vegetables on the ground, HKO is also working to obtain a small aquaponics facility with an associated fish hatchery to raise the fingerlings. The emerging technology of aquaponics has great potential in areas where water is scarce, such as Waiʻanae Valley. When properly utilized, the fish are grown in tanks, the water is circulated to the plants growing in a gravel medium, the fish waste is converted by the plants in the medium and the clean water returns to the fish tanks, creating a perfect, mutually beneficial cycle. Very little water is lost in this process, no soil is needed and plants grow extremely well in this type of system (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012). This system would provide both produce, as well as protein to promote a healthy diet.

Aquaponics facility details
Implementation schedule: Long-term
Permitting requirements: Building permit
Cost: Facility will be donated. Model not available yet. A greenhouse model such as the one pictured below is ~ $15 ,000 (Friendly Aquaponics, Inc., 2011)

Final appearance (Aquaponics facility, approximate, no plans available yet):

A Friendly Aquaponics Greenhouse facility in Hawaiʻi

In order to prepare and/or process some of the food grown on the land, there is a need for a community kitchen. This should include a DOH-certified food processing area to produce items like jam, pesto and chutney made from the produce grown on-site. This will create added value for the agricultural products, which can then be marketed for sale. The kitchen will be located close to the farm area so that produce can be easily harvested and transported to the kitchen for processing, both from the fields, as well as the aquaponics facility. Easy access to the worm bin will allow for food scraps from the kitchen to be fed to the worm bin right away. Having a full certified kitchen will help educate and train HKO clients and community members in the food service industry and value chain production as part of their ongoing workforce development program.

Community kitchen details
Implementation schedule: Long-term
Permitting requirements: Building permit
Cost: $250,000 +

Close to the farming operations shall be a garage and maintenance area for the maintenance of vehicles and farm machines. An additional bathroom will also be located in this area for easy access by people working on the farm as well as people from the other nearby facilities. HKO is already talking with NRCS regarding a soil and water conservation plan for the land.

Garage/maintenance area details
Implementation schedule: Long-term
Permitting requirements: None- Agricultural accessory
Cost: $100,000

Bathroom details
Implementation schedule: Long-term
Permitting requirements: Building permit
Cost: $100,000 +

Operational Structures
The majority of facilities would be located in another cluster farther away from the farm, with easy access to the bathroom, including a Therapeutic Art Center and farm accessory structures.

To expand on the therapeutic program offered by HKO, a Therapeutic Art Center is proposed to help clients express their personal trauma through art. This has been proven to help people with substance abuse and mental illness, who often have difficulty expressing their traumatic past through verbal means. The Therapeutic Art Center will be a place to create and learn about art in a

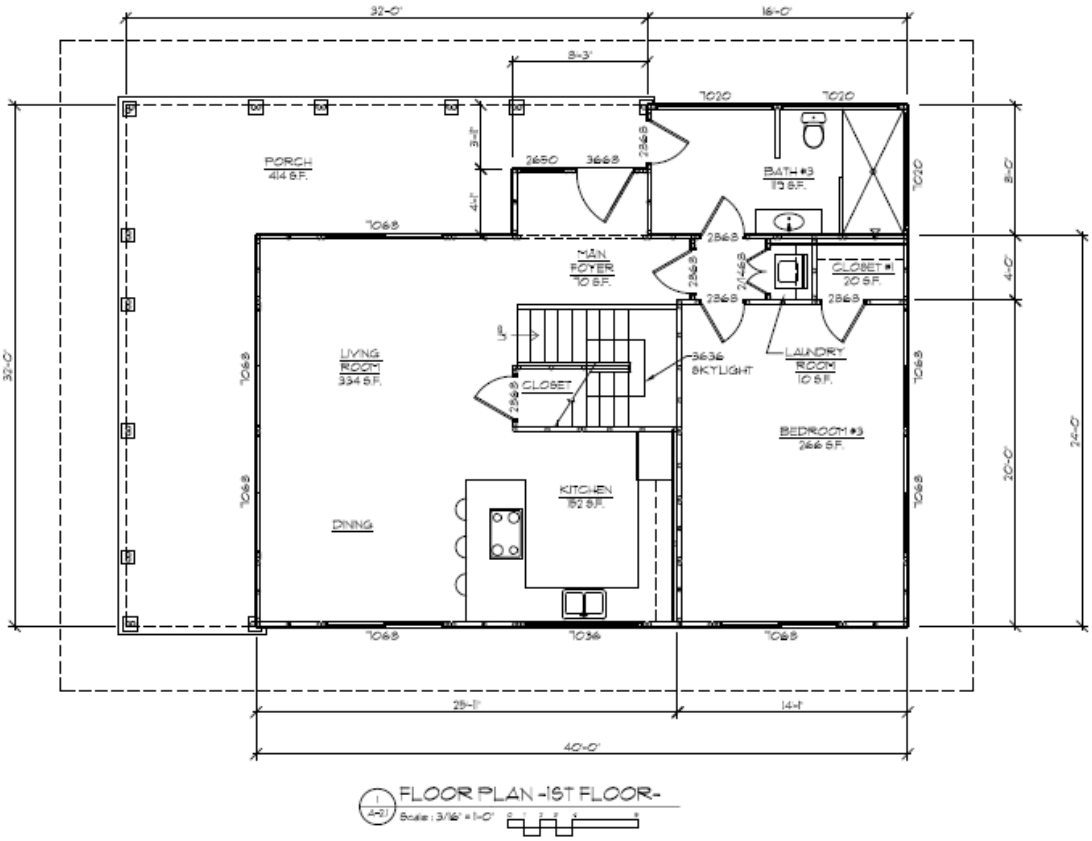
therapeutic way. A similar facility on Maui, the HUI Noeau Visual Arts Center, will be used as a model. The structure has not been selected yet for this facility, but it will likely be another small Bamboo Living pre-fabricated structure.

Therapeutic Art Center details
Implementation schedule: Long-term
Permitting requirements: Building permit
Cost: Possibly a small Bamboo Living facility <$200,000

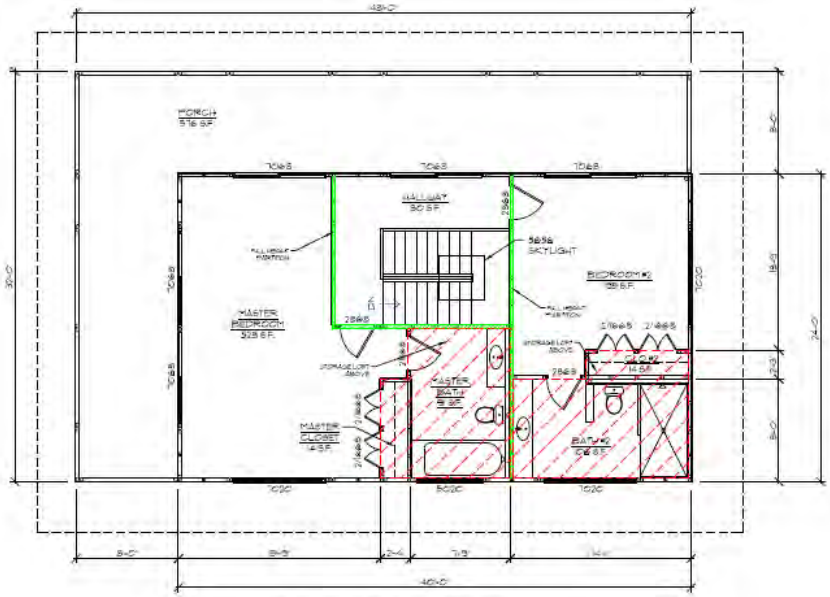
The only facility to be located on the farmland is the operational headquarters. HKO plans to move their operations from their Farrington Highway location to the ranch property after obtaining the lease. To accomplish this, they will need a "multi-purpose building" to provide space for client activities, keiki, administrative support, bathrooms, etc. Like the security office, this facility will also be a Bamboo Living pre-fabricated structure. For the multi-purpose building, the model chosen is the "Bali 2080", a 2,080 sf 3 bedroom, 3 bathroom facility. The "bedrooms", as they are typically called for residential and pre-fabricated buildings like this will be used for a variety of operational activities, including administration, storage and therapy sessions, as well as childcare space for HKO staff. The roof of this building will be covered with solar panels and water and energy efficient fixtures will be used to qualify the structure for LEED certification. This structure will replace the dilapidated former ranch house currently in the headquarters area. Since the ranch operations already disturbed this area and there is existing infrastructure connected to the old ranch house, it makes sense to place the new main structure in the same location after tearing down the old house. HKO and KFI would like for any structures to be built outside of the previously disturbed farm area in the future to only be of traditional Hawaiian design. The existing vegetable garden near the old ranch house can be used as a keiki garden and an outdoor keiki area will be constructed around the garden to teach children about gardening, vegetables and animal care.

Multi-purpose building details
Implementation schedule: Immediately
Permitting requirements: Building Permit
Cost: $350,000
Plus solar: ($2,000 per 50W panel)

Floor plans (multi-purpose building, Bali 2080):

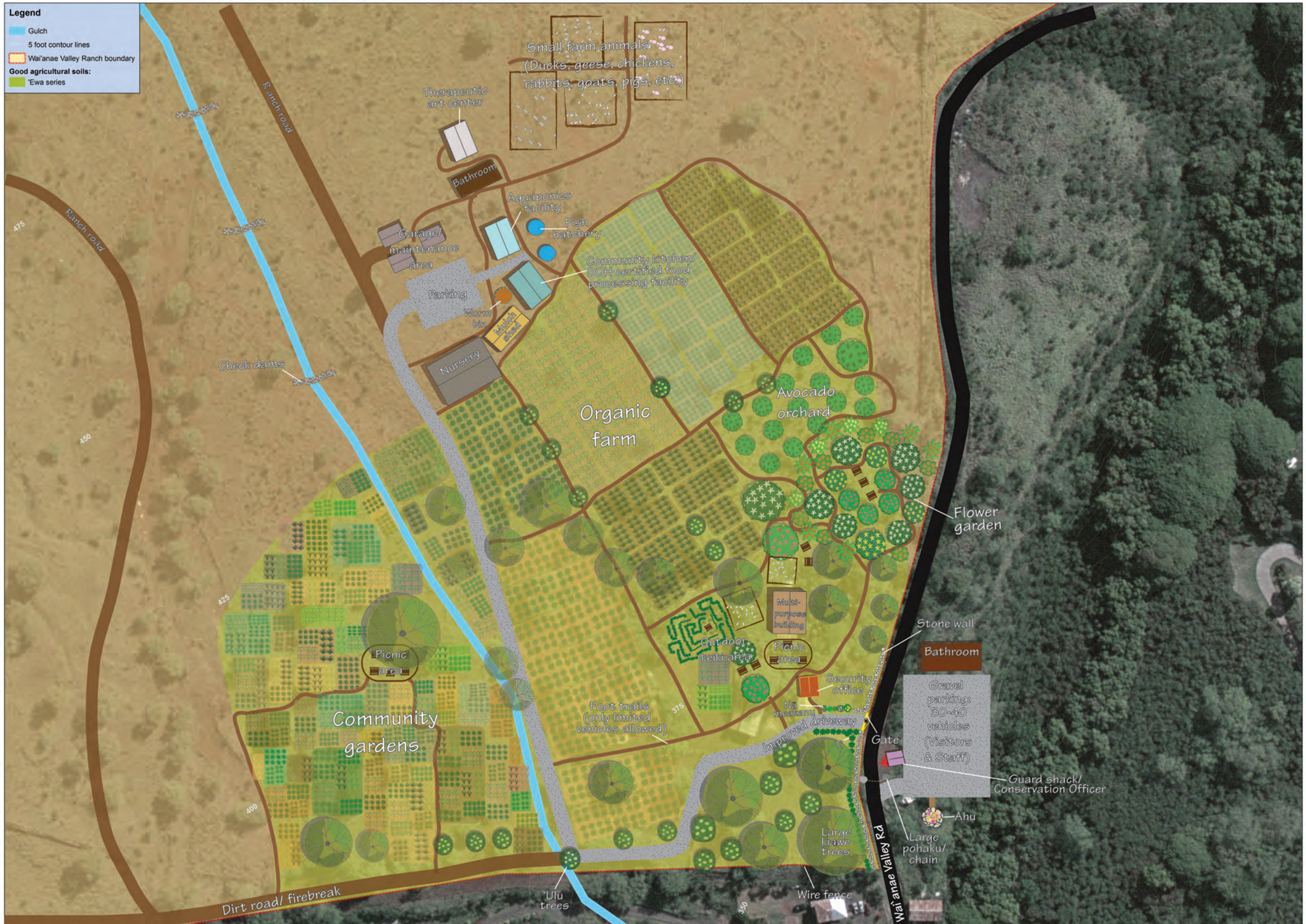


FLOOR PLAN -1ST FLOOR-



FLOOR PLAN -2ND FLOOR-

Final appearance (multi-purpose building, Bali 2080):



Note: Locations of facilities and other improvements are preliminary and may change based on engineering, archaeology and/or other constraints.

Figure 1. Project # 1 CONCEPTUAL SITE PLAN (Farm and Facilities ~ 25 acres)

By: Townscape, Inc. For: Ka'ala Farm, Inc. & Ho'omau Ke Ola Date: July 2013

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2.2.2. Project # 2 - Cultural Preservation Pilot Project

There are hundreds of acres of historic dryland fields throughout the ranch, some of which have been mapped and excavated by archaeologist Dr. Ross Cordy, who has been studying this area with his students for 16 years (see Figure 13). There are tremendous opportunities for cultural preservation of the Punanaʻula heiau and re-planting the surrounding kalo and ʻuala fields (Cordy, 2011) . Kaʻala Farm is already growing irrigated kalo and their staff has expertise in growing traditional crops. Since HKO therapeutic programs incorporate traditional Hawaiian principles, preservation of cultural sites, including the heiau and fields are a big priority for the applicants (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012). A field trip to the heiau and fields on March 29, 2013 with Dr. Cordy helped us identify where to best focus initial preservation efforts and what precautions need to be taken to avoid damaging cultural sites. After completion of the AIS for the discrete project area, basic preservation (including manual weed control) of the heiau will be proposed in a preservation plan. Using chemical herbicides would make this an easier task, but KFI and HKO wish to avoid using chemicals on the land, especially in such close proximity to food crops. The preservation plan will likely propose plantings of native plants near the heiau as well as repair of some damaged facings of the heiau. This type of work will be done by a stonemason trained in Native Hawaiian stonemasonry and overseen by both the mason and a professional archaeologist to best record the architecture of the heiau.

Initial dryland field and loʻi re-planting are proposed on a roughly 5-acre zone surrounding Punanaʻula heiau (see Figure 2). Preparing this land for growing kalo and ʻuala will take considerable effort, which will keep HKO clients busy for some time. The terracing is still intact, however it is densely overgrown by non-native grasses. Preparation will include manual removal of this vegetation before planting can take place. Existing stone terraces and architecture will not be altered. Water for re-planting will likely be taken from Punanaʻula Stream at an old small ranch "reservoir", fed by a registered stream diversion and water catchments. In addition, the pilot project area is well above the 50-inch rainfall isohyet, making it suitable for rain-fed cultivation (outside of the loʻi area). The initial 5-acre area can serve as a pilot project to refine the methods before expanding re-planting efforts to a larger area (Project # 3 – Expansion of pilot project). The pilot project will also include some planting of various food plants such as banana, ʻulu, ti, etc. along the small drainage receiving water from the Punanaʻula spring, as well as invasive species removal and fence repairs.

2.2.3. Project # 3 - Expansion of Preservation Pilot Project

Once enough lessons have been learned from the pilot project and the cultivation methods have been refined, proposals for the terrace preservation and cultivation of dryland field terraces will be expanded to a larger area of about 20 acres after completion of an AIS for that area and approval and execution of appropriate historic preservation mitigation plans. There are hundreds of acres of terraces here and two heiau in addition to Punanaʻula. The preservation of these cultural sites could potentially be expanded throughout much of the mauka portions of the property, depending on the available manpower and resources for continued archaeological surveys.

2.2.4. Project # 4 - Road and Firebreak Maintenance, Flood Mitigation

There are a number of remaining and overgrown dirt ranch roads throughout the parcel that are in severe disrepair. If restored, then most of the property can be accessed via 4WD vehicles. This would be very helpful in transporting tools, equipment, and people to remote parts of the property. Cultural sites are not found within these roads, but some are quite close by. Thus, proposed road maintenance will need to include identification of significant historic sites and detailed mitigation plans to ensure site protection and avoidance during maintenance and access activities. The maintenance work will be performed by HKO clients via hand-clearing and without the use of major machinery to preserve the cultural sites on the property. Several vehicle turnaround areas and small parking areas may be part of these plans.

One of the major natural hazards of concern for the area is fire. According to the LANDFIRE mapping project, the historical fire regime for most of the property is Fire Regime Group I, with an average fire return interval of 0-35 years (USGS, 2006). Roads can serve as firebreaks, so restoring and maintaining the ranch roads will help prevent the spread of wildfires. Road restoration plans will thus include enough space so that fire engines can have access. To prevent damage to cultural sites by turning vehicles, several turnaround areas will be proposed for construction in areas with no cultural sites to allow fire engines to turn. This will ensure that vehicles will stay on the approved paths, away from sensitive cultural sites. In addition, the applicants wish to maintain a firebreak corridor along the southern boundary of the property to keep any potential fires from spreading to neighboring parcels. This would be accomplished through weed whacking along the southern fenceline and strategic herding of farm animals (probably goats) along the firebreak to control vegetation. Additional firebreaks may be proposed along the forest reserve boundary and throughout the property to help protect the headquarters area. A recent study completed for DOFAW articulated the need for fire suppression and prevention on neighboring parcels to keep wildfires from grassy areas with heavy fuel loads from spreading into the forest reserve (Heider, Chris; Salminen, Ed (WPN LLC), 2013). HKO and KFI are interested in partnering with DOFAW to prevent the spread of wildfires, as well as for potential longer term fencing and re-forestation projects. DOFAW has already expressed willingness to provide assistance.

A secondary hazard is flash flooding during heavy rain events. Waiʻanae Valley receives relatively little average rainfall and the streams are intermittent. However, during heavy rainfall events, the dry gulches throughout the property fill rapidly, causing flash flooding downstream. To minimize flood damage, facilities will be strategically located outside of flood-prone areas. Care has to be taken to avoid any land uses that could alter water flows and cause additional downstream flood hazards for neighboring parcels. Dr. Cordy suggested constructing a series of check dams along major drainages to retain some of the stormwater for irrigation purposes. These check dams may have some positive benefits for flood mitigation as well, but will need to be re-built after severe rain events. Additional flood mitigation measures may include increasing groundcover to stabilize the soil via native flora such as aʻaliʻi, pili grass and wiliwili, among others. Long-term flood mitigation could be accomplished through upland reforestation with native plants.

All these flood and fire mitigation activities will be documented with detailed plans, including historic preservation mitigation plans, which will need to be approved and implemented.

2.2.5. Longer Term Possibilities

Due to the size of the property and the resources on site, there is tremendous potential for long-term use. Some of the possibilities that have been discussed include 1) A traditional thatch roof hale as a gathering space, to be built by certified traditional builders. This will be located mauka of the headquarters area near the first heiau to create a cultural piko outside the main operations area; 2) Native forest restoration in the mauka areas in combination with woodworking; 3) Fencing projects to protect native species and exclude feral ungulates (possibly in partnership with DOFAW); 4) A botanical garden showcasing native plants; 5) Edible forests containing food plants from which to harvest; 6) Restoration of historic trail systems for the general public; 7) A non-commercial solar farm for energy production on the makai end of the property. This can power the property for operational uses and any excess can be sold back to the power grid.

2.2.6. Projected Water Demands

The primary demand for water will be for irrigation of the "Organic Farm" and the "Community Garden" that are illustrated in the CONCEPTUAL SITE PLAN (Figure 1). These future planted areas total about 16 acres and will require approximately 30,000 to 50,000 gallons of water per day, depending on the crops and garden plants that are being cultivated, the acreage of fallow areas, and seasonal variations of temperature and rainfall. Irrigation water will come from the Board of Water Supply system that provides water to area farms and homes. There are no other major water uses/users planned for the ranch.

Other water demands – of farm workers, educational programs, and various environmental restoration programs – will be nominal; probably in the range of a few thousand gallons per day from the BWS system. The program to preserve and replant some of the historic dryland fields will not require irrigation water, as new plantings will be limited to crops like ʻuala that can survive and grow with natural rainfall as their only water source.

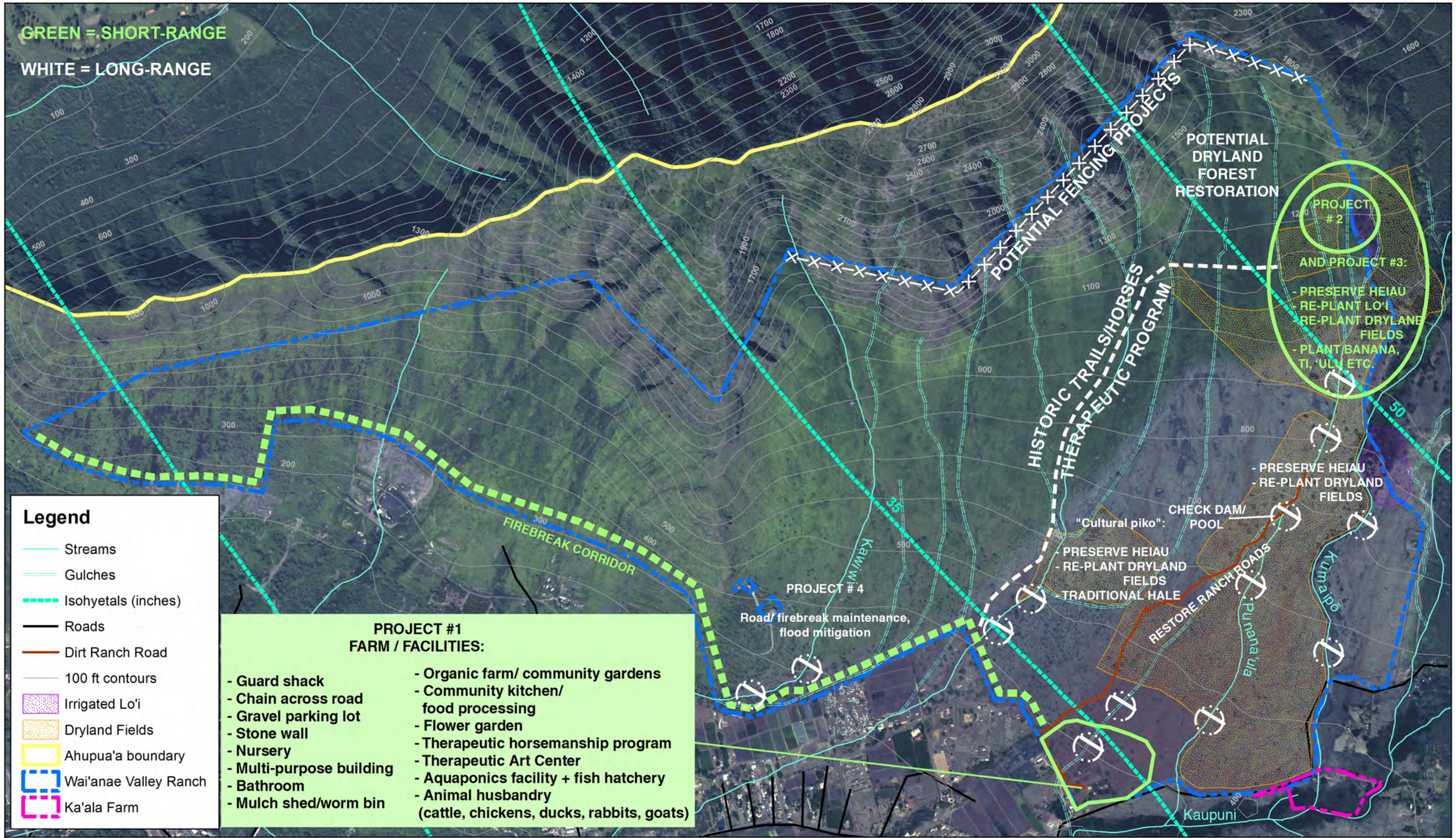

Figure 2. CONCEPTUAL PLAN

By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: June 2013

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3. DESCRIPTION OF THE AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

Legend
Major roads
Wai'anae Vallley Ranch
Wai'nae Ahupua'a boundaries
Ka'ena Point
Keawa'ula
Kahanahāiki
Mākua
Ohikilolo
Kea'au
Mākaha
Mount Ka'ala (4,025 ft)
Pu'ukawiwi
Wai'anae Kai
Mākaha
Wai'anae
Lualualei
Nānākuli
Nānākuli
O'ahu
Wai'anae
Wai'anae Valley Ranch EA
0 2 4 Miles
0 11,000 22,000 Feet
N
W E
S
Figure 3: Regional Map
By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: September 2013

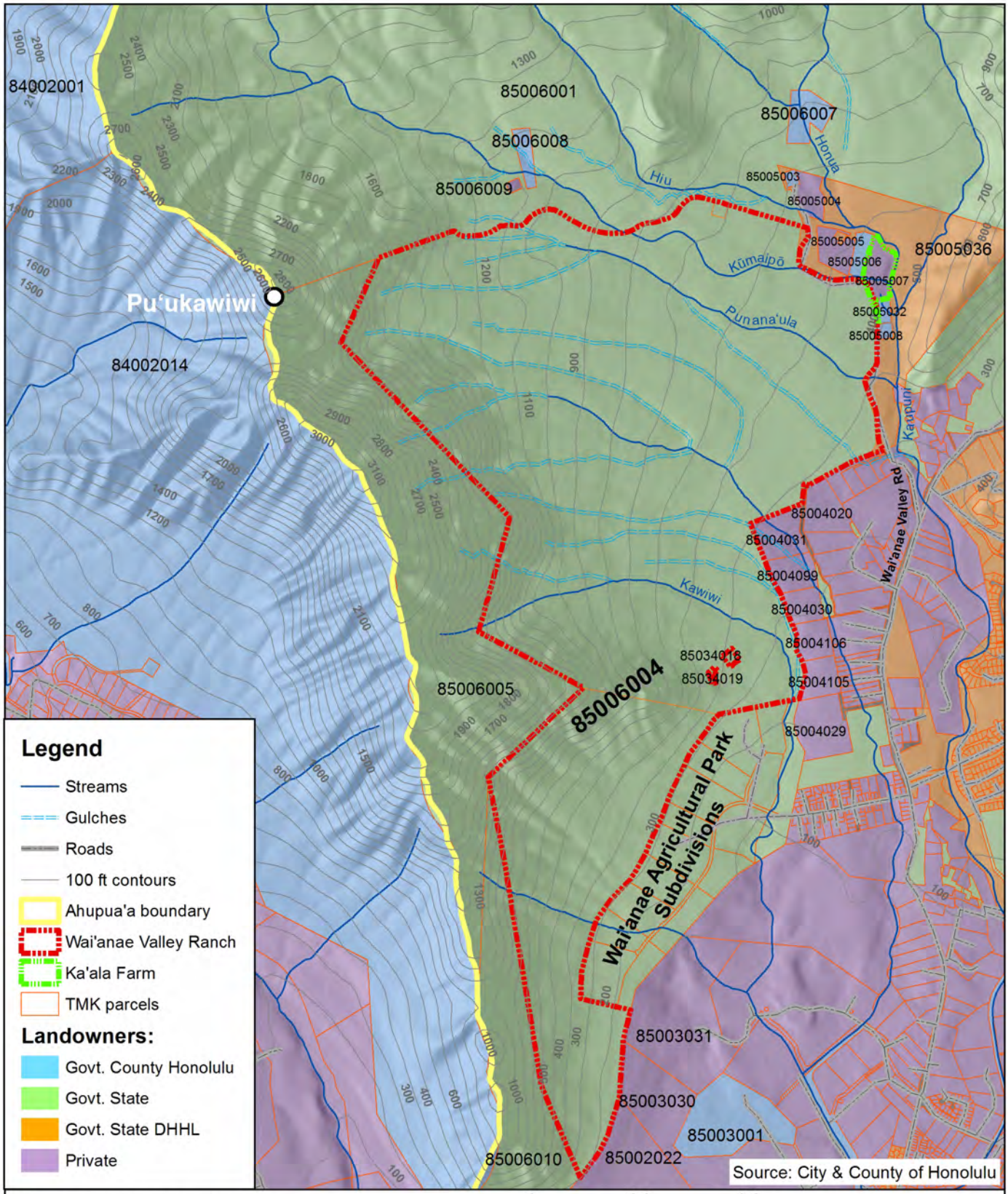
3.1. NATURAL ENVIRONMENT

3.1.1. Regional Setting

The ahupuaʻa of Waiʻanae is located in the Waiʻanae district (moku) of the Island of Oʻahu. Waiʻanae lies along the southwestern slopes of Mount Kaʻala. The moku is bordered to the north by Waialua, to the east by Koʻolauloa and to the south by the ʻEwa moku. The old moku boundaries have some overlap with modern Congressional and Census District boundaries (Townscape, Inc., 2009).

The Waiʻanae moku is believed to have had a significant population of 4,000 to 6,000 inhabitants at the time of first European contact. It was a culturally important area that was frequented by aliʻi (Cordy, 2002). In the 1800s, mostly due to the introduction of Western diseases, the population reached a low point of less than 800 (Townscape, Inc., 2009). The following sugar era brought in a large wave of plantation workers. During the post-sugar period of the past 60+ years, the once sparsely populated rural Waiʻanae District experienced rapid population growth. The demise of the sugar industry led to large areas of agricultural land being sold off in small parcels in the 1940s. From 1950 to 1980, the population grew from 7,024 to 31,487 people. After the 1980s, the growth became more moderate (Townscape, Inc., 2009). The Waiʻanae Senate District (District 21) of Honolulu County has a population of 48,519, according to the 2010 U.S. Census. This was 5% of the total Honolulu County population of 953,207. Out of all 18 Senate Districts in the County, eight have lower populations than Waiʻanae. Waiʻanae Valley Ranch is almost completely within Census Tract 97.01, which has a total population of 6,635 and a relatively low population density of 829 people per square mile. The average population density for the island of Oʻahu is 1,699 people per square mile (U.S. Census Bureau, 2010). Waiʻanae retains its rural character and has not been subject to resort and other large commercial developments. There are a number of small businesses servicing the local population, but in accordance with the Waiʻanae Sustainable Communities Plan (WSCP), there will likely not be any heavy industry or significant commercial development in the foreseeable future (Townscape, Inc., 2010).

The parcel covered under this environmental assessment is located in the center of the ahupuaʻa of Waiʻanae Kai. The very tip of the property on the makai side which has not been developed in any way, is approximately ¾ mile inland from the shoreline. The ranch headquarters area which has had some development and is the primary focus of future use, is approximately 2.5 miles inland from the shoreline. The project area as well as surrounding parts of the ahupuaʻa have been subject to extensive archaeological research over the past 15 years. According to Dr. Ross Cordy (UH West Oʻahu), this region is home to some of the best preserved archaeological sites on the island, including several heiau and old loʻi on the ranch property (Cordy, 2012).



Wai'anae Valley Ranch EA

Figure 4. Property Parcels

By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: September 2013

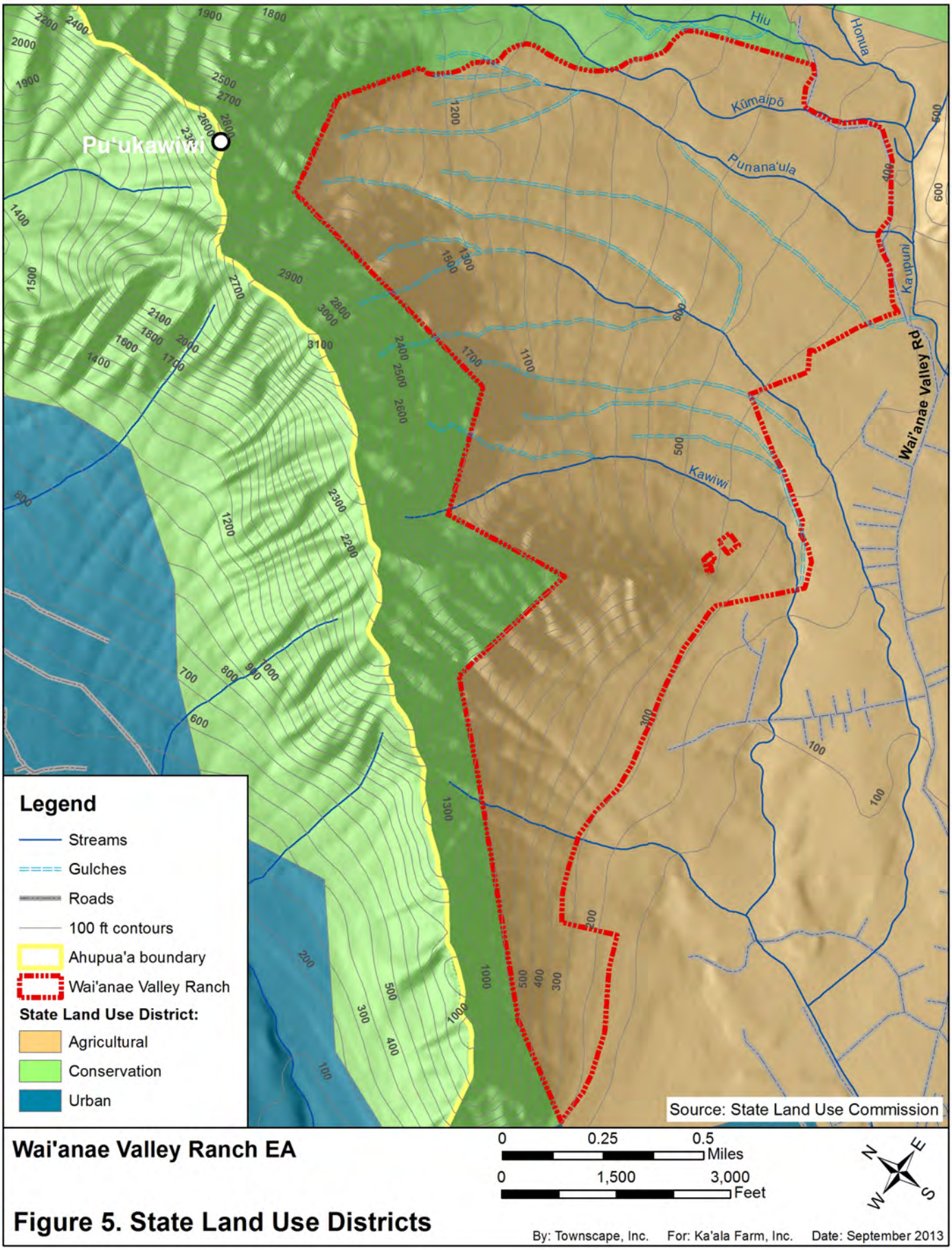
3.1.2. General Planning Area Description And Land Uses

The 1,122 acre Waiʻanae Valley Ranch parcel extends from the slopes of Kamaileʻunu Ridge on the southwestern side to the bottom of Puʻukawiwi in the north down the boundary of the Waiʻanae Kai Forest Reserve and Kaʻala Farm, as well as several smaller agricultural plots (State of Hawaii Office of Planning, 2012). The elevation on the ranch parcel ranges from ~ 150 feet at its makai boundary to 2,200 feet at its mauka boundary below the ridge. On its southwestern boundary tip, the parcel is neighbored by State and private land. Along the southern boundary, the parcel is neighbored by the Waiʻanae Agricultural Park, as well as several small agricultural plots and an automobile junkyard (State of Hawaii Office of Planning, 2012). To the southeast, the neighbors are the State Department of Hawaiian Homelands (DHHL), the City & County Board of Water Supply (BWS), and Kaʻala Farm. The 97-acre DHHL parcel is licensed to Kaʻala Farm which also owns a small 7 acre farm parcel. To the northeast and northwest, the ranch shares borders with the Waiʻanae Kai Forest Reserve, administered by the State DLNR Division of Forestry and Wildlife (DOFAW) (State of Hawaii Office of Planning, 2012).

The parcel was formerly known as Waiʻanae Valley Ranch. Due to lack of proper ranching practices, the property has been in a deteriorated state with cattle escaping and roaming the valley. In September 2011, the Board of Agriculture canceled the lease with the former rancher and DLNR now seeks to find a more appropriate lessee. The planning area is currently not in agricultural use and is covered in very dry pasture land and kiawe trees. The structures still remaining on the ranch are in a severely deteriorated condition and include the main ranch house and a smaller house near the gate, as well as several other roofed structures. Potential hazards on and surrounding the property include high risk of fire and flooding as well as trespassers and hunting dogs (Townscape, Inc., 2012).

Potential Impacts and Mitigation Measures

The proposed farm and ʻāina-based healing programs are anticipated to have positive impacts on the existing land uses. The parcel is currently not used and overgrown. The proposed actions will return part of these lands to active agricultural use, improve the visual appearance of the property and provide a multitude of services to the applicants' clients as well as the larger community.



Wai'anae Valley Ranch EA

Figure 5. State Land Use Districts

3.1.3. State Land Use And County Zoning

State Land Use Districts

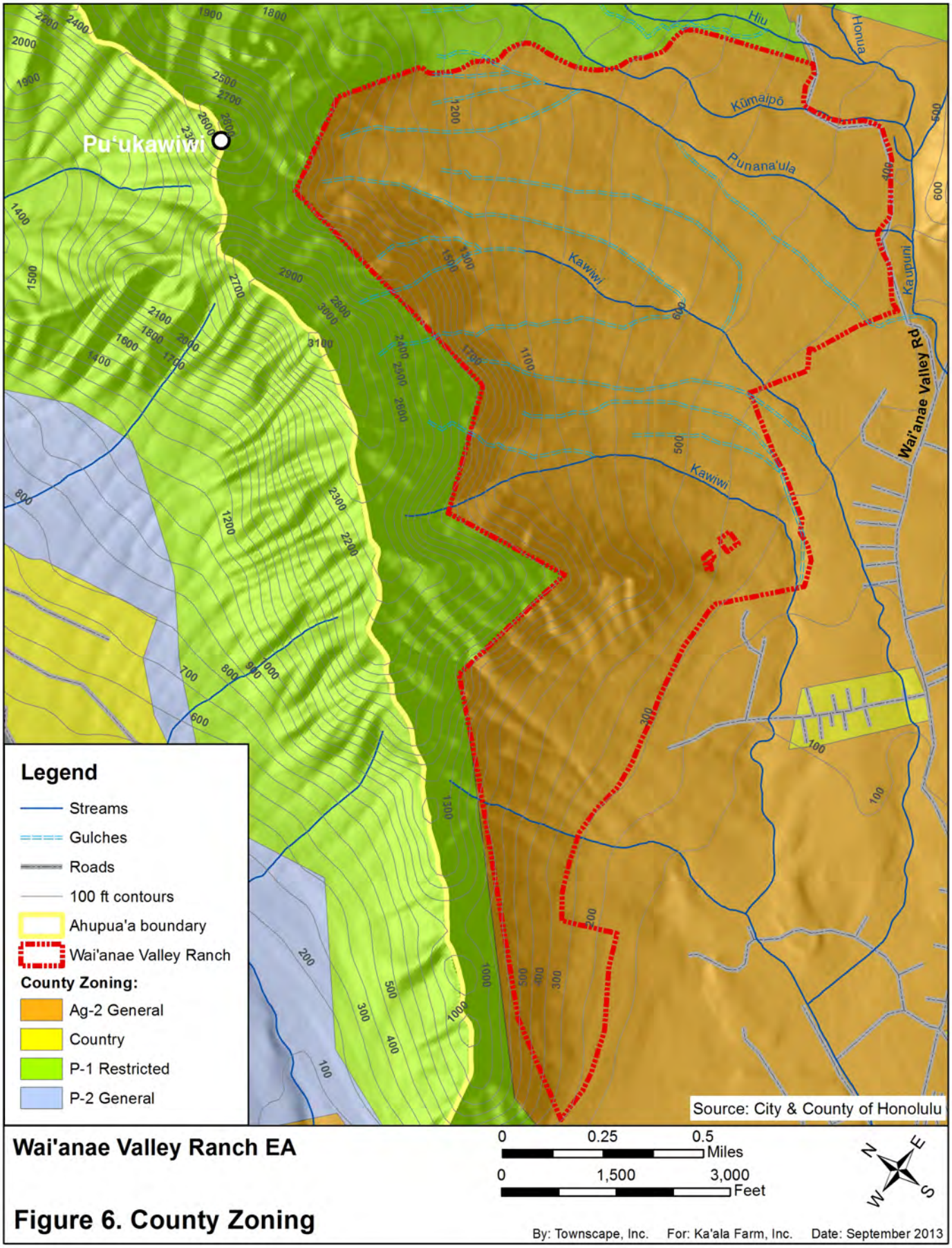
The entire Waiʻanae Valley Ranch parcel is in the State Land Use "Agricultural" District, along with neighboring lands to the southeast and southwest. Makai of the western tip, it is bordered by the "Urban" District. The State Lands to the northeast and northwest, encompassing the Waiʻanae Kai Forest Reserve, are in the State Land Use "Conservation" District (State of Hawaii Office of Planning, 2012).

County Zoning

Waiʻanae Valley Ranch falls under the City & County's "Ag-2 General" zone (minimum lot size of 2 acres, no piggeries allowed). The surrounding agricultural parcels have the same zoning. The Forest Reserve parcels are zoned "P-1 Restricted", as is required for State Land Use "Conservation" land.

Potential Impacts and Mitigation Measures

None. The proposed actions are aligned with the State and County designations for the land.



Wai'anae Valley Ranch EA

Figure 6. County Zoning

3.1.4. Relation to Regional Plans

Wai‘anae Sustainable Communities Plan

The Wai‘anae Sustainable Communities Plan (2010) was developed in accordance with the City & County's General Plan and is to be reviewed every five years. It is one of eight regional plans for the Island of O‘ahu. The WSCP focuses heavily on sustainability principles and maintaining Wai‘anae's rural charater. Chapters 2 ("Visions for the Future") and 3 ("Land Use Policies and Guidelines") are most relevant to Wai‘anae Valley Ranch. Important elements outlined in these chapters include protecting and preserving cultural sites and landscapes and allowing access; developing and supporting community-based businesses; prohibiting incompatible land uses and supporting compatible land uses for agricultural areas (Townscape, Inc., 2010).

Wai‘anae Watershed Management Plan

The Wai‘anae Watershed Management Plan (2009) gives an overview and analysis of the resources present in nine watersheds in the Wai‘anae moku and provides a long-range plan (until 2030) for the *"protection, preservation, restoration, and balanced management of ground water, surface water, and related watershed resources."* This plan has a strong water use focus and provides relevant general background information for the entire moku. Chapter 4 contains five objectives with multiple sub-objectives and strategies which will be useful when planning sustainable water and other resource use at Wai‘anae Valley Ranch. These five objectives are as follows:

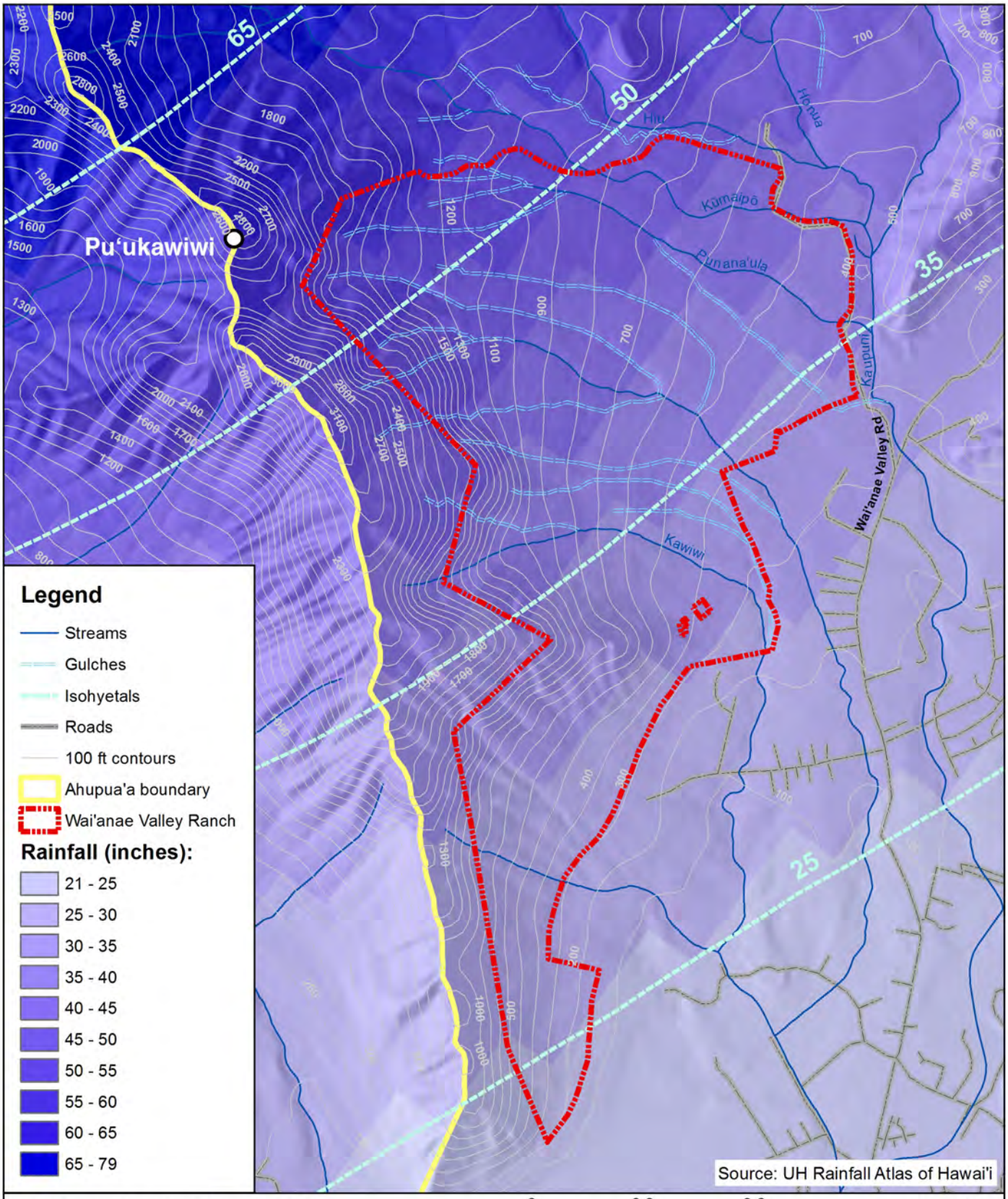
1. PROMOTE SUSTAINABLE WATERSHEDS
2. PROTECT AND ENHANCE WATER QUALITY AND QUANTITY
3. PROTECT NATIVE HAWAIIAN RIGHTS AND TRADITIONAL AND CUSTOMARY PRACTICES
4. FACILITATE PUBLIC PARTICIPATION, EDUCATION, AND PROJECT IMPLEMENTATION
5. MEET FUTURE WATER DEMANDS AT REASONABLE COSTS (Townscape, Inc., 2009)

Upper Wai‘anae Valley Baseline Report

The Upper Wai‘anae Valley Baseline Report (2012) provides baseline information on the natural and cultural resources in Upper Wai‘anae Valley. It describes the physical, archaeological/cultural, biological, land use and community setting of Upper Wai‘anae Valley. The appendices include the lease application by Ka‘ala Farm, Inc. for the ranch parcel, cultural plan ideas, information on historic sites by Dr. Ross Cordy and a Custom Soil Resource Report by NRCS for the area (Townscape, Inc., 2012).

Potential Impacts and Mitigation Measures

None. The proposed actions are aligned with the regional plans for the area and are expected to bring positive impacts to the community.



Wai'anae Valley Ranch EA

Figure 7. Mean Annual Rainfall (inches)

By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: September 2013

3.1.5. Climate And Topography

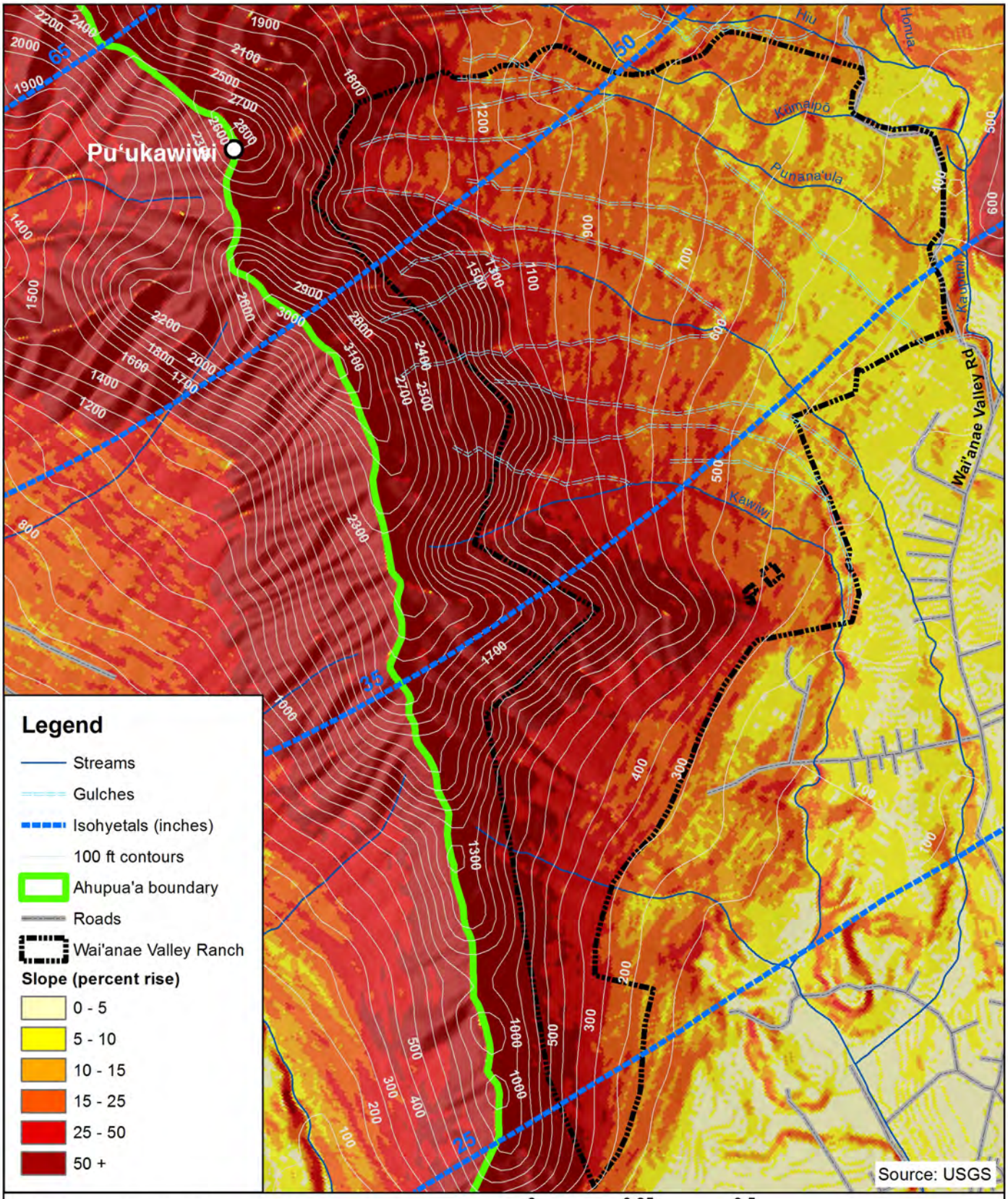
Local climatic conditions at Waiʻanae Valley Ranch are typical for leeward Oʻahu areas. The amount of rainfall in the Waiʻanae Mountain Range is much lower than in the Koʻolau Range, resulting in a hot, sunny and dry climate on the coast and somewhat wetter conditions at higher elevations. The average annual rainfall in this area ranges from 21 inches at the coast to 79 inches near the summit of Mount Kaʻala (Giambelluca, et al., 2012). In comparison, on the windward side of Oʻahu, it is not unusual for coastal areas to experience 50 inches and mountainous areas to experience up to 279 inches per year. Due to the physical characteristics (elevation ranges) and size of the Waiʻanae Valley Ranch parcel, the mean rainfall is not the same throughout the entire ranch. The portions of the ranch farthest from the mountains and at lower elevations receive as little as 29 inches of mean annual rainfall. In the center of the parcel, the amount ranges from 33-48 inches and the upper reaches receive up to 55 inches per year (Giambelluca, et al., 2012). Coastal areas have low temperatures of 62 ° F in the winter and 70 ° F in the summer and high temperatures of 80 ° F in the winter and 88 ° F in the summer. Upper elevations experience cooler and wetter conditions (Townscape, Inc., 2012).

Data on climate change indicate that the future climate of this area will probably be hotter and drier (Townscape, Inc., 2009).

Land elevations on the ranch range from about 150 feet above mean sea level (MSL) in the makai corner of the property to a high of about 2,200 feet above MSL in the upper/mauka corner. Slopes range from about 5% near Waiʻanae Valley Road to more than 50% at the high elevations of the ranch (NOAA, 2007; ESRI, 2012).

Potential Impacts and Mitigation Measures
None.

Rainy and dry season pictures of the landscape. The summers are extremely dry.



Wai'anae Valley Ranch EA

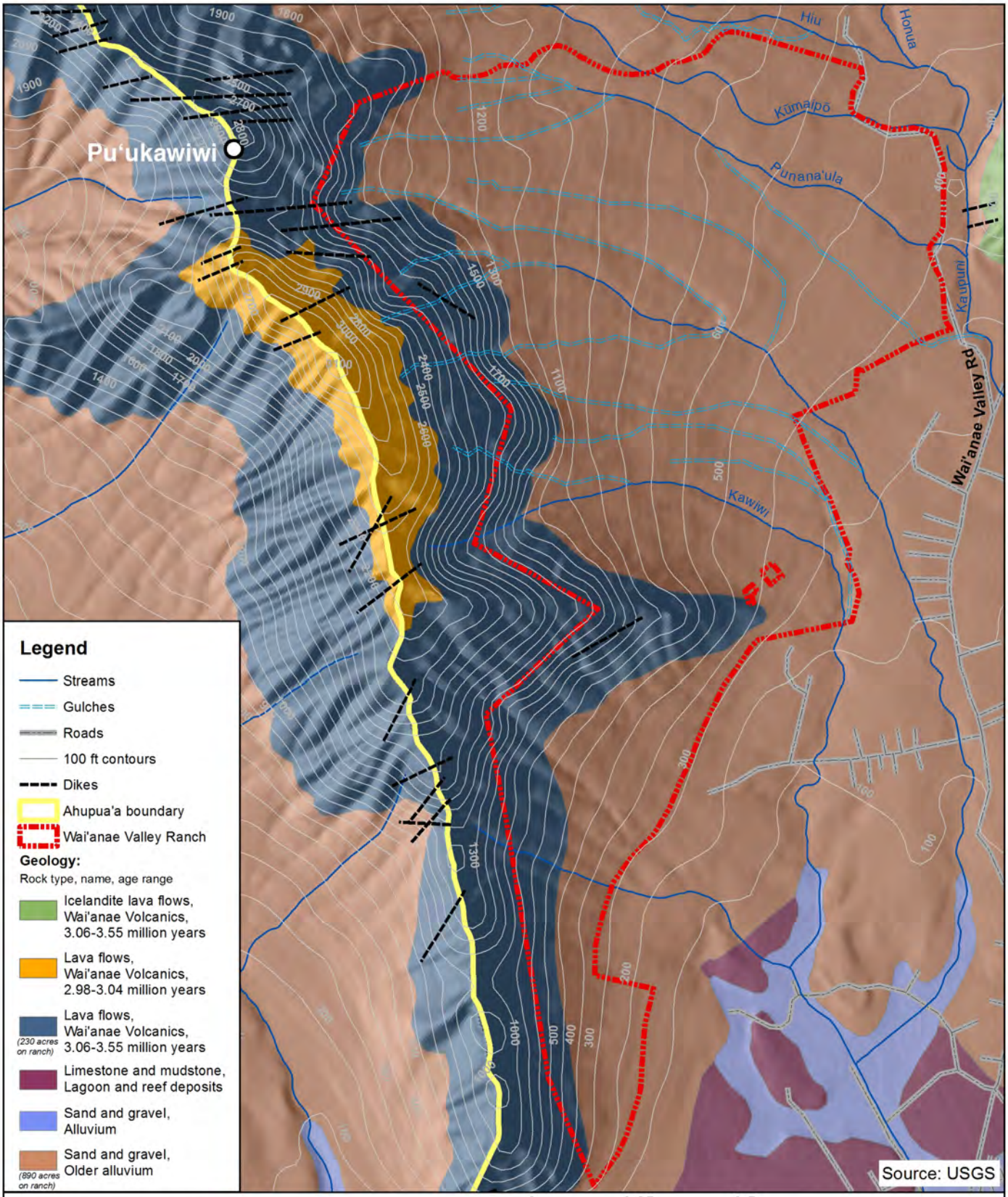
0 0.25 0.5 Miles

0 1,500 3,000 Feet

N E S W

Figure 8. Topography

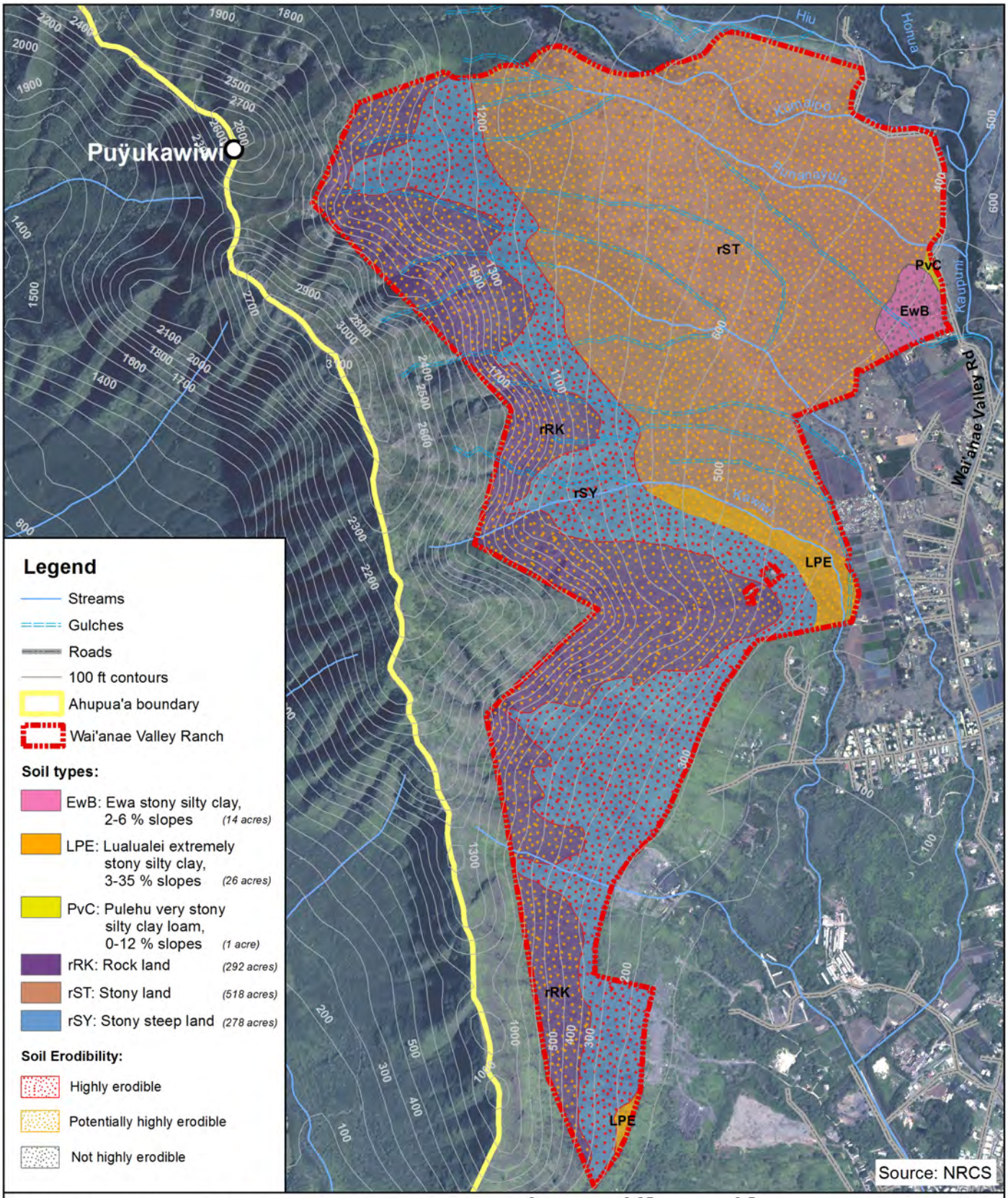
By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: September 2013



Wai'anae Valley Ranch EA

Figure 9. Geology

By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: September 2013



Wai'anae Valley Ranch EA

Figure 10. Soils

By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: September 2013

3.1.6. Geology And Soils

The Waiʻanae Mountains are the remnants of the Waiʻanae shield volcano that formed over three million years ago. Several million years of erosion created nine valleys in the Waiʻanae moku, characterized by steep valley walls at the back of the valleys to very gently sloping valley floors and coastal plains (Townscape, Inc., 2012). Mount Kaʻala mauka of Waiʻanae Valley Ranch is the highest peak on Oʻahu, at an elevation of 4,025 feet (State of Hawaii Office of Planning, 2012).

Prominent features found in the Waiʻanae moku and around Waiʻanae Valley Ranch are puʻu (hill or peak). There are several significant puʻu along Kamaileʻunu Ridge to the northwest of the ranch, including Puʻukawiwi near the northern tip of the ranch.

The geology in and around the ranch is dominated by "sand and gravel and older alluvium". The entire western border of the ranch along Kamaileʻunu Ridge consists of 3.06-3.55 million year old lava flows from the Waiʻanae shield volcano.

Soil series in upper Waiʻanae Valley are dominated by Stony land (rST) in the middle of the valley, and Rock land (rRK) and Tropohumults-Dystrandepts association (rTP) along the valley walls. There are also some sizeable pockets of stony steep land (rSY). These soils are generally unsuitable for conventional cultivation due to their shallow, stony nature (Natural Resources Conservation Service, 2011). However, the long history of ʻuala and kalo farming in the valley indicates that these soils are rich in nutrients and can be suitable for traditional Hawaiian methods of cultivation (Cordy, 2012).

The entire eastern half of Waiʻanae Valley Ranch contains Stony land (rST), except for a small pocket (14 acres) of ʻEwa stony silty clay (EwB) and one acre of Pulehu very stony clay loam (PvC) near the entry gate.

The western side of the ranch is dominated by Rock land (rRK) and Stony steep land (rSY), with a small corridor of Lualualei extremely stony clay (LPE). All of the soils on the ranch, except for the pocket of ʻEwa series, are considered highly erodible or potentially highly erodible land (State of Hawaii Office of Planning, 2012). In terms of suitability for conventional agricultural methods, almost all soils on the ranch, except for the ʻEwa and Pulehu series, are classified under the NRCS "Land Capability" system as "7s". Class 7 soils have "very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat". The subclass "s" shows that the soil is mainly limited because it is shallow, droughty or stony. The Pulehu soil near the entry gate is designated as "6s". Class 6 has the same limitations as class 7, although it is rated as "severe", while Class 7 is rated as "very severe". The ʻEwa series soil also present on the ranch is classified as "4s" without irrigation. Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both. If irrigated, this soil is classified as "2e" and considered "prime farmland" by the USDA and the State of Hawaiʻi (ALISH). Class 2 soils have moderate limitations that restrict the choice of plants or that require modern conservation practices. Subclass "e" shows that the main hazard is the risk of

erosion unless close-growing plant cover is maintained (Natural Resources Conservation Service, 2011).

Potential Impacts and Mitigation Measures

Minimal levels of grading and grubbing will be required for the implementation of some parts of the projects. A grading and grubbing permit application will be completed for these purposes, detailing the requirements for sediment control. Most of the property is currently covered with dry grasses and kiawe trees. The parts of the property currently not vegetated are the areas considered "prime agricultural land". The proposed actions include planting this land with organically grown crops and mulch that will help reduce erosion and sediment runoff. Best management practices will be used to avoid soil runoff and the applicants are planning to implement a soil and water conservation plan in collaboration with NRCS. Using the land for active agriculture is anticipated to improve the condition of the soil due to organic practices and the use of mulches and earth worms. Any additional impacts on the soil will be limited to the initial site preparation. Construction BMPs will be used to ensure that these impacts are negligible.

Ranch landscape

Ranch carport/pavilion

Current ranch vegetable garden

3.1.7. Water Resources And Water Supply

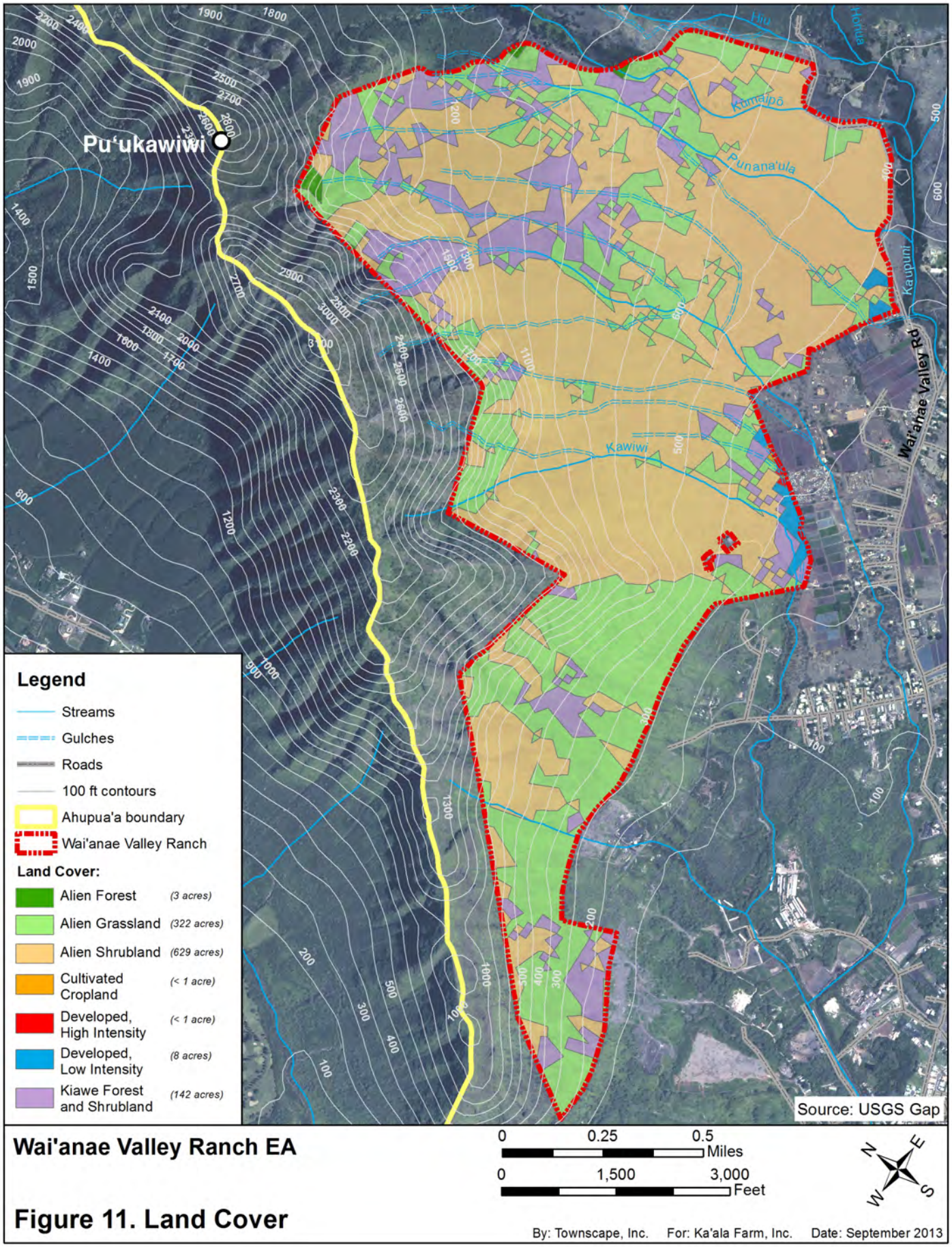
The aquifers in the Waiʻanae moku are recharged by rainfall and fog drip. Groundwater once fed up to 30 natural springs throughout Waiʻanae Valley. Most of these springs have disappeared due to ranching activities, the construction of water tunnels and wells, and climate change. Several springs are still feeding the tributaries of Kaupuni Stream (Townscape, Inc., 2009). The Waiʻanae Aquifer, a dike aquifer with a high level of vulnerability to contamination (HIDOH) has a sustainable yield of 3 million gallons per day (MGD). The BWS has been using approximately 2MGD in recent years, supplying water to about 4,000 Waiʻanae homes. Just north of Waiʻanae Valley Ranch is the Mākaha Aquifer sharing the same characteristics, with a sustainable yield of 3MGD (State of Hawaii Office of Planning, 2012). There are two BWS water storage reservoirs in the southwestern part of the ranch, as well as multiple wells. There is also a stream diversion for the ranch on the northeastern boundary. The ranch property is supplied via water pipes by the BWS. The water lines extend throughout different parts of the property, but currently, water service is confined to the ranch headquarters area. This is where all the water required for the proposed programs will be needed (see section 2.2.6. "Projected Water Demands").

Kaupuni Stream is the main stream draining the watershed containing Waiʻanae Valley Ranch. It is one of the two largest streams on the Waiʻanae coast and has several named tributaries, some of which flow directly through the ranch property. These are Kūmaipō, Punanaʻula and Kawiwi, from mauka to makai (Parham, et al., 2008). All of these tributaries are intermittent. There are also multiple gulches that feed into these tributaries. Kaupuni Stream is listed on the State's 303(d) list of impaired waters for Total Nitrogen, Nitrate and Nitrite, Total Phosphorus, Turbidity, and Suspended Solids (TSS) (Hawaii State Department of Health, 2008-2010). Historically, Kaupuni was a perennial stream, although diversions for agricultural and municipal water use have decreased the stream flow, causing it to be intermittent. There are three recorded diversions from Kaupuni Stream, including one by Waiʻanae Valley Ranch from a spring source tributary to Punanaʻula Stream. This diversion will be able to provide some water for re-planting of historic fields.

Although the ranch property is designated as "Zone D" on the flood insurance rate maps (meaning the risk of flooding has not been determined), flooding problems are expected from some of the gulches and tributaries during heavy rains.

Potential Impacts and Mitigation Measures

The streams in the valley are affected by pollutants that come from typical agricultural operations, e.g. synthetic fertilizers. The proposed actions will not be contributing synthetic fertilizers to the environment due to the use of organic agricultural methods. Furthermore, the soil conservation and stormwater runoff BMPs implemented will prevent runoff that increases turbidity and TSS levels in streams. If any existing wells are not intended to be used, they will be appropriately sealed and well abandonment permits will be obtained. (At this time, there are no plans to change the water systems, wells or stream channels on the property.)



Wai'anae Valley Ranch EA

Figure 11. Land Cover

By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: September 2013

3.1.8. Flora And Fauna

Wai‘anae Valley Ranch is surrounded by Forest Reserve land and designated hunting areas, containing habitats for a variety of native species, including the endangered endemic ‘elepaio bird. The ranch property is primarily dominated by alien shrubs and grasses as well as alien kiawe (see Figure 11). However, at the northwest boundary along Kamaile‘unu Ridge, the ranch property contains approximately 70 acres of “Critical Habitat” designated by USFWS for nine endangered plant species (see Table 1 and Figure 12). The density of threatened and endangered plants on the ranch is “low” in the lower elevations, “medium” in the middle elevations and “very high” on the steep slopes (see Figure 12). Just like the rest of the Hawaiian Islands, problems with feral ungulates exist in Wai‘anae Valley. Kamaile‘unu Ridge is home to a feral goat population and other parts of the valley are also inhabited by feral pigs and cattle. The designated hunting areas are meant to help alleviate feral ungulate problems.

Potential Impacts and Mitigation Measures

The proposed actions are limited to the discrete project areas described in section 2, which do not cover any critical habitat areas. Access to the property will continue to be allowed to hunters, which will help control feral ungulates, providing a beneficial impact. Some of the long-term goals include possible ungulate fencing and reforestation, which will only have beneficial impacts for critical habitats.

The proposed planting of native plants for ornamental and flood mitigation purposes will also increase the density of native plants on the property, providing a beneficial impact on the ecology.

One potential impact from bringing horses onto a property can include the introduction of invasive weeds through feces and seeds caught on horse hair and coats. Therefore, as advised by DOFAW, any horses to be brought to the property will be grained for several days before being transported to the property, to allow for any invasive weeds and seeds to pass through their system and for their coats to be inspected and washed.

Table 1. Critical Habitat Plant Species at Waiʻanae Valley Ranch

Species Scientific Name	Other Names	Acres	Picture
Schiedea hookeri	Sprawling Schiedea	2.97	
Lobelia niihauensis	Niʻihau Lobelia	5.22	
Dubautia herbstobatae	Naʻenaʻe, Kupaoa	5.26	
Peucedanum sandwicense	Makou	5.46	
Tetramolopium filiforme	Ridgetop Tetramolopium, Pamakani, Mākua Daisy	6.28	
Lipochaeta lobata var. leptophylla	Nehe	6.75	
Chamaesyce celastroides var. kaenana	ʻAkoko	34.54	
Silene lanceolata	Kauaʻi Catchfly	56.56	
Lepidium arbuscula	ʻAnaunau, Waiʻanae Ridge Pepperwort	61.11	

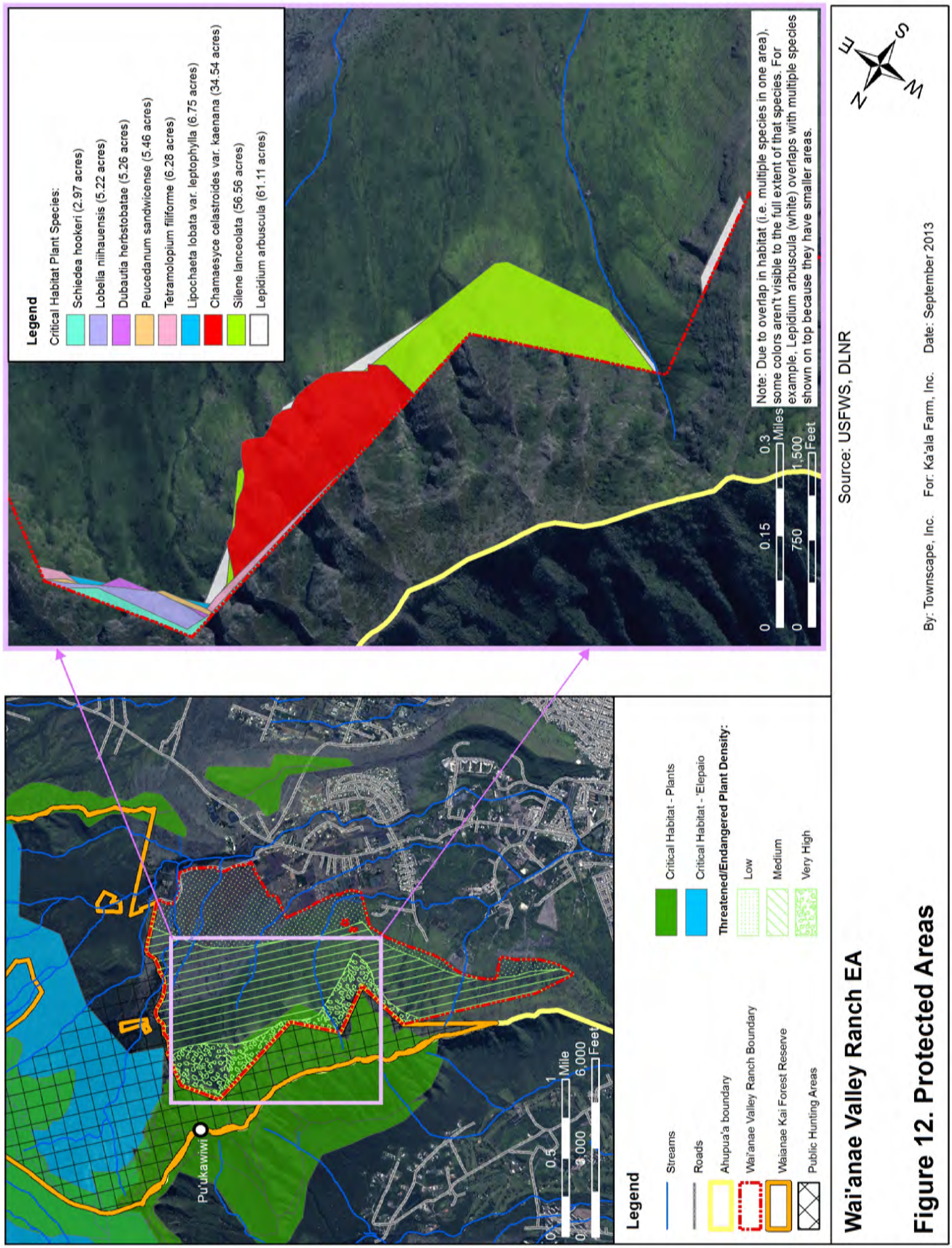


Figure 12. Protected Areas

3.2. SOCIO-ECONOMIC, CULTURAL, AND ARCHAEOLOGICAL ENVIRONMENT

3.2.1. Waiʻanae Valley History

Pre-Contact History

Waiʻanae Valley is one of the most fertile lands of the leeward coast and thus it has a long and rich history, as well as many important cultural sites (Townscape, Inc., 2012). Archaeological surveys have suggested that continual use of Waiʻanae Valley dates back as early as the 1100s A.D. At that time small groups of Hawaiian people lived near the shoreline and cultivated kalo along Kawiwi and Kaupuni Streams. Oral histories suggest that large chief-ruled kingdoms started being formed around the 1300s (Cordy, 2012). Waiʻanae Valley was part of the ʻEwa kingdom, which included ʻEwa, Waiʻanae, and Waialua. In the 1400s, all of Oʻahu was unified into one kingdom. From that time through the 1700s, the population of Waiʻanae Valley and the Waiʻanae moku steadily grew. Due to its abundant springs and streams and its fertile soils, Waiʻanae Valley had the largest population in the moku of Waiʻanae – which was estimated at about 1,500 to 2,000 inhabitants by the time of European contact (Cordy, 2002). Waiʻanae Valley also held some of the most important places of the moku, with six large heiau in the makai portion of the valley and several large fishponds. Three additional large heiau are located on the parcel covered under this EA (Cordy, 2012).

Post-Contact History

Captain James Cook first sailed off the Waiʻanae Coast in January 1778 on his way to Kauaʻi. Soon after the discovery of Hawaiʻi by these European sailors, disease epidemics began decimating the Hawaiian population. Waiʻanae was not spared this tragic population loss – over 50% in 40 years – experienced across the Hawaiian archipelago (University of Hawaiʻi at Hilo Geography Department, 1998).

The Waiʻanae moku had large sandalwood forests on its valley slopes and in the early 1800s, the sandalwood trade began between Hawaiian chiefs and western sailors, who traded western goods for the wood, and in turn sold the wood to Chinese markets. By 1830, the sandalwood trade had completely collapsed and had resulted in the near extinction of sandalwood in the Waiʻanae Mountains (Townscape, Inc., 2009).

By the second half of the 19th century, the landscape in the Waiʻanae moku was characterized by large ranches in Lualualei, Waiʻanae, Mākaha, and Mākua Valleys (Townscape, Inc., 2009). In 1879, sugar pioneer Hermann Widemann obtained a 25-year lease for Waiʻanae Kai crown lands, and in 1880, the Waiʻanae sugar mill began operations. The sugar industry brought a wave of population growth of mostly Japanese and Chinese plantation workers in Lualualei and Waiʻanae Valleys. Residential and agricultural landscapes developed around the plantation lifestyle. By 1940, at the peak of the sugar industry, the district population had increased to 3,000 people (Townscape, Inc., 2009).

The Waiʻanae sugar industry also brought drastic changes to the Valley's water resources. Sixteen tunnels were drilled in Waiʻanae Valley to irrigate the thirsty crop. These water tunnels yielded an average of 4.5 million gallons per day (Stearns & Vaksvik, 1935). In 1946, when the Waiʻanae Plantation closed its operations, some 9,150 acres became available for public purchase. Chinn Ho purchased the entire acreage for $1,250,000 and soon thereafter offered subdivided lots for sale. For the first time, a great number of building lots were available for purchase in the District. By 1950, and in large part due to Chinn Ho's development program, the population of the Waiʻanae moku had grown to 7,000 people (Townscape, Inc., 2009).

Population increases in the 1950s were accompanied by a succession of public facility developments in Waiʻanae Valley and throughout the Waiʻanae District, including the breakwater at Pōkaʻī Bay, improvements to the public water system, a new high school at Kamaile, a new police station, and a bath house and park at Pōkaʻī Beach. The population of the Waiʻanae district continued its rapid growth through the 1960s, reaching 24,077 in the 1970 census, and as a result rapidly changing the face of this "rural" community (Townscape, Inc., 2009). The U.S. Census of 2010 counted over 48,000 people living in the Waiʻanae District (U.S. Census Bureau, 2010).

Potential Impacts and Mitigation Measures

None. The proposed actions will have no impact on the population size.

3.2.2. Community Socio-Economic Environment

Waiʻanae Valley is a rural community with a high percentage of Native Hawaiians. In the 2010 Census, 68% identified themselves as at least partly Native Hawaiian or other Pacific Islander. Waiʻanae Valley residents tend to live in larger households, with an average of 4.0 persons per household as compared to 3.0 for the island of Oʻahu as a whole. Households in the Waiʻanae District generally have lower incomes than the Oʻahu average, and the rates of unemployment and poverty are higher than the island averages (U.S. Census Bureau, 2010). The areas surrounding the property covered under this EA are primarily used for small-scale agriculture. Traditional cultural values are still strong in the community and are being revived and passed on at the Kaʻala Cultural Learning Center (Townscape, Inc., 2012).

Potential Impacts and Mitigation Measures

The only impacts on the local community are expected to be positive. The applicants are well-respected in the community and their plans for educational programs and community gardens will help improve the economic situation for many people and bring families together. The applicants share a vision of restoring balance to the land and people and providing a puʻuhonua for their clients and local residents to foster a sense of community.

3.2.3. Cultural Practices

Many people in Waiʻanae still engage in some level of subsistence farming and hunting. Hunting for feral pigs and goats is common in the back of Waiʻanae Valley, including the ranch property. Gathering of traditional plants and flowers for medicinal and ceremonial uses is also common on the ranch and these activities will be continued after lease approval and are encouraged if practiced in a sustainable way (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012).

To assess potential cultural impacts of the proposed action, Townscape, Inc. spoke with three knowledgeable community members with expertise on the subject of Hawaiian culture. One of the interviewees was a member of "Ka Lima O Punanaʻula", a stewardship group that spent many years (primarily in the 1990s/2000s) working on the stewardship and restoration of the Punanaʻula heiau, located on the ranch property. The people interviewed were Eric Enos (Hawaiian cultural practitioner, Executive Director of Kaʻala Farm), Momi Cruz-Losano (Cultural Director at Hoʻomau Ke Ola), and Butch DeTroye (Long-time employee at Kaʻala Farm, member of Ka Lima O Punanaʻula). All of the interviewees saw the proposed actions as having exclusively positive impacts on cultural practices and the Hawaiian community in general. They agreed that the proposed actions will help restore pono to the cultural landscape by inviting people to participate in cultural activities and promoting the proper protocols by educating them about what is not considered pono (e.g. leaving trash and moving artifacts). In terms of modern cultural practices such as pig hunting, the interviewees expressed the need for continued access to the land by hunters. Eliminating access would result in distress for the local community and could cause problems such as trespassing and disturbance of cultural sites. Allowing access combined with an educational component about proper protocols (to be provided be the Conservation Officer) will ensure sustainable use of the land by all stakeholders.

Members of Ka Lima O Punanaʻula spent many years tending to the heiau and nearby kalo loʻi. They engaged in vegetation control and trash removal around the heiau, planted kalo and engaged in traditional ceremonies. Although many of the members are no longer in a physical condition to walk up to the heiau, they are supportive of the proposed actions, which will contribute to the long-term preservation of the heiau, something that has been up to their group until now. Townscape, Inc. went on several site visits with members of Ka Lima O Punanaʻula to discuss their visions for preserving the heiau. These consultations became part of the planning process for the parcel (particularly Projects # 2 and # 3) and are reflected throughout this document.

Potential Impacts and Mitigation Measures

There are no expected negative impacts on cultural practices. Instead, the proposed actions will help restore and teach cultural and spiritual practices in a traditional way. Both KFI and HKO staff are very knowledgeable about Hawaiian culture and some are educated specialists in the fields of cultural anthropology. Once the proposed actions are implemented, the property will be a place for families to go and explore and learn about cultural sites and practices. This is in line with Hawaiian concepts of community and sharing land (not owning it). Access will be granted for other cultural activities such as gathering of medicinal plants and hunting. To prevent any disturbance of cultural sites, the Conservation Officer will provide visitors with information on proper protocols required while visiting.

HKO clients practicing hula above Punana‘ula heiau

3.2.4. Archaeological Sites On The Ranch Property

Upper Waiʻanae Valley contains one of the largest, most important intact cultural/archaeological landscapes still left on the island of Oʻahu. This landscape includes continuous historic properties, fields (dryland and irrigated), permanent house sites, small religious structures, and three large heiau, as well as natural features (including puʻu and Mount Kaʻala). This landscape has tremendous potential for research, educational programs, and cultural preservation and restoration activities (Cordy, 2011). The landscape in the upper half of Waiʻanae Valley Ranch was determined eligible for inclusion on the Hawaiʻi Register of Historic Places, based on multiple significance criteria by SHPD in 2002, with the objective that this landscape be preserved. Traditional agricultural sites identified so far on the ranch parcel include at least 184 acres of dryland fields, probably mostly formerly used to grow ʻuala, and 3 acres of irrigated kalo fields. Other sites include three large heiau, various religious structures (including household shrines, agricultural shrines and small heiau), as well as permanent habitations (commoner house sites) (Cordy, 2012) (see Figure 11). Dr. Ross Cordy, professor of Hawaiian-Pacific Studies at UH West Oʻahu has conducted archaeological work on the ranch and adjacent lands over the past 16 years, and much of the northeastern (mauka) portions of the property have been investigated as outlined in Appendix B.

One of the largest historic properties on the ranch is the Punanaʻula heiau. This 854 m^2 heiau is located on the northeast boundary of the ranch at an elevation of 1100 feet, just inside the fence separating the property from the forest reserve. Two other large heiau were found at lower elevations. These major heiau were likely constructed under the sponsorship of a high chief to promote success in farming, and possibly for additional uses (Cordy, 2012).

Dr. Cordy recently conducted a survey of the ranch headquarters area which has undergone bulldozing and development over the past few decades. No historic properties were found in the 5-acre survey area (Cordy, 2012).

Potential Impacts and Mitigation Measures

See section 3.2.3 ("Cultural Practices") for details on cultural practitioners consulted about cultural and archaeological sites.

Most of the projects not specifically aimed at preserving historic properties or re-planting historic agricultural properties are proposed for areas with no archaeological resources, such as the ranch headquarters area. For part of this area, an archaeological survey (without excavations and testing) has already been completed, with the conclusion that ranch activities and bulldozing have already altered the land so significantly that there are likely no remains there (see Appendix A). This survey area will need to be expanded to include the full Project # 1 area.

As determined by SHPD in a discussion about AIS requirements, an Archaeological Inventory Survey will be submitted for each discrete project area (Projects # 1-4). Many of these areas already have had inventory or near inventory level surveys. In a few cases, dates need to be

processed or additional small excavations and dating need to occur. For each discrete project area containing significant historic properties or that is within the landscape determined eligible for inclusion on the Hawaiʻi Register of Historic Places, a mitigation plan will be submitted to SHPD for review and approval. Some of these plans will be preservation plans (such as heiau preservation). Some of these plans will be archaeological data recovery plans (such as where re-planting historic agricultural fields may damage archaeological soils and potentially impact stone features). Many of these re-planting projects will retain stone features and will only require small excavations to recover archaeological samples from the soils (such as charcoal, pollen, etc.)

To prevent any disturbance of historic properties, the Conservation Officer will be providing visitors with information on proper protocols required while visiting. Details on mitigation measures and SHPD requirements by project are summarized below.

Project #1:

Dr. Cordy has conducted an inventory survey of a 5-acre area around the ranch headquarters. This survey will need to be expanded to include a larger area and some excavations. If cultural sites are found, a mitigation plan will be needed to detail preservation, data recovery and avoidance needs and submitted to SHPD for approval. A full AIS will also be required for the DHHL property proposed for the parking lot.

Project #2:

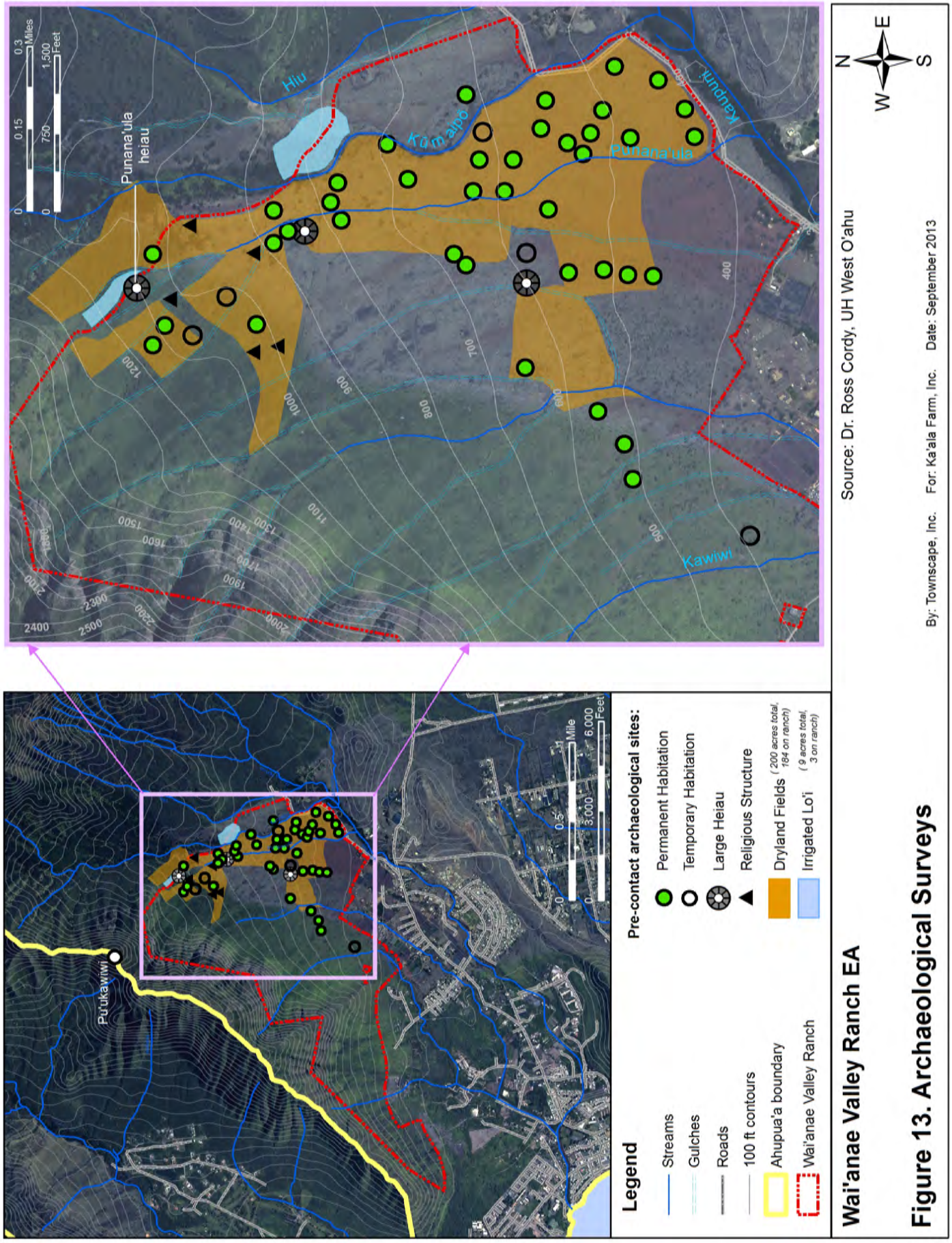
Dr. Cordy has conducted archaeological surveys of the proposed area and the full written report for this area is still being finalized. The heiau has been mapped in detail. Given the cultural sensitivity of the heiau, excavation has not occurred. Some level of testing and dating could possibly be done in the future, if the community would support this. The adjacent kalo loʻi have been mapped in detail and test excavated, but funding will need to be obtained for dating of the charcoal samples obtained. The nearby dryland fields have been identified and their borders mapped, but individual terrace lines have not been mapped and there has been no excavation work. Detailed mapping of terrace lines, testing and dating will still be needed. This project area will require two interlinked historic preservation mitigation plans: 1. A very specific preservation plan for the heiau and 2. A data recovery/preservation plan for the loʻi and dryland fields. These can be combined and submitted to SHPD as one proposed mitigation plan.

Project #3:

Dr. Cordy has conducted survey work throughout all of this area, but some additional survey and excavation/ dating work will be needed to bring everything up to AIS level. As with project # 2, historic preservation mitigation plans will need to be approved and executed prior to any re-planting work.

Project #4:

Dr. Cordy has conducted thorough surveys of the areas along the old ranch road from the headquarters area to the Punanaʻula heiau, which may be one of the first road repair projects proposed. All sites in the road corridor area are known and have been mapped. If the road corridor and turn-arounds are carefully planned, they can avoid all sites except for very small sections of agricultural fields. The south boundary of the property containing the firebreak road is not expected to have archaeological sites, but surveys will be needed. All of the proposed activities will be preceded by an AIS. Where planned activities occur within the significant cultural landscape or near significant historic sites, then proposed detailed historic preservation mitigation plans will be submitted to SHPD for review and approval and properly implemented prior to any activities taking place. Additionally, annual consultation with local fire-fighting agencies would be part of these fire suppression plans, informing them of the significant cultural landscape and the importance of avoiding damaging the cultural sites during firefighting activities.



Wai'anae Valley Ranch EA

Figure 13. Archaeological Surveys

4. ADDITIONAL IMPACTS AND MITIGATION MEASURES

Air Quality and Noise

The air quality in the valley is good and noise issues mostly arise from military training exercises at Schofield Barracks, on the other side of the mountains. When hiking within the mauka portions of the property, the sound of machine guns and explosives can sometimes be heard. Impacts on the air and noise from the proposed action will be limited to short-term construction-related impacts. In compliance with HAR Section 11-60.1 ("Fugitive Dust"), BMPs for dust control will be implemented during construction to mitigate these impacts.

Infrastructure

The road leading to the ranch is a narrow, 12-foot wide private road owned by the Board of Water Supply. Modern infrastructure is limited to BWS water. There are no sewer lines, so septic tanks or composting toilets will be required.

Scenic resources

The proposed action is expected to have positive impacts on the scenic resources. The current condition of the ranch headquarters area with its collapsing buildings is considered an eye sore by the community. Demolishing these old structures and implementing Project # 1 will greatly enhance the visual appeal of the property. In addition, the proposed actions will encourage people to visit and hike up to the mauka portions of the property, where they can enjoy incredible scenic vistas.

One of the remaining ranch houses

Scenic view from the mauka side

4.1. CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts resulting from the incremental impacts of various actions are expected to be positive only. Project # 1 will return the land to active agriculture and grant access to community members to grow food and participate in other activities on the land. Projects # 2 and # 3 will preserve important archaeological and cultural sites and return them to their original uses, thereby promoting Native Hawaiian dietary staples. Project # 4 will mitigate hazards that could affect other surrounding lands, thereby increasing fire and flood safety for the valley. Finally, the rehabilitation that will be experienced by HKO clients doing the work will have a positive overall impact on the local community and the Hawaiian community in general because each HKO client getting an opportunity to work here will have a chance at full recovery and re-integration into society, equipped with new skills that will help them perpetuate their native cultural practices. With the rates of drug abuse and incarceration among Native people being higher than average, programs such as this help restore pono for the land and the Native Hawaiian community (Townscape, Inc., Kaʻala Farm, Inc. & Hoʻomau Ke Ola, 2012).

Secondary impacts that result as a byproduct of an action are expected to be minimal. There will be no impact on population size or distribution. The only expected secondary impacts are related to infrastructure/roads. The proposed actions are expected to result in increased traffic along Waiʻanae Valley Road towards the back of the valley. Since the road is narrow (one lane) and requires careful attention to oncoming traffic, appropriate signage will be needed at the entrance to this road to increase awareness and remind people to drive slowly and carefully and watch for oncoming traffic.

Road leading to ranch gate

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APPENDIX A

ARCHAEOLOGICAL SURVEY OF THE FORMER WAIANAE VALLEY RANCH HEADQUARTERS AREA

WAIʻANAE VALLEY, OʻAHU

[TMK: 8-5-06:04]

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November 2012

INTRODUCTION

On September 27, 2012, Wai‘anae High School (WHS) Hawaiian Studies Program students under my supervision with the assistance of Moana Lee and the WHS teacher Michael Kurose conducted an archaeological survey of the area around the former Waianae Valley Ranch’s headquarters. This is the southeastern, down-valley portion of the former ranchlands, located along the paved access road into the upper valley (Figures 1-3). The ranch had two dwellings and a corral in this area, among other features. Entry here was through a locked gate.

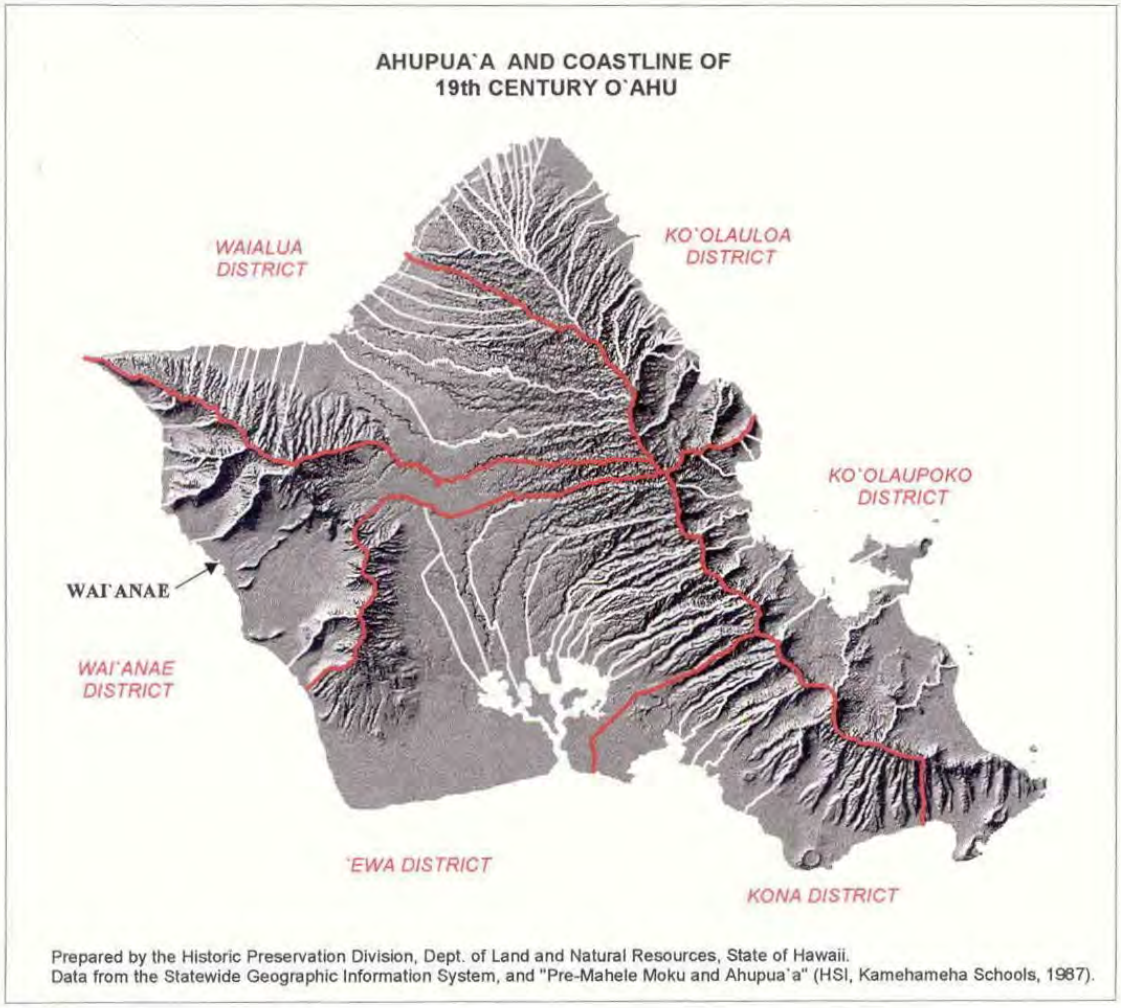

Figure 1. Location of Wai‘anae valley on the west side of O‘ahu.

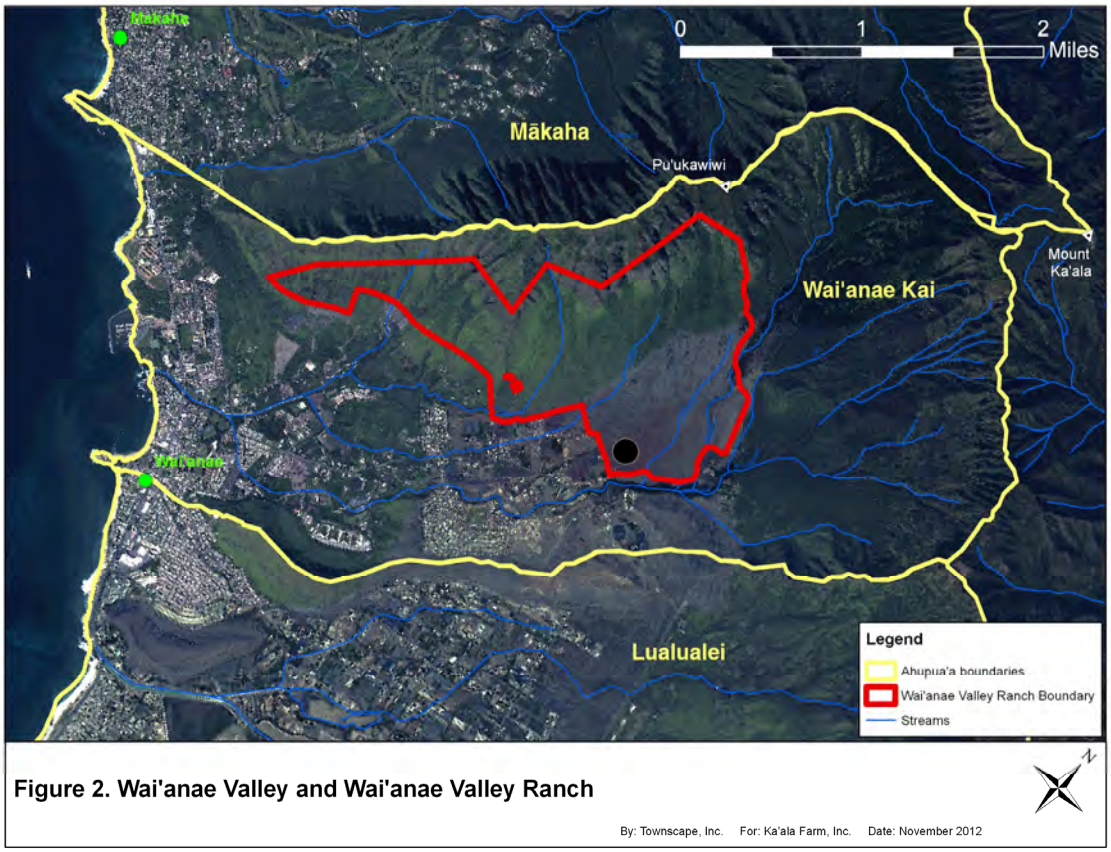

Figure 2. TMK 8-5, showing Wai'anae valley and the former Waianae Valley Ranch bounded by the red border. The black dot is the location of the former ranch headquarters buildings.

Figure 3. Aerial view of former ranch, showing project area in upper right bounded in yellow-green. (Map courtesy of Townscape, Inc.)

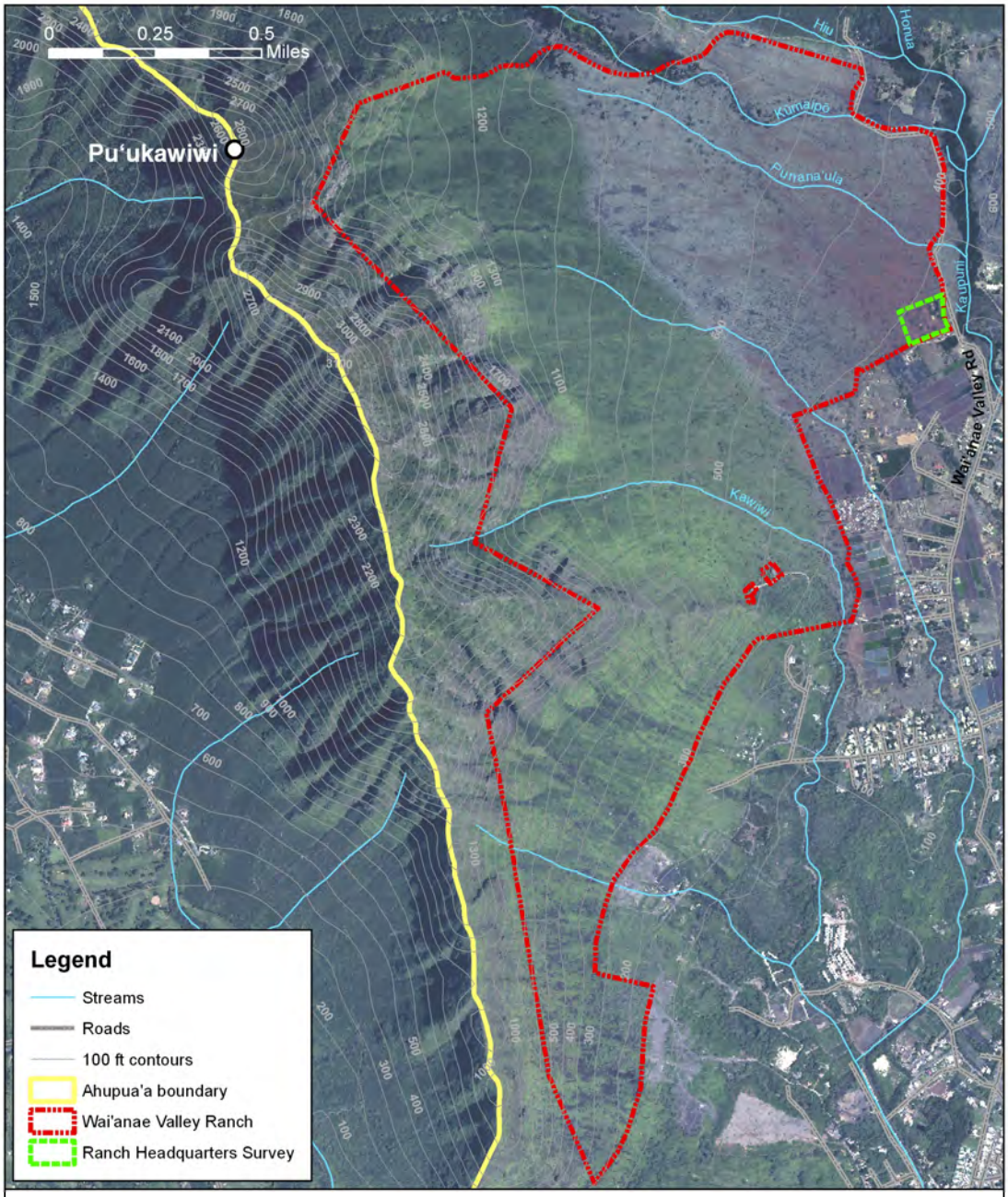

Figure 3. Ranch Headquarters Survey Boundary

By: Townscape, Inc. For: Ka'ala Farm, Inc. Date: December 2012

ENVIRONMENTAL SETTING

This part of the former ranch is again the most down-valley edge along the paved access road. This is at about the 360 foot elevation. Just down the road outside of the ranch boundaries is an adjacent house. The former ranch buildings are just in from the gate, and these are the last dwellings along this paved access road until one reaches Rosas' houses near the locked gate that leads up to the Wells.

This survey area is flat, with a shallow gulley separating a small northwestern section of the area surveyed. Tree cover in the area is mostly kiawe. This area is in the middle portions of Waiʻanae Valley, for Punanaʻula Stream is the border of the upper valley. Rainfall is under 40 inches.

PRIOR WORK AND CULTURAL SETTING

This part of the ranch was never surveyed prior to this project. Survey that was done for the initial ranch study in the late 1990s by the State Historic Preservation Division (Cordy 2001) occurred farther up the access road, up-valley from where Punanaʻula Stream crosses the paved access road. Survey also took place farther upslope from the ranch headquarters above the 480 foot elevation.

Along the paved access road, up-valley of Punanaʻula Stream, there were walled yards that included dryland fields and usually permanent house sites. Some of these yard areas had pre-European fields and several had pre-European houses – all of which would have pre-dated the walls, which are 1.0+ meter high walls characteristic of post-1840 times. In the area upslope of this walled yard area and upslope of the ranch headquarters area, pre-European dryland agricultural terraces and scattered permanent habitations were also found. It, thus, was considered possible that this pre-European pattern could extend down to the ranch headquarters area, although it was recognized that the headquarters survey area was much drier and might not have this pattern.

The walled yards farther up the paved access road, however, again date after the 1840s. Such walls often were constructed to wall-in houseyards and fields to keep out cattle, which started to become numerous on Oʻahu and leeward Waiʻanae in the 1840s (Sahlins 1992:148-149, 164-165; Cordy 2001:148-152; Cordy et al. 2012:273-297). Several of these walled yards farther up the paved access road have permanent house sites that date into the period after 1840. These have been studied with detailed mapping and test excavation by UH West Oʻahu Field Archaeology classes under my direction (not yet written up) and by WHS Hawaiian Studies Program classes under my direction (Abad et al. 2003). Euro-Asian artifacts that post-dated 1840 were found at houses in sites 5783, 5784, and 5786 (e.g., Naboa 2002, 2009). It is expected that dryland fields within the same yards would have continued to see use in this period. These walled yards with habitations were very similar to Land Commission Awards to commoners elsewhere on Oʻahu, but these ones along the paved access road were not claimed in the 1840s Māhele, nor were they purchased as grants after the Māhele. These houseyards seem to have been abandoned by the late 1800s, with one house possibly still used up to about the

1930s, when water spigots off the large water pipe that ran on a stone aqueduct through this area apparently were removed. (See Cordy 2001:147-152; Naboa 2002, 2009 on abandonment of these sites.) After that point these parcels were incorporated into the ranch parcel, with the exception of the family cemetery within site 5786 – where family members now live under plastic tent awnings. This cemetery was excluded from the ranch. Given these findings up the paved access road, it was considered possible that walled yards with post-1840 houses may have been in the ranch headquarters area.

An additional post-contact pattern directly relates to ranch activity. The ranchlands were Crown lands, apparently leased for ranch activities back into the 1850s – although the history of the ranch use has yet to be studied in detail. By the 1870s, Waianae Plantation appears to have been leasing the ranch and using it for cattle grazing. An 1878 map shows that the ranch borders were beginning to be walled (Monsarrat 1878). Thus, the walls visible along the ranch boundaries, all along the paved access road (outside of the above walled lots) date at most to the 1870s (Cordy 2001:147-152). These walls are very similar to those around the walled lots, and it is possible that they all were built about the same time. This pattern of walls along the ranch borders, thus, was also considered a possible pattern that might appear in this ranch headquarters area – with a wall possibly running along the paved access road and then south along the ranch's seaward edge.

SURVEY FINDINGS

We did our survey on September 27, 2012. I split the WHS Hawaiian Studies Program students into three groups. As a teaching exercise and a means of surveying the headquarters area, each team surveyed the entire project area. I headed one group; my colleague Moana Lee headed another, and the WHS teacher Michael Kurose was in charge of the third group. Each group was required to make a sketch map of what they saw. At the end of the survey, we compared our maps and our findings. Again, I supervised the entire exercise and saw all the features in the project area.

Figure 4 is the aerial photograph of the project area, showing the project borders. Figure 5 is a sketch map of the features identified, and Table 1 lists those features.

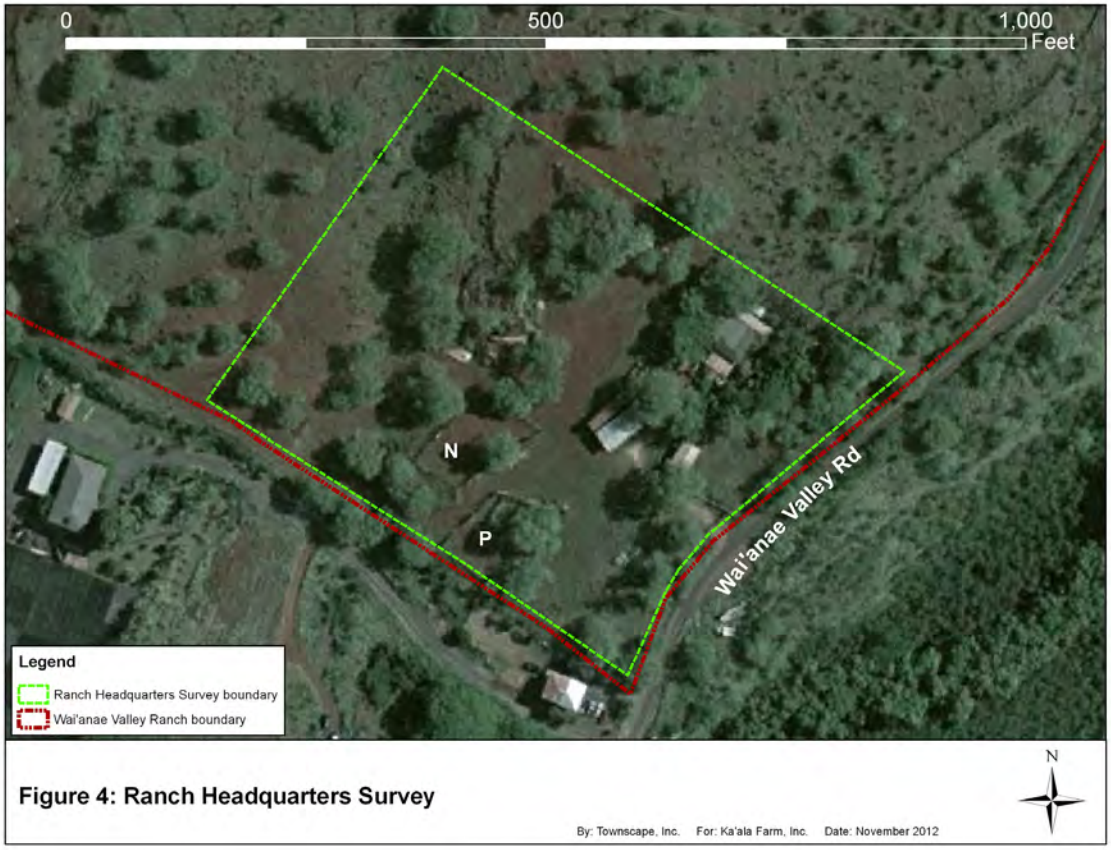

Figure 4. Aerial photograph of project area. (Courtesy of Townscape, Inc.).

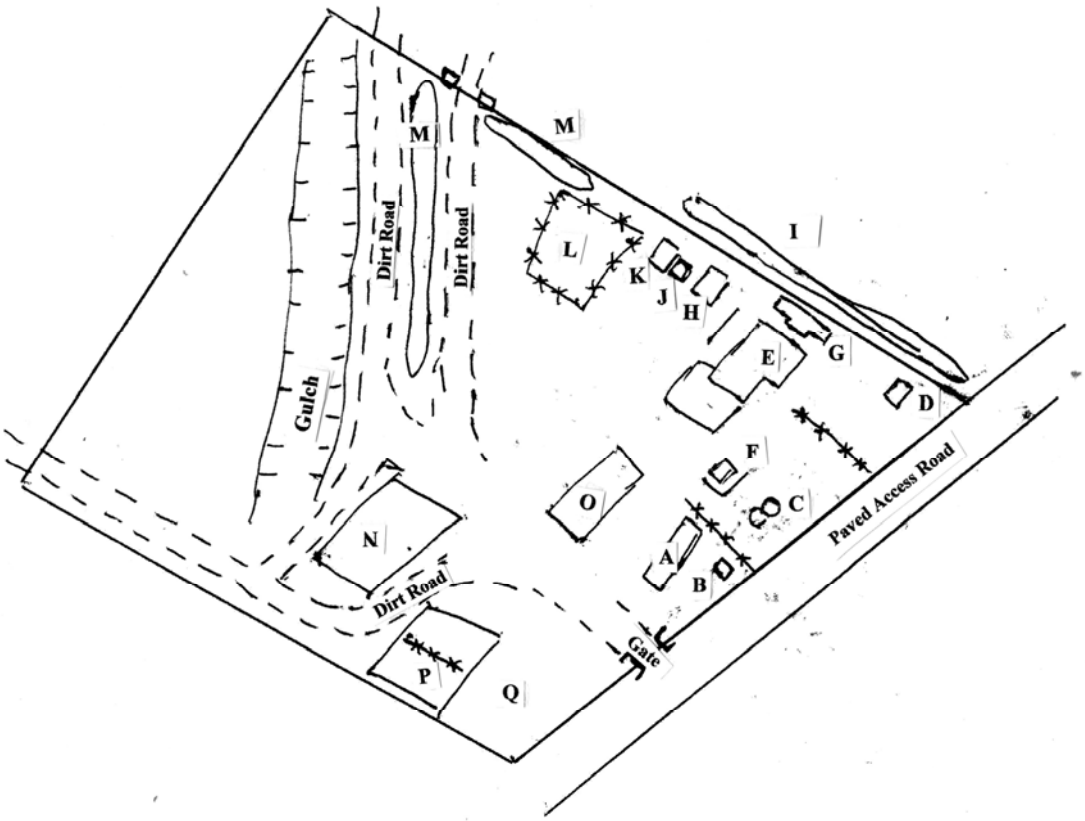

Figure 5. Sketch Map of Features in the Project Area. See Table 1 for Description.

Table 1
List of Features in the Project Area

Feature	Description briefly	Function
A	Rectangular walled, roofed structure	Small house structure
B	Small rectangular cement foundation	Small outbuilding
C	Figure-8 low stone platform	Recent horse burial
D	Small rectangular wood structure	Small outbuilding
E	Modern house with patio	Dwelling
F	Small brick paving, rectangular	Unknown garden feature
G	Rectangular cement foundation with metal poles.	Small outbuilding
H	Small rectangular wood building	Small outbuilding
I	Linear stone rubble	Bulldozer push
J.	Rectangular mesh-metal area	Duck pen
K	Rectangular wood shed	Storage shed
L	Rectangular wire fenced area	Pen
M	Linear stone rubble along top of gulch	Bulldozer push
N	Wood fenced trapezoid area	Corral
O	Rectangular cement foundation with roof	Possible car port
P	Rectangular metal fenced area	Corral
Q	Area with stone and dirt rubble	Bulldozer push

All features that were identified are modern, non-historic features – likely dating to the last 20-30 years. It was apparent that the entire project area between the gate and gulch was bulldozed. There are no walls lining the access road or south border. Some of the bulldozer push is lineal, but on close inspection, these lineal formations were not walls, rather bulldozer push. The dozing leveled the parcel and cleared any earlier stonework off to the northeast, north and west borders of the area.

As can be seen from the aerial, sketch map and list of features, several features dominate the parcel today. The larger house with its patio (Feature E), a smaller house (Feature A), and a roofed cement foundation that might have been a car port (Feature O) are visible on the aerial and sketch map. Additionally, there are two visible corral features (N and P), N being a sturdy, well-built, wood corral in excellent condition. As seen in the sketch map, several dirt roads extend from the area near the houses and the corral back into the ranch. One passes between the two corrals and runs along the south border. The other runs from the corral along the low gulley and out through two large wood posts and up into the ranch.

A look at the sketch map and table shows that there were a number of smaller outbuildings and features near the houses. Several were obviously pens for ducks, chickens or other smaller animals. One had been a storage shed (Feature K) and still contained some stored items.

No features were found on the slope across the gulch.

CONCLUSION

No historic properties were found in this parcel. While there might have been historic features present at one time, bulldozing in the past by the former ranch destroyed any such properties that were present. Thus, I believe that any activities in this project area will have "no effect" on significant historic properties found elsewhere on the former ranch.

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APPENDIX B

INFORMATION ON HISTORIC SITES
UPPER WAIʻANAE VALLEY

Ross Cordy
Hawaiian-Pacific Studies
UH – West Oʻahu
January 2012

AREA COVERED

This summary applies to the following lands in upper Waiʻanae valley: the State lands formerly leased to Waianae Valley Ranch by the Dept. of Agriculture (TMK: 8-5-06:11), the lands in the Waiʻanae Kai Forest Reserve (including apparently tiny City and County enclaves)(TMK: 8-5-6: 1), the DHHL parcel which Kaʻala Farm leases (TMK: 8-5-05:36), the Kaʻala Farm parcel on the south side of the dirt entry road into Kaʻala Farms (TMK: 8-5-05:7), and a small City and County parcel along the north side of the dirt entry road into Kaʻala Farms (TMK: 8-5-05:6). These lands have undergone archaeological and historical research at different levels of analysis.

Geographically, the upper valley of Waiʻanae consists of two areas, split by a small hill (Kōlealiʻiliʻi) and the ridge area that extends back from this hill to the base of the valley walls. To the north (Mākaha-side) three tributary streams drain the area (Hiu, Kūmaipō, and Punanaʻula). To the south (Lualualei-side), the tributaries of Honua and Kauaʻōpuʻu drain the area. (Honua's smaller tributaries are Kaneamimi, Kukaki, Niolupua, Kanewai from south to north, as listed on Monsarrat's 1906 map.) All these streams form from springs at the base of the valley walls in the Forest Reserve. The northern streams swing across the valley from north to south, joining the tributaries from the southern area, and then they flow seaward collectively as Kaupuni Stream. Kaupuni flowed year-round down to the shore. On the northern side, gradual, flat-topped ridges descend between the Kūmaipō and Punanaʻula drainages and the Kūmaipō and Hiu drainages. The access road to the Waiʻanae Wells runs up the later ridge. The former ridge runs all the way down to the paved access road leading to Kaʻala Farms.

This area also includes a portion of the middle valley of Waiʻanae. Punanaʻula Stream is essentially at the 40-inch rainfall line – the key amount of rainfall needed for year-round kalo cultivation. Seaward of Punanaʻula Stream is the middle valley. Most of the former Waianae Valley Ranch extends seaward of Punanaʻula Stream and is in the middle valley. This area on the Ranch has no flowing streams, only intermittent stream drainages coming off the Mākaha-side Kamaile ʻunu ridgeline. In periods of heavy rainfall, these streams may briefly flow. Collectively, research in this area has called these drainages the Kawiwi drainages. They extend seaward north of Waiʻanae Valley Road and join Kaupuni Stream just before Puʻu Kāhea where today's Mormon church is located. Much of the terrain in the ranch in this area consists of steeper small gullies and

intervening flat ridges (some stony) up near the base of Kamaile ‘unu ridge. As the terrain descends towards the valley floor (towards the paved access road from the end of Wai‘anae Valley Road to Ka‘ala Farms), the slope flattens out and broader areas of gradual slope are present.

NATURE OF THE RESEARCH COVERAGE

The information on these areas comes almost entirely from the 15-year research program run by Ross Cordy and his colleagues (notably Aki Sinoto and Moana Lee for Wai‘anae High programs), begun in 1997.

Prior to the late 1990s, there was very minimal archaeological work in upper Wai‘anae Valley, all at a brief reconnaissance level. On the northern side of the upper valley McAllister’s 1930 survey of O‘ahu (which focused on locating primarily large ruins such as heiau and fishponds) identified and mapped Punana‘ula heiau (site 165) – just seaward of the Forest Reserve fence along upper Punana‘ula Stream (McAllister 1933). His survey also has a short note about house structures somewhere nearby (site 164). About the same time, Handy of the Bishop Museum mentioned several terraces in the southern half of the upper valley, with very little description (Handy 1940). Several very brief studies were done for the Waianae Wells and the paved access road (A. Sinoto 1979; Bordner 1980, 1988, 1989; Barrera 1982; Ota 1981). Sinoto (1979) identified irrigated terraces on the slopes immediately below Well I, but these were not described or mapped in detail. Bordner (1988) briefly identified features just upslope of Well I. Bordner (1988,1989) also described very briefly agricultural terraces below Well I and out onto the ridge between Kūmaipō and Punana‘ula streams, resulting in a poorly defined complex in the State Historic Preservation Division’s records (site 2951) that has proven to be of little value (see critique in Cordy 1999). [Site 2951 is superceded by more recent work and should no longer be used.] Bordner (1989) also mentioned that there were terraces far up Kūmaipō drainage above Well II, but these were not documented in any detail (Bordner 1989). Last, in the southern half of the upper valley, the Bishop Museum did a brief reconnaissance of the Ka‘ala Farms area about 1979 (A. Sinoto, copy in Bishop Museum). [There is also a site polygon in the SHPD records – site 1179 -- that is cited in some sources to Ota (1981). SHPD records indicate that Earl Neller recorded this area consisting of irrigated kalo terraces, but the descriptive information is very brief, and I suspect the boundaries of 1179 are approximations at best.] In sum, early archaeological information for the upper valley is very limited in exact site locations, borders, and descriptions.

In 1997 Cordy and his colleagues started their research program. He was then the Branch Chief for Archaeology at the State Historic Preservation Division (SHPD) within the Department of Land and Natural Resources (DLNR), and a part-time Lecturer in Anthropology and Hawaiian-Pacific Studies at the University of Hawai‘i – West O‘ahu. At that time, DLNR was promoting “hotspots”, areas of importance to multiple divisions within DLNR. One such “hotspot” that then DLNR Chair Michael Wilson identified as important was upper Wai‘anae Valley. SHPD and the Division of Forestry and Wildlife (DOFAW) jointly had concerns about protecting historic sites in this area, protecting the

watershed, and promoting reforestation with native plants. Another aim of this hotspot was to partner with groups within the Waiʻanae community to develop a management board and plan for this area. Cordy was placed in charge of this hot spot program. One of the concerns was to begin to inventory the historic places in the upper valley.

This study of historic places in the upper valley began in two programs in 1997 – both of which continue today, and both of which are educational programs. [These are affiliated today with UH – West Oʻahu, for Cordy has been there full-time since 2003, as a Professor in Hawaiian-Pacific Studies.] One program has involved teaching of field archaeology to UH West Oʻahu students – predominantly Anthropology and Hawaiian-Pacific Studies students. Field archaeology classes have been taught over the years in various parts of the upper valley. These classes have been directly taught by Cordy, but often with the assistance of advanced UH West Oʻahu students, UH Mānoa Anthropology graduate students, and some professionals (many of these assistants being of Native Hawaiian ancestry). 10 such classes have been taught. Each class has been taught basic site types, then some have done reconnaissance mapping of an area to identify fields, houses and other sites. Then specific mapping and limited test excavation has occurred at one or two sites.

Over the same time period, Cordy has been involved with Waiʻanae High School's Hawaiian Studies Program. Parents, teachers, and Native Hawaiian community groups (among them Kaʻala Farms and QLCC) were concerned about student performance at the high school. They developed a program that would involve Hawaiian culturally-focused hands-on fieldwork with professionals and scientists. The idea was that the students would get more involved in hands-on learning and this would have positive impacts back in the classroom. Three main "rotations" have existed since the program's beginning: botany/reforestation, archaeology/history, and work with the Waiʻanae Comprehensive Health Center. Other rotations have also existed (marine science, stream science, etc.). Aki Sinoto ran the archaeology program in its first year. In the second year, Cordy began participating, with the assistance of Native Hawaiian graduate student Moana Lee. All three have continued to work with this program since 1997. Once a week or every other week, the students are taught archaeological fieldwork – doing tasks very similar to UH West Oʻahu students. They do reconnaissance, and at specific sites they have done detailed mapping and test excavations. They have also participated in drafting of reports. Some students received advanced training in the summers from Cordy and Lee, becoming mentors or supervisors for the following year's class. This summer work has involved further work in upper Waiʻanae.

The third element of research in the upper valley began in March 1998. Not long before, the Department of Agriculture (DOA) had just leased the ranch area to Waianae Valley Ranch. They reported this at a Waiʻanae Neighborhood Board meeting to great controversy. The representative of DOA claimed that there were no historic sites on the property, and had to be informed at the meeting that the large Punanaʻula Heiau sat on the DOA land, just over the Forest Reserve Boundary. It was clear that other historic sites could well be present and that DOA had not done Chapter 6E (historic preservation law) compliance – as this permit was an undertaking that could impact significant historic

sites. Several community groups complained, as well as SHPD and OHA. A meeting occurred at OHA. DOA representatives stated that the lease allowed for removal of all areas with significant historic sites. But the problem existed that it was not known if significant historic sites were present. DOA had no funds to do archaeological inventory survey. Thus, Cordy volunteered SHPD's services to do an intensive reconnaissance survey of the ranch (as staff time allowed), to determine the types of sites present and their general patterning and significance. This survey followed off-and-on through 1998 to July 2000, with a report written up in 2001 (Cordy 2001). The survey did archaeological inventory level survey coverage (excluding test excavation) of transects within the ranch to identify site patterns. This was complete coverage of approximately 34% of the Ranch (excluding steep ridge walls). It included the entire flat ridge between Kūmaipō and Punanaʻula Streams and other areas. This survey very clearly identified the nature of the sites and site patterning in 2/3 of the ranch, with the lower valley 1/3 still needing more work.

Since the above survey on the ranch, Cordy has supervised more work at a number of sites on the ranch (done by Waiʻanae High and UH West Oʻahu students). This has included detailed mapping of sites and test excavations, as well as reconnaissance work in previously unsurveyed areas that has found more sites.

At this point, archaeological work in this area of Waiʻanae valley has covered at inventory survey levels portions of the Forest Reserve (areas back of Kaʻala Farms and the lands from the Well access road seaward to the edge of the Forest Reserve), the DHHL parcel (with a small area yet unsurveyed), the City and County parcel along the Kaʻala dirt access road, the Kaʻala Farms parcel on the south side of their dirt access road, and sizable portions of the inland two-thirds of the ranch (the low flat ridge between Kūmaipō and Punanaʻula and areas more seaward). Additionally, reconnaissance level work has led to preliminary site identifications in other areas in the Forest Reserve (on the inland edge of the Well access road, and farther above Kaʻala Farms) and on the ranch (in the seaward third of the ranch). This work has led to identifications and descriptions of numerous sites, and a large number of test excavations.

It is important to realize that this has primarily been an educational research program without the deadlines of contract archaeology. Commitments to preserve all these sites in the Forest Reserve and on the ranch have been understood for years. Generally, there have not been immediate threats to the sites, although incidents have arisen. Also, it is important to realize that this program has had strong commitments and working relationships with Native Hawaiian groups from the Waiʻanae area (e.g., Kaʻala Farms, QLCC) and with Waiʻanae High School.

At this point, only a few progress reports have been presented at scientific meetings and been published (Cordy 2001b; Cordy 2003). The initial SHPD Waianae Ranch survey is written as a manuscript (Cordy 2001) and is available at the SHPD Library in Kapolei, as are a number of the early Waiʻanae High and UH – West Oʻahu projects. A recent manuscript report summarizes the work in the Forest Reserve (Cordy 2010). However, many of the small Waiʻanae High and UH – West Oʻahu studies are still being written –

hopefully to be finished within a year or so. Also, given the low cost, educational focus of this research, there have been no funds for radiocarbon dating and other lab studies. However, this is now changing, and initial radiocarbon dates and charcoal species identification are anticipated this year – to be followed by an application for research funds for a larger dating program.

Last, this research program has also involved archival research with land and other records for upper Waiʻanae and all of Waiʻanae valley with some already reported (Cordy 2001c). The program has also involved larger Waiʻanae district (moku) level work, integrating the findings with other valleys along the Waiʻanae coast (e.g., Cordy 2002).

FINDINGS

116 sites have been specifically identified in this area of the upper valley: 34 in the Forest Reserve, 4 on the DHHL/Kaʻala Farms parcel, 1 on the Kaʻala Farms parcel south of their entry road, 1 on the City and County of Honolulu parcel north of the Kaʻala Farm entry road, and 76 on the former Waianae Valley Ranch.

Waiʻanae Kai Forest Reserve

34 historic sites have been identified in the Forest Reserve to date (not counting site 2951 which is no longer applicable). Tables 1 and 2 list these historic sites, their function and likely age, and they also indicate when work occurred and reports (many still in preparation). Figures 1 and 2 show locations.

Sites on DHHL Parcel Leased to Kaʻala Farms parcel

Most of the parcel that Kaʻala Farms leases from DHHL has been inspected. Four sites are present (Table 3). Much of the parcel is covered by irrigated kalo fields – descending soil terraces lined with stone facings on the downhill side. There are 3 terrace complexes that enter from the inland side of this parcel. Along Honua Stream (not fully investigated) terraces from site 7113 enter and broaden out. Down the center of the parcel (the Mākaha edge of Kaʻala Farms' large hale) are terraces descending down from site 5965); and on the Lualualei side of the higher ground with today's houses and hale, more terraces descending down from site 5965 enter the parcel and broaden out. All these terraces essentially join as one huge irrigated kalo complex extending across the southern part of the upper valley – from Honua Stream to Kauaʻōpuʻu. These terraces emptied their water back into Honua Stream on the down-valley side of the parcel at multiple points, and one small lower extension of the complex runs farther down valley to the join of Honua, Kūmaipō, and Kauaʻōpuʻu. These terraces have been sketch-mapped, with detailed maps of portions of the complex, and with test excavations in areas on the downvalley edge. [This complex matches 23 acres shown on Monsarrat's 1906 map as "formerly in taro."]

On the higher ground where Ka‘ala Farms’ large hale and two houses are located is another site. Only small fragments of this site are present, and have been recorded. The site has not been given a number. However, when Ka‘ala Farms was first developing this area in the 1970s, habitation artifacts were collected from this area – food pounders, ulu maika stones, adzes. These artifacts have been photographed to scale by UH West O‘ahu students. They suggest that a permanent house site once stood on this higher ground.

The two other sites on this parcel are across Kaua‘ōpu‘u Stream on a narrow stream flat at the base of the Kaua‘ōpu‘u Ridge wall. (They may actually be in another parcel.). A lineal set of descending terraces (irrigated kalo) terraces covers this stream flat. Also, one rockshelter is present against the base of the ridge wall. Aki Sinoto ran two Wai‘anae High projects here at the rockshelter, which was a temporary habitation and an adze production place (with numerous stone waste flakes).

Sites on City & County of Honolulu Parcel

One site is present on the City and County of Honolulu parcel that runs along the north side of Ka’ala Farms’ dirt access road between Kumaipo and Honua streams (Table 3). This parcel corresponds to LCA 3132 awarded to Kaupea in the Māhele. Archaeological work has found irrigated kalo fields covering 2/3 of the parcel with water flow coming out of Honua Stream. The 1/3 of the parcel towards Kūmaipō Stream is higher and has dryland field remnants (low, irregular terraces; clearings; mounds). Two small stone platforms with uprights, agricultural shrines, are present at opposite ends of the irrigated kalo fields. One 20th Century house site (confirmed by oral informants) was found on the edge of this site near Ka‘ala Farms’ bus parking lot and Honua Stream. All the irrigated kalo fields and the shrines have been mapped in detail, with numerous test units in the fields and several in the 20th Century house. One small portion of the parcel nearest Kūmaipō Stream has not been investigated due to high grass. It is at a high point and may well contain the house area of LCA 3132. [These irrigated terraces are shown on Monsarrat’s 1906 map as part of a ___ acre area “formerly in taro.”]

Sites on Ka‘ala Farms Parcel

Remnants of one site have been found in this parcel, which is on the south side of the Ka‘ala Farms’ dirt access road between Kūmaipō and Honua streams (Table 3). This parcel continues toward Lualualei to the joining of Kūmaipō and Honua streams. This parcel is shown on Monsarrat’s 1906 map as a continuation of the __ acre area “formerly in taro” that included the City & County parcel. In the 1900s, this area was truck farmed. This farming apparently destroyed most of the descending terraces that were once in this parcel. Today, only remnant pieces of terraces are found, mostly along the edge of the streams. This parcel has undergone reconnaissance survey and some surface collection. It is now used by Ka’ala Farms for native plant restoration work.

Sites on Waianae Valley Ranch

74 historic sites were found in the Waianae Valley Ranch survey (Cordy 2001) and 2 additional sites since them (Table 4). Additional observations over the ten ensuing years in times of low vegetation have further characterized the immense size and nature of the terraced dryland fields. (There are still portions of the Ranch, notably the seaward third that have not undergone survey, and additional sites will undoubtedly be found.)

SITE PATTERNS IN THE AD 1700S – THE ERA JUST BEFORE AND INCLUDING EUROPEAN CONTACT

Wai‘anae valley was the economic, demographic, political and religious center of Wai‘anae district in the 1700s. Far larger areas were under irrigated kalo cultivation in Wai‘anae than anywhere else in the district. Wai‘anae was the agricultural “food basket” of the district. Not surprisingly Wai‘anae also had a far larger population than any other land in Wai‘anae moku. With 1,500-2,100 people, it had at least 30-40% of the district’s population. Based on oral traditions, the high chiefs of Wai‘anae in the 1700s resided in Wai‘anae valley. Last, nearly all the large major national religious structures of the district were in Wai‘anae valley -- 9 of the 11 known large heiau, with three near the high chief’s residence at Pu‘u Kāhea in the lower valley, near the shore. While other important heiau and religious places existed elsewhere in the district, these large structures and the national religion was clearly focused in Wai‘anae valley. The upper valley and upper middle valley covered by this plan were a part of this picture of the entire valley.

The archaeological findings show the presence of a continuous archaeological landscape of farms and houses and associated sites that extended from the middle valley (the middle third of the former Waianae Valley Ranch) up into the upper valley (the inland third of the Ranch and on up through the Forest Reserve areas that have been surveyed so far). Almost the entire landscape is continuous fields with associated houses. It is likely to reflect the maximal cultural landscape present in the 1700s and at European Contact, prior to depopulation. The striking pattern of this landscape is that it is all virtually intact. Only minor alterations and damage have occurred to this landscape over the years.

What this means is that at least the lower portions of the Forest Reserve – below the access road in the northern half of the upper valley and below Honua Stream across the southern half of the upper valley – were not in forest in the 1700s. Instead, this area was the inland extension of Wai‘anae valley’s agricultural fields and associated permanent houses. This human landscape was near continuous from the valley mouth up along Kaupuni Stream, across today’s Waianae Valley Ranch and well into today’s Forest Reserve. Most of the fields in the 1700s in the upper valley were irrigated kalo fields, with houses on adjacent high land. Irrigated fields continued on down-valley along Kaupuni Stream to the shore. But, importantly, a large acreage of intensive dryland fields (likely sweet potato, and perhaps kalo in the inland parts) was present in the upper middle valley over much of Waianae Valley Ranch and partly into the Forest Reserve. These were stone terraced dryland fields, likely with very short fallow periods; and permanent houses were scattered densely through these fields.

This agricultural-housing landscape actually appears to have extended farther up into the Forest Reserve than archaeologically documented to date. In the northern half of the upper valley, irrigated terraces are reported (with very little description and no locations) in the upper Kūmaipō tributaries (Bordner 1989), and Monsarrat's 1906 map shows 42 acres "formerly in taro" between Hiu Stream and the Kōleali'ili'i ridge (below the 1,400 foot elevation). In the southern upper valley, Monsarrat's 1906 map shows a 49 acre area "formerly in taro" covering the area between Kōleali'ili'i hill and Honua stream (the Kalalua tributary area). Two more "former taro terrace" areas are shown up-valley of our archaeological surveys -- one of 21 acres above our site 5965 up to about the 1,000 foot elevation (apparently an upper part of site 5965 still not mapped by us) and the other of 12 acres farther up-valley between the Kaneamimi and Kukaki tributary branches of Honua. Also, there is the very brief site 1179 record for Kānewai Stream against the Kōleali'ili'i ridge. Additionally, house sites were reported by a community member in the south side of the valley back near the base of the valley walls. This evidence suggests that probably only the uppermost parts of the Forest Reserve (the steep slopes above 1,400 ft in the northern half and possibly some above 1,000 feet in the southern) may have still been in forest in the 1700s. However, this human farming-house landscape may have intentionally incorporated small, remnant clusters of forest trees. Resolving where the upper boundary of the agricultural-housing landscape was in the 1700s awaits future survey findings.

Once radiocarbon dates begin to be processed, a chronology of the spread of fields and houses into the upper valley will be available. Certainly, the forest once extended farther down in the upper valley. Given archaeological findings elsewhere in upper valleys throughout the islands, fields and houses are likely to have begun expanding into the upper valley from the AD 1300s/1400s on. This may well have been the pattern in Wai'anae valley.

1. Irrigated Fields

In the Forest Reserve and in one small section of the Ranch which penetrates across Kūmaipō Stream, irrigated kalo fields in the form of descending rectangular soil plots with downslope stone terrace facings are present almost wherever water could be diverted. The 1906 Monsarrat map shows areas with abandoned taro terraces, most notably in the southern part of the upper valley. From this map and other sources, Green (1980) computed the area of land under irrigated kalo cultivation for Wai'anae, showing that Wai'anae valley far exceeded all other lands in Wai'anae moku in irrigated kalo cultivation. Archaeological work since 1997 has shown that even more fields were in the northern upper valley.

In the northern half of the upper valley, the upper part of Punana'ula Stream has a narrow stream flat area, all of which was in irrigated terraces (site 5523), fed by a canal leading down a short distance from the spring at the ridge base. This linear set of terraces also had water diverted out onto the low ridge slope above Punana'ula heiau, on the Ranch just outside of the Forest Reserve, where water passed through a few more terraces and dropped into a nearby intermittent stream. These were the only irrigated taro fields in the

Punanaʻula drainage. Stream flats (slightly wider) are also raised above Kūmaipō Stream across the stream from Well I, and most of these flats were terraced, with water diverted out of Kūmaipō in two places into these terraces (site 5521). Immediately below Well I, the steep slope is intensively terraced from the access road down to the bank above the stream (site 5767). Here, several canals led from springs now under or just above the access road and passed down through these terraces. Most of the water returned to the stream, but one canal led across the slope above the stream and passed into a set of terraces on a more gradual slope (site 5841, a set enclosed by wall). This canal then continued farther down and across the slope (with a branch dumping back into Kūmaipō) and into another wall-enclosed set of terraces (site 5852). Just downslope of that site, a small area has yet to be surveyed, so we are uncertain of water flow. But from Monsarrat's 1906 map it appears several springs existed in this area, forming a small side stream. This stream was channelized (lined with stone) and dumped water out onto a low rise between it and Kūmaipō. Much of this low rise (except the raised lower end) was covered in irrigated kalo terraces, with water exiting back into Kūmaipō and the side stream (site 5662). This site is at the base of the steep slope immediately below the tiny weather station along the paved access road. Today's fence line between the Ranch and Forest Reserve and its firebreak buffer cut through this site. Monsarrat's map indicates that much of this site may be within the Forest Reserve; but of the area identified so far, most of it is on the Ranch side of the boundary fence.

Monsarrat's map also shows a __ acre area "formerly in taro" between Kūmaipō and Hiu streams and between Kūmaipō and the joined Hiu/Honua streams, extending all the way down to the join of Kūmaipō and Honua. This area begins just within the Ranch, extends across the paved access road through TMK 8-5-05:5 (altered in the 1990s by grading which covered over unsurveyed historic sites), on through the City & County parcel (TMK 8-5-05:6), and across Kaʻala's dirt access road, and through the Kaʻala parcel on the south side of that access road which is now used for native plantings. Archaeological work in the latter two parcels has found descending kalo terraces – with those on the City and County parcel having some of the largest stones in its facings documented on Oʻahu.

Irrigated kalo fields also cover large areas of the southern upper valley in the Honua and Kauaʻōpuʻu drainages. Monsarrat's map shows a set of terraces covering about 49 acres between the Kōlealiʻilliʻi ridge and Honua Stream, where the Kaloloa side stream descends off the ridge. This area is not yet archaeologically investigated. Descending terraces of irrigated fields are present in the Forest Reserve leading off Honua Stream in four areas – corresponding to the "formerly in taro" area of 104 acres on Monsarrat's map and the adjacent 23 acres in the DHHL/Kaʻala Farms parcel. One (site 5965) is where water is diverted out into a canal that runs down the low Olive Tree trail ridge and out onto the slopes to the south of this ridge. (It appears likely that at least one more canal higher up diverts water onto this slope to the south, as terraces are present slightly higher than the canal identified to date. Monsarrat's map also shows 21 more acres in this area.) The terraces continue all the way down this flat topped ridge and adjacent slopes, splitting into two sets as they exit the Forest Reserve and enter Kaʻala Farms –one set going around to the south of the higher rise where Kaʻala Farm's large hale and modern houses sit and the other going around to the north through the loʻi that are in operation.

Then below this rise, these terraces rejoin and extend all the way down to the joined Hiu-Honua stream, which they drain down into. This is all site 5965. However, a portion of the slope near Kaua‘ōpu‘u Stream proved to have no visible terraces when it was walked in 2009. So Monsarrat’s map does not appear to be completely accurate. Water from Honua and from the canal at the top of the Olive Tree ridge terraces was diverted into a second set of terraces in a broad intermittent drainage just below and to the north of site 5965 (site 6405). These terraces have yet to be mapped in detail, but over 47 individual fields were identified in reconnaissance survey work. This terrace set does not go all the way down the drainage, however; so again there is an area without terraces within Monsarrat’s 104 acre map area. A third diversion from Honua Stream occurred at the bend of the stream just below where all of the upper tributaries of Honua meet. This diversion has at least one canal emptying into a set of terraces in this bend (within site 5967). This site may correspond in part to LCA 3131 to Kuapuu, where he claimed lo‘i fields. This canal leads farther downslope through rugged terrain without irrigated kalo fields (again contrasting with Monsarrat’s map), but where at least two small water reservoirs appear to have been constructed to hold water (site 7112), possibly to fill fields further downslope during the dry season. A fourth diversion from Honua Stream occurs about halfway farther down its course towards the join with Hiu. Here the stream was dammed, and a canal feeds a narrow set of descending terraces below higher ground (site 7113). These terraces appear to continue down along Honua Stream out of the Forest Reserve into the northernmost terraces currently cultivated within Ka‘ala Farms, where they join the immense site 5965 terrace area that virtually extended here from one side of the southern upper valley to the other. The last sets of irrigated kalo terraces present in the southern half of the upper valley consist of a linear set of 10 or so fields descending down a raised flat along Kaua‘ōpu‘u Stream. on the Ka‘ala side of the stream (site 7114) and a similar linear set slightly farther down-valley on a raised flat along the opposite side of Kaua‘ōpu‘u Stream at the very base of Kaua‘ōpu‘u ridge. [The upper reaches of Kaua‘ōpu‘u have yet to be surveyed.]

Collectively, these irrigated kalo fields cover much of the waterable slopes and stream flats of the upper valley.

2. Dryland Fields

Dryland fields (rain-fed fields) have been identified archaeologically down the entire low ridge between Punana‘ula and Kūmaipō streams from the base of Kamaile ‘unu ridge’s wall to the paved access road just before the entry to Ka‘ala Farms, and an even larger acreage between Punana‘ula Stream and the first large down-slope Kawiwi drainage (again from the base of Kamaile ‘unu ridge’s wall down to the paved access road). Besides these large acreages, smaller dryland field areas are present on the low ridge just upslope of the paved access road near Well I, immediately around some house sites, below site 5967 and above site 7113 in a rocky area along Honua Stream.

On the gradual Punana‘ula to Kūmaipō ridge, these fields consist of often large rectilinear soil fields with low, 1-3 stone-high terrace facings on the downhill edges and often on the sides (site 5524). These fields again begin on the colluvial soils right at the base of

Kumaile ‘unu ridge’s wall and extend down through the Forest Reserve and out onto Waianae Valley Ranch and down to Kaupuni Stream (just beyond the paved access road). The larger area of these type of fields on the Ranch (seaward of Punana‘ula down to the first large Kawiwi drainage) is similar in appearance. These dryland agricultural terraces are difficult for the lay person to see. They become visible only with the grass is very low, or after a fire, or along the firebreak strip at the fence line between the Ranch and Forest Reserve. These are formal, terraced rectangular fields – not the informal clearings, mounds and short terraces like the dryland fields of Mākaha and Nānākuli. The labor involved in these fields reflects intensive cultivation, with short fallow periods. This in reinforced by the fact that virtually no field shelters are present here; instead, permanent houses are densely scattered about. These are likely to have been sweet potato fields, perhaps with kalo as 40-inch rainfall line near the Forest Reserve is approached.

The other dryland fields that have been found [on the inland side of the paved access road behind Well I (site 7111), just downslope of Well I (site 7112), in rocky areas along Honua Stream and in rocky areas between Punana’ula heiau and the first large Kawiwi drainage] are informal fields – mounds, clearings, short irregular terraces.

3. Houses

Permanent housing has been identified archaeologically in the upper valley areas, based on a common model of identifying such housing (Cordy 2001). Ca. 50 such permanent house sites have been found to date.

In the upper valley, these are scattered on slightly higher, drier ground among the irrigated kalo fields. One is along the stream flat of Kūmaipō with associated irrigated terraces (Feature A of site 5521). One is on the high ground at the top of the terraces in site 5852 on the slope below the Wells. Another (site 7070) is within the Honua site 5965 terraces on the Olive Tree ridge. The modern house area at Ka‘ala Farms once was another such housing area farther down within site 5965, based on domestic artifacts recovered here – food pounders, adzes, ulumaika gaming pieces. Several houses appear to be associated with the Honua terraces at site 5967 (with only Feature B intensively studied to date). Two are on the high ground above the lower Honua terraces (site 7113), sites 6853 and 7040.

Down-valley among the dryland (rainfall) agricultural fields on the low ridge between Punana‘ula and Kūmaipō streams (the upper part in the Forest Reserve) and on the low ridges between Punana‘ula and the first, large Kawiwi stream, over 40 house sites are found – 25 on the low ridge between Punana’ula and Kumaipo alone.

Based on this housing evidence the population in the upper middle and upper valley once may have numbered 500 people – amounting to 25-30% of the valley’s probable 1,500-2,000 people.

All these house sites range from small houseyards that are enclosed by low walls to open houseyards. Actual house foundations or enclosures range from 1-3 structures. Nearly

all have been interpreted as commoner house sites, following a commonly used model (Cordy 2001). Horizontal excavations at one house site found an earth oven area near the house structures, and most likely had such cooking areas. Excavations typically find smaller flakes of basalt or volcanic glass, cores of basalt or volcanic glass, some basalt adzes (complete or fragments), and sometimes less common artifact types.

One house site (5783-A) on the Ranch not far from the paved access road had an enclosing wall sitting on a very large raised terrace – essentially a house yard wall. The terrace's facing and fill showed much more labor expenditure than at any other permanent house site of this era. Thus, there is the possibility that this house site belonged to an individual of higher rank.

4. Burials

Few burials have been identified within this area at present. One site has small rectangular platforms just outside its houseyard walls that appear likely to be burials (site 5700). However, burials in areas with considerable soil, like upper Waiʻanae are often very difficult to identify from surface features. Burials are expected to be in association in small numbers with many of the house sites, as family members were frequently buried within the houseyards or nearby. Other burials could be scattered about in small numbers.

5. Heiau – Religious Structures

Four different types of religious structures have been found in the upper valley: household shrines, agricultural shrines, small heiau, and large, major heiau.

Based on Hawaiian records from the early 1800s (e.g., Malo), household shrines are likely to have been associated with almost every house site as an unroofed structure. Several have been identified with houses out on Waianae Valley Ranch – upright stones, large enclosed boulders, branch coral placed on a small platform, etc. One has been identified within the Forest Reserve at site 6854 (a small rectangular enclosure with an upright stone). Household shrines are extremely difficult to identify archaeologically without the presence of upright stones, branch coral or rare other features; and it is likely that many household shrines did not use these structural elements. But, again, it is anticipated that every permanent house site had one.

Small agricultural shrines have been found on the Ranch, in the Forest Reserve, and on the City and County parcel along the north edge of Kaʻala Farms' dirt access road. In the Forest Reserve, one such shrine was present at the canal entry into an irrigated kalo terrace set along Kūmaipō (site 5521) -- a small platform with upright stones. On the city and County parcel, two agricultural shrines have been found – both small, low platforms with one and multiple upright stones. One is on the Honua Stream side of the irrigated kalo fields on this parcel, and the other is on the Kūmaipō Stream side of these irrigated kalo fields. Out on the Ranch, several upright natural stones were found that were edged by low pavings. Other agricultural shrines are undoubtedly present throughout these

fields. The more one works in these areas (particularly when the grass is low) the more frequently these features are found – one of the benefits of a long-term educational/research program in an area, rather than quick contract archaeology projects.

Smaller heiau have been found scattered among the dryland fields out on the Ranch. At least two are stepped platforms on ridge tips between intermittent gullies, where the terrain drops down from steeper slopes to more gentle slopes of the center of the valley (site 5656 and an unnumbered site). Another is next to a cluster of permanent houses (site 5648). The individual functions of these heiau are unknown.

Three major, large heiau are present in the upper valley (Cordy 2001). Major heiau are those above 500 square meters in area. Punanaʻula heiau (site 165) was the only known major heiau here prior to 1997. It consists of a low two stepped platform with a high facing down a drop in terrain, and is 854 m^2 in area. It was recorded by McAllister in 1930, and remapped by the current archaeological program, finding several additional features. This heiau is on the Ranch, literally just over the boundary fence from the Forest Reserve, along the upper reaches of Punanaʻula Stream at the 1,100 foot elevation. Two other large, previously unknown heiau are farther out on the Ranch. One, site 5713, a large rectangular enclosure (672 m^2) with massive, distinctive trapezoidal wall architecture, is on the seaward edge of Punanaʻula Stream at the 850 foot elevation. The other, site 5810 is a large rectangular enclosure (775 m^2), with very thick walls and several internal features. It is on the flatter center of the valley floor, not far from Punanaʻula Stream at the 600 foot elevation. These major heiau are likely to have been constructed under the sponsorship of a high chief. Oral histories indicate that the luakini of the valley was Kamohoaliʻi heiau, located at Puʻu Kāhea, the hill where the Morman Church is today. However, other major heiau had functions to promote success in farming, fishing (probably Kūʻīlioloa heiau at Pōkaʻi Bay), surfing, and other uses. These three in the back of the valley quite likely were built and used at least to promote success in farming.

[Bordner, 1988, identified one of the structures in site 7110 behind Well I as a possible heiau. But close inspection by Cordy indicates that it clearly is not a heiau. It has 1800s era walls (high and narrow), and the area enclosed has no resemblance to those of heiau.].

6. A Puʻuhonua or Refuge Area ???

Bordner (1988, 1989) after brief reconnaissance surveys near Wells I and II hypothesized that an area from along Kūmaipō Stream below Well I and out across the low ridge between Kūmaipō and Punanaʻula was a puʻuhonua (refuge area). He based this on a claim that a large wall (he thought too massive for a cattle wall) ran from Kōlealiʻiliʻi out across to the Kamaile ʻunu ridge and set off this Kūmaipō area (a wall that he saw on aerials, but could not find on the ground), that this area was the only area with many agricultural terraces (some with massive walls), that there were an "unusual number of heiau" here, and that an usually dense number of sites in general were present here. His claim was also based on his conclusion that the refuge on Puʻu Kawiwi mentioned in oral

histories recorded in the mid-1800s by ‘Ī‘ī (1959:97), Kamakau (1991:54; 1961:139-140) and Fornander (1880:88) was not above on the ridge but down below in this area.

None of these ideas have any basis. The oral histories very clearly say that the refuge was on the ridgeline above, and that it was a war refuge (pu‘u kaua) not a pu‘uhonua. There is no basis to doubt these oral histories. Archaeologically, we now have coverage across the entire upper valley and out on the adjacent Ranch. Site density is no greater in this area of Bordner’s; in fact more houses are out on the ranch largely below the 600 foot elevation. The wall that he speaks of has been identified (site 5651), and documentation identifies it is as a late 1800s wall to retain cattle. Last, this area of Bordner’s does not contain an unusual number of heiau. Punana‘ula heiau is out on the margin of this area, but the other two large heiau of the upper valley are scattered much farther down-slope – roughly equidistant down the seaward side of Punana‘ula Stream. In brief, this hypothesis of a refuge area is no longer tenable. (See Cordy, 1999, for a detailed analysis.)

7. Trails

One major trail passed through the upper valley in traditional times. The main coastal trail of the O‘ahu Kingdom passed along the shore, near today’s Farrington Highway. But a mountain trail that was open to all residents of the kingdom passed from the Wahaiwā/Schofield area through Kolekole Pass, with one branch leading through the gap into Wai‘anae and down Wai‘anae valley (approximating Wai‘anae Valley Road, and Old Government Road at the seaward end), connecting to the shore trail,. This trail, roughly where Wai‘anae Valley Road is today, was the main trail up and down the valley. It branched where the bus turn-around is at the end of today’s Wai‘anae Valley Road – one branch leading to Kolekole Pass and the other branch going into the upper valley. The upper valley trail (called Kūmaipō Trail in the oral histories, ‘Ī‘ī 1959:97) ran up-valley; and near today’s entry into Ka’ala Farms, it turned across the valley approximating the paved access road to the wells, and crossed over the low point in the Kamaile ‘unu ridge into upper Mākaha valley. Monsarrat’s 1906 map shows a portion of this trail (as well as side trails farther up valley that may or may not have been old).

Another trail was known to lead up the Kamaile ‘unu ridgeline to the top of Ka‘ala mountain and then down across steep cliffs into the Schofield areas of Kalena and Hale‘au‘au where it was known as the Eleu Trail (‘Ī‘ī 1959:97).

Neither of these trails has clear archaeological traces that have been identified today, although it is possible segments survive. (Apparently a segment of the Eleu trail was found on the Schofield side of Ka‘ala.) They are clearly old historical access routes, and thus could be considered historic sites with approximate corridors.

8. Traditional Cultural Places

Two places are mentioned in the traditional oral literature that are on the ridgeline above the upper valley – Mount Ka‘ala and Pu‘u Kawiwi. These are traditional cultural places,

linked to deities and famed events. They would have been well known to residents of the upper valley in traditional times. No attempt to identify boundaries for these cultural sites is made here.

Mount Kaʻala has stories associated with deities living on the mountain, particularly the goddess Kaiona who helped people lost in the forest by sending out an iwa bird to guide them out (Fornander Collection 1919,6(2):344; Pukui 1983: proverbs 770, 1643, 1714). Many other stories and chants refer to Kaʻala, often linked to the Wahiawā and Waiʻanae uka areas on the other side of the mountain from the Forest Reserve.

Puʻu Kawiwi was a natural fortress on the Kamaile ʻunu ridge down-valley over the low point where the Kūmaipō Trail passed over the ridge. The 1906 Monsarrat map shows this point directly above the spring where Punanaʻula Stream originates, so it may well be within the Forest Reserve. Puʻu Kawiwi held a famed puʻu kaua, fortress, used at least in the time of the revolt against the ruler Haka in the mid-1500s and again in the final days of the failed 1785 revolt against Kahekili and his Maui high chiefs (Kamakau 1961:139-140, 1991:54; Fornander 1880:88; Fornander Collection 1919,5(2):498; see also ʻĪʻī 1959:97; Kelly [1957] 1986:159; Thrum 1910). It also is said to have had deities associated with it, who guarded a famous coconut whistle that was stolen by a bird of Haumea (Kamaʻakanahiai story in July 22, 1911 issue of *Aloha ʻĀina*, in Sterling & Summers 1978:76; McAllister 1933:117). To our knowledge, no archaeologist has visited this traditional place.

SITE PATTERNS OF THE 1800s

Life in Waiʻanae Valley continued along the traditional subsistence pattern, with service to overlord chiefs, up until land was privatized ca. 1850. Labor was required for sandalwood in the 1810s-1820s and increased taxation undoubtedly affected the Waiʻanae population in the 1830s-1840s as it did in the rest of the Islands, in the chiefs attempts to pay off debts (Sahlins 1992). The high chief and his representative continued to reside at Puʻu Kāhea in the front of the valley through these years. In 1820 with the national religion abolished, the major heiau were abandoned, and it is expected that Punanaʻula heiau and the other two large heiau in this area also would have been abandoned about this time. Western churches and schools all seem to have been down-valley too.

When the 1800s began, the upper valley's commoner agricultural/housing landscape of the 1700s was still present. However, population began to drop dramatically, down to 25% of the total at European Contact by 1855. As a result house sites and associated fields began to be abandoned – due to disease (no heirs), emigration down valley (to vacant land that could be claimed) or emigration to Honolulu (to earn wages or see the bright lights). This happened in upper Waiʻanae valley. Although more archival work is needed to clarify the causes of abandonment, the timing of the abandonment of the upper valley has begun to be documented (Cordy 2001; Naboa 2002, 2009). At this point, the following picture can be offered (understanding that more archival work is needed).

At the end of the 1700s, approximately 50 house sites seem to have been occupied in the project area (the upper middle valley, and the upper valley), as they have no Euro-Asian artifacts or architecture. Given the percentage of the Ranch and Forest Reserve surveyed, it is likely that about 70 house sites may be present (and this may prove to be an underestimate somewhat). These are likely to have mostly been in use at the end of the 1700s, along with all the associated agricultural fields that were discussed above.

It is suggested that Euro-Asian artifacts started to enter rural areas of Oʻahu in the 1840s in numbers. Only 11 house sites – total -- have been found to have 1800s Euro-Asian artifacts/architecture – 4 in the Forest Reserve (5645, two in 5967, 7040) and 7 on the Ranch (5782, 5783, 5784, 5785, 5786, 5788, 5669). (One on the Ranch was abandoned by 1840.) Thus, it appears that by the 1840s most of the house sites in the upper valley of Waiʻanae were abandoned. The late 1840s Māhele awarded 4 commoner LCA claims with likely houses (one possibly corresponding to site 5967). This was a serious decline, from 70 to 11 households, possibly 15. Quite likely associated agricultural fields were similarly abandoned.

These remaining house sites ca. 1840-1850, were nearly all clustered at the front of the southern upper valley, 7 along the old Kūmaipō trail (5 in the Ranch along the paved road just before getting to Kaʻala Farms; 2 LCAs between Kaʻala Farms and the Forest Reserve gate) and 4 just up Honua Stream probably on a connecting trail (LCAs 3087 to Kanepaina and 3131 to Kuapuu, the latter apparently corresponding with site 5967, and site 7040 just seaward). Only two households were more isolated, one along the middle reaches of Kūmaipō on the Ranch (site 5669), and another along Punanaʻula Stream, just below Punanaʻula heiau on Forest Reserve land (site 5645).

From the 1850s to the 1890s, this traditional housing-agricultural landscape of the upper valley came to end, with the rise of ranching and the Waianae Plantation.

It appears cattle were in the upper valley in the 1850s, although archival work is needed to document who controlled the area (possibly the Lualualei leases also included this Crown land area too). By the 1870s, the Plantation may have been conducting the cattle operations, although again more research is needed. Stone walls began to be built in the 1870s, perhaps for boundaries and to restrict the cattle to certain areas. One such wall appears on Monsarrat's 1878 map of the upper valley. This corresponds to the long wall that runs from Hiu Stream across the paved well access road (breached by the road) and down and across Kūmaipō Stream and out across the Ranch to the Kamaile ʻunu Ridge (site 5651). It clearly seems intended to keep cattle out of the upper valley's northern area. The 1906 map shows a side walls leading down-slope from this wall along the gradual slope between Hiu and Kūmaipō streams. Archaeological work on the ranch has found a similar side wall leading down the seaward top of Kūmaipō's drainage and down along the paved access road towards Waiʻanae Valley Road (Cordy 2001). It is suspected that this wall set also dates from the same period – between the 1870s-1890s. These walls are likely to be associated with the documentation of John Dowsett's more active program of stone wall construction in the late 1890s to restrict cattle movement, and to attempt to reforest the northern part of the upper valley. In the 1880s-1890s,

experimentation with coffee plantings also occurred. But, clearly major restriction of cattle to the northern upper valley began in the 1870s.

The mid- to upper parts of Wai‘anae probably were controlled by the Waianae Plantation from the 1870s. Although sugarcane fields were in seaward areas of Wai‘anae, the Plantation was tapping water sources from the upper valley – tunneling, damming streams, tapping springs, using water ditches and flumes, etc. There are sites associated with these activities in the Forest Reserve. Documentation of all these sites has not occurred, as the research focus has not been on late 1800s times. However, there is a dam across Kūmaipō just within the Forest Reserve and with an associated cement and metal flume (site 5642). There was reported tunneling activity into many of the springs. Monsarrat's 1906 map shows many of the tunnels. Site 5646 below Well I has clear evidence of such tunneling. Also, Monsarrat's 1906 map shows a flume and 12-inch pipeline extending down from the Kanewai tributary above Honua Stream to an "old electrical power station" just below the Forest Reserve, and then the 12-inch water pipeline continues on down-valley across the Ranch. A stone aqueduct supporting this pipe is present out on the Ranch. It is uncertain what the pipeline looks like above the power station in the Forest Reserve, as again the research focus has not been on late 1800s sites.

Both these activities had impacts on the remaining Hawaiian housing-agricultural landscape. All remaining houses in use after 1850 that have been identified archaeologically have 1+ meter high walls around their houseyards, a characteristic often marked by the presence of cattle (to keep cattle out).

By the 1890s, the one remaining house in the northern upper valley seems to have been abandoned (site 5645, in the Forest Reserve straddling the boundary fence with the Ranch just below Punana‘ula heiau) and the three houses along the paved access road just before the entry into Ka‘ala Farms (based on Euro-Asian artifacts dating no later than that)(Naboa 2009). It seems likely that small Hawaiian homesteads and farms in the northern half of the upper valley and out on the Ranch were all abandoned at this time. A core of perhaps 3-4 homesteads seem to still have been present along the Kūmaipō Trail at the front of the southern part of the upper valley – from the grant at Rosas location through the adjacent two LCAs all outside the Forest Reserve and perhaps LCA 3131 (site 5967) in the Forest Reserve.

Farming may have occurred adjacent to these homesteads as Handy noted some small scale taro farming near such households (Handy 1940:83), and an elderly informant mentioned 20th Century truck farming in the Ka‘ala Farms parcel south of its dirt access road and an associated house in the City and County parcel just north of the dirt road. However, it appears that all the other agricultural fields of the upper valley were abandoned by the 1890s. Those fields in the northern part of the upper valley may have been mostly abandoned first. The long cattle wall (site 5161) that was present in 1878 cut through the irrigated kalo site of 5662, suggesting it was abandoned then. This wall may have set off this part of the upper valley for Plantation uses (like coffee). Also, Monsarrat‘s 1906 map shows only a few areas as "formerly in taro" in this area, and fails

to identify other farms that have been identified archaeologically as being in use at the end of the 1700s. So these fields seem to have been long gone by then. In the southern part of the upper valley, the end may have come in the 1890s. Monsarrat's 1906 map indicates all the field areas here were "formerly in taro". It may be the wall at the back of Kaʻala Farms was built about 1890 – cutting across site 5965. This final abandonment of the taro fields in the 1870s-1890s is probably strongly linked to the water tapping activities of the Plantation. Without water, one cannot farm taro. Similarly more aggressive ranch walling may have been accompanied by eviction of anyone residing out in the Plantation's ranch and upper valley lands (such as the residents of site 5645 in the Forest Reserve and those in sites along the Kūmaipō Trail just seaward of Kaʻala Farms.)

Interestingly, Widemann, the owner of the Plantation, apparently had a house (cabin) at the base of Kaʻala. There is a grant parcel to Widemann well back behind Kōlealiʻiliʻi that may have held such a cabin. Monsarrat's 1906 map shows a "mountain cabin" on the ridge behind Kōlealiʻiliʻi, up the Kanewai tributary of Honua. Perhaps this was Widemann's cabin. Cordy has been shown a more 1800s looking archaeological site in this general area – a sizable stone platform with terraced steps – but he has not returned to carefully locate and document it. Clearly more research is needed on this house.

THE SIGNIFICANCE OF THE HISTORIC SITES

Typically in development-related archaeology all sites must be evaluated according to significance criteria (criteria of importance) as a prelude to making management decisions in relation to the development. An archaeological survey report is submitted to the State Historic Preservation Division (SHPD) with proposed significance evaluations for each site, and the SHPD reviews these proposals, with concurrence eventually reached on which sites are eligible for inclusion on the Hawaiʻi Register of Historic Places. Because these sites in the Forest Reserve, DHHL/Kaʻala Farms, Kaʻala Farms, and City and County parcels were recorded in educational programs and not in development related work, they have not undergone significance evaluation review and approval by the State Historic Preservation Division. The case on the Ranch is slightly different. The SHPD survey of the Ranch was not a complete inventory survey, and its aim was to identify site patterns and make recommendations on mitigation approaches to the Department of Agriculture. No specific site significance evaluations were made in that study. However, a general review of significance of the sites and a collective evaluation was made (Cordy 2001).

No attempt here is going to be made to list by site which significance criteria apply. This can be an aim for future historic preservation management work. Here, like in the Ranch study, general patterns of significance of the sites will be noted, and then a collective evaluation will be made. However, one point that must be emphasized is that all these historic sites are significant under at least one criterion of the Hawaiʻi and National Registers of Historic Places. Some are definitely significant under multiple criteria.

All these historic sites are significant under Criterion D of the Hawai‘i and National Registers of Historic Places, significant for their information content. They contain important information on traditional times and on the changes of the 1800s in Wai‘anae valley.

Many of these sites are also excellent examples of site types, Criterion C of the Hawai‘i Register. Narrow linear irrigated kalo fields emerging from springs (Punana‘ula’s 5523), narrow irrigated kalo terraces along stream flats (Kūmaipō’s 5521, Honua’s 7113), large terrace sets descending down steep slopes (Kūmaipō’s 5767), sets on slopes fed by long canals and enclosed by walls (Kūmaipō’s 5841 and 5852), sets descending down flat ridges and adjacent slopes (Honua’s 5965), and sets descending down broad intermittent streams (Honua’s 6405) are excellent examples of these different varieties of upland irrigated fields. The irrigated kalo terraces on the City and County parcel include some of the largest stones in irrigated kalo facings that Cordy has seen on O‘ahu. Additionally, the apparent reservoirs fed by canals leading from Honua’s 5967 and 7112 – although not yet clearly placed in time -- are extremely unusual examples of this form of water control and retention. The intensive dryland agricultural terraces on the ridge between Punana’ula and Kumaipo (site 5524) are part of the larger area of such terraces on Waianae Valley Ranch. These and those farther out on the Ranch are the only intensive, terraced dryland fields covering a large area that has been identified to date on O‘ahu. Various types of permanent habitations are also excellent examples of their types – solitary sites such as rectangular walled houseyards with a open, down-valley terrace, some with internal house features (e.g., 5700, 5811); rectangular walled houseyards enclosed on all sides, again some with internal house features (e.g., 5669, 5802, 5782, 5525, 7040); unenclosed rectangular platforms (e.g., 5804, 5526, 5527, 6853 with a small family shrine); unenclosed house terraces (7070); complexes of rectangular walled houseyards (5645, 5783, 5645, 5967); complexes of rectangular enclosures and platforms on slopes (5710, 5816) and on rocky ridges (5660, 5712, 5813); and houses within large grant- or kuleana-like walled areas with late 1800s-1900s artifacts (5874, 5876) and with apparently only pre-contact artifacts and use (5785, 5788).

A few sites clearly meet Criterion E of the Hawaii Register, having traditional cultural significance to the Native Hawaiian people. Automatically, SHPD considers burials and religious sites to meet this criterion. There are sites with religious components, from agricultural shrines and household shrines to smaller heiau to the three major, large heiau (including Punana‘ula heiau). The SHPD often considers major trail corridors to meet this criterion, and this would include the major trail corridors for the Kūmaipō Trail and the Eleu Trail. Also, most definitely, Mt. Ka‘ala and Pu‘u Kawiwi would be considered traditional cultural places of significance, for they are associated with deities, major historical events (notably Pu’u Kawiwi’s use as a pu’u kaua), and at least in Ka‘ala’s case are linked to famed Hawaiian oral literature (oli, mele, kanikau, etc.). It is also believed that many other sites in upper Wai‘anae would have traditional cultural significance, as site visits and discussions with community groups and individuals from the Wai‘anae area over the last decade indicate a strong feeling that many irrigated fields and other sites are extremely significant cultural sites. Such a significance evaluation would need a

special assessment, with interviews with the Native Hawaiian community to document their views on this matter.

But far more important, collectively these historical sites are extremely significant under Criteria A, C, D and E of the Hawaiʻi Register. They form a historic district, archaeological landscape, and cultural landscape of hundreds of acres associated with traditional Hawaiian times and the dramatic changes of the 1800s. This landscape covers 2/3 of the Ranch and continues into the upper valley through all the parcels and up into the Forest Reserve, and it includes the ridgelines with Puʻu Kawiwi, Mount Kaʻala and even Kauaʻōpuʻu. In many respects, the landscape effectively includes the streams too, given their linkage to the fields and to Native Hawaiian feelings for and use of the land. This cultural landscape with its agricultural fields and house sites and associated shrines and burials, and with larger heiau reflecting the high chiefs' influences is largely intact. The houses of the people who farmed these fields are still in place where they were abandoned, scattered about among the fields. Cattle ranching, well construction, plantation water control and other 1800s-1900s activities have altered only small portions of this landscape.

[Note: Down-valley of the first large Kawiwi drainage, small areas of dryland fields and associated houses continue, but these seem to be small and scattered given survey findings and those for the Waiʻanae Agricultural Park and its well – probably due to low rainfall. However, this lower third of the Ranch is poorly surveyed, and it is possible that the continuous landscape might extend down-valley across the Kawiwi drainage at higher elevations – from the 800-1,200 feet elevations.]

Waiʻanae district is unusually fortunate in that many of the valleys on the Waiʻanae coast have their cultural landscape in the upper valleys intact or partially intact. This is unique on the island of Oʻahu. But the cultural landscape that survives in Waiʻanae valley is the largest intact landscape – perhaps the largest intact archaeological landscape left on Oʻahu. With Waiʻanae Valley being the political, religious, demographic and economic center of the moku of Waiʻanae in traditional times, this cultural landscape is even more diverse and more important. This cultural landscape in upper Waiʻanae in Cordy's opinion is "the largest, most important archaeological-cultural landscape left on the island of Oʻahu" (Cordy 2001, 2011). In 2001 (Cordy 2001:153), he noted that "Briefly, this continuous archaeological landscape in the back of Waiʻanae valley is the largest surviving, intact, archaeological landscape along the Waiʻanae coast. And in my opinion, after 30 years of work in Hawaiian archaeology, this is the largest, important, archaeological landscape still surviving on Oʻahu."

In 2002, the State Historic Preservation Division in a formal letter to the Department of Agriculture concluded that the landscape on the ranch was significant under criteria A, C, D and E of the Hawaiʻi Register of Historic Places and determined that it was eligible for inclusion on the Hawaiʻi Register of Historic Places. It can be anticipated that a similar determination would be made for the remainder of the cultural landscape in the upper valley.

RECOMMENDATIONS FOR USE

In the SHPD 2001 study of the Ranch (Cordy 2001), it was recommended that this continuous cultural landscape on the Ranch be preserved.

> The virtually continuous archaeological landscape in the Ranch from the first Kawiwi stream drainage up to the Forest Reserve and from the Kamaile ʻunu ridge down to the paved access road extending off Waiʻanae Valley Road (Fig. 65) must be protected from land alteration and be preserved for the benefit of the State's public and for the Waiʻanae community. As State land, such action is vital.
> (Cordy 2001:157).

Further, in 2002 the SHPD in a letter to the Department of Agriculture formally recommended preservation of the portion of this cultural landscape on the Ranch, which the Department of Agriculture agreed to. The next step required was for the Department of Agriculture to prepare a preservation plan, which they never did. However, this commitment to preservation of the important cultural landscape was clearly made on the Ranch. In the Forest Reserve, the Division of Forestry and Wildlife (DOFAW) has long had as one of its management commitments the preservation of the historic sites. As they have come to understand that these are not just individual sites, but a continuous cultural landscape, DOFAW has remained a partner in this preservation commitment. Kaʻala Farms, similarly, has made this commitment on its lands.

Preservation of the cultural landscape can include many things within the realms of the historic preservation laws.

Important information is present in the archaeological sites. Waiʻanae valley once was the focal land of its district – the population, food producing, political and religious center -- just as Kamananui and Kawailoa in Waialua district, several of the ahupuaʻa of ʻEwa (perhaps Honouliuli, Waikele, and Waipiÿo), Nuʻuanu and Waikīkī in Kona, and Kailua and Kāneʻohe Bay's lands in Koʻolaupoko district. Most of these focal lands have been severely altered. Their major heiau, most of their houses, and most of their farms have been destroyed or severely damaged by urbanization and/or modern intensive farming (e.g., for sugarcane or pineapple). Pieces survive in these areas – both as subsurface archaeological sites and surface ruins – but few intact archaeological landscapes survive on Oʻahu. Waiʻanae valley – although impacted in its shore and lower valley areas – has a large landscape in the back of the valley, and subsurface archaeological sites do survive along the shore and lower valley (habitation sites and soils of old taro fields and fishponds). The archaeological landscape in Waiʻanae contains information on a district's focal lands that is likely to help us better understand important parts of Oʻahu's history – such as exactly when irrigated taro fields began to expand up valley in focal district centers, the nature and timing of population growth after the 1200s-1300s, and its correlation with the spread of intensive agriculture (loʻi and dryland terraces). Questions about the nature and timing of the construction of major national heiau, and heiau ceremonies, can potentially be addressed with so many major heiau

surviving. Thus, the archaeological landscape of Waiʻanae can help improve our understanding of Oʻahu's past and thereby benefit the public. Many years of archaeological, oral historical, and historical work, and interviews with knowledgeable community members will be needed to address these questions. But, as long as Waiʻanae's vast landscape and its numerous archaeological sites are preserved, these questions can be addressed, and be studied with improving archaeological technology, linked with oral historical and historical research. This is a perfect setting for a long-term research program – like the ones that exist with unique local community components (the Wai'anae High Hawaiian Studies program).

But the information in these sites is not just relevant to research work, it is relevant to broader educational learning and well-being for the children and adults in the communities of the Waiʻanae coast, and particularly the Native Hawaiian communities. Here is the last large area on Oʻahu where people can walk among the irrigated kalo fields and large dryland fields of the past and see the house sites and heiau. One can feel the past in such landscapes. It is different than going and seeing one heiau surrounded by modern houses, or one small set of loʻi fields preserved just above a residential subdivision. In Waiʻanae a truly large landscape survives, bounded by high valley walls and dominated by Mt. Kaʻala. One can walk away from houses and modern noise, stroll through the trees and see the ruins of irrigated fields along the streams and the nearby houses of former residents. One can sit and visualize how people lived in the past. One can be impressed by walking through more and more fields and seeing numerous houses. Then one can truly understand the scale and nature of settlement in Waiʻanae and on Oʻahu prior to the arrival of outsiders. One can also look at the large heiau, and see the power of the national religion of Oʻahu and its ruler and high chiefs. And if you look up, you can see Puʻu Kawiwi, and in the quiet perhaps hear the last of the Oʻahu Kingdom's warriors who fled there in their final and futile resistance against Kahekili and his Maui Kingdom. And some say you can listen and look to Kaʻala and feel the akua who once lived there – and perhaps still do. Only such a large cultural landscape has the educational potential to appreciate such a wide perspective of the past.

The educational and cultural values of this landscape can be enhanced compatibly with the historic sites in many ways. One can have interpretive signs and brochures. But community-based cultural education, linked to the places is another aspect. Kaʻala Farms past record as a learning center is a reflection of this educational value. The educational program with Waiʻanae High's Hawaiian Studies Program is another example. Yet another is the pending curator agreement for the Punanaʻula heiau and kalo loʻi area, being cared for by a small group of men from Waiʻanae district with a wider support group of many individuals and groups. These programs involve students and community members, enabling them to see places from the past (historic sites) and understand how their ancestors lived on the land, enabling them to experience cultural practices (from irrigated kalo farming to kapa making to plant collecting, to many other potential areas), enabling them to learn in this outdoor setting in a hands-on fashion, and enabling them to develop a sense of personal and cultural pride and concern. This educational learning context obviously reflects the cultural significance of this landscape.

Even the following cultural uses of the landscape are compatible with historic preservation: replanting of irrigated kalo fields, replanting and use of dryland fields, rebuilding of hale for multiple uses (education, and others), reforestation with native plants, restoration of water flow in the streams, planting and harvesting of native plants for hula halau or by kahuna lapaʻau, training of students in resource management, developing fire control measures, developing access. These are but a few uses that can be compatible, sometimes with prior archaeological work. There are undoubtedly other uses.

This leads to an important concern with management. Originally DLNR when dealing with this as a hotspot supported greater Native Hawaiian community participation in the management of these resources. Clearly, cultural education, protecting historic sites, reforestation, and re-establishing the water of the streams are activities of cultural significance to the largely Native Hawaiian community of Waiʻanae. The idea originally was that a board would oversee management with a large percentage representing the community. Their participation would help restore the native forest and the watershed and would help protect the historic sites for generations to come. It will enable the local Hawaiian community in Waiʻanae to once again play a greater management role in their own valley – which after all was once the land of many of their ancestors, who had once cared for the streams, forests, farms and gods and who left the archaeological sites behind.

Such a management approach is compatible with historic preservation laws, and it is still applicable today. In the intervening years since DLNR hotspots plans, Kaʻala Farms, Waiʻanae High School and many Hawaiian community groups in Waiʻanae have expressed the desire to play a role in managing the State's Forest Reserve and Ranch – to protect cultural and historical sites, to re-plant the native forest, and to get streams flowing again. Kaʻala Farms and Waiʻanae High School's Hawaiian Studies Program have undertaken important management actions over these years, supported by DOFAW, SHPD, OHA, QLCC, UH West Oʻahu and many others. This plan is the first step towards this long-range preservation and management approach to benefit the Waiʻanae Native Hawaiian community as well as the general public and larger Native Hawaiian community of the State.

TABLE 1

HISTORIC SITES IN THE WAIʻANAE KAI FOREST RESERVE NORTH (MĀKAHA) SIDE OF UPPER VALLEY

Site #	Brief Description	[All numbers officially preceded by 50-80-07-]

SITES ON DOWN-VALLEY SIDE OF ACCESS ROAD UP TO WELLS I & II

Upper Punanaʻula Stream Flats

5523[7] Spring, stone-lined canal and descending low stone terraces enclosing rectangular field soils. [Part just outside the Forest Reserve.] Irrigated kalo fields. Pre-contact age.

The Gradual Ridge Between Punanaʻula and Kūmaipū Streams – from the Base of Kamaile ʻunu Ridge to the Forest Reserve Fence

5524[1] Long, low stone terraces across the ridge retaining soils & shorter terraces, cover the entire ridge. Dryland agricultural fields. Pre-contact age.

5525[2] Low-walled rectangular stone enclosure with internal paved rectangular terrace. Permanent houseyard. Pre-contact age.

5526[3] Small rectangular platform. Not studied closely, permanent or temporary house likely. Pre-contact age.

5527[4] Small rectangular platform, with lower step. Permanent house. Pre-contact age.

7109[5] Small rectangular enclosure. Not studied closely, permanent or temporary house likely. Precontact age.

5645[6] Stone-walled rectangular areas, one with an internal rectangular stone-platform. Next to Punana'ula Stream, one feature is across the Ranch fence. Permanent house yards & one dryland field enclosure. 1800s in age.[3]

Raised Stream Flats of Kūmaipō Stream – Across the Stream from the Well I Area Down to the Ranch Fence

5521[8] a) 2 diversion canals from stream into descending low stone terraces enclosing rectangular field soils. Irrigated kalo fields. Pre-contact age.
b) On same flats, just upslope are stone-walled rectangular field soils. Dryland agricultural fields and one possible pig-pen. Pre-contact age.

c) On same flats, rectangular stone platform and adjacent area. Permanent house site. Pre-contact age.

On Steep Slope from Edge of Road at Well I Area Down to Kūmaipō Stream

5767[9] Spring-fed canals leading to long, low rectangular stone terraces and retained field soils that descend down this slope. At least 2-3 canals. Irrigated kalo fields. Pre-contact age, possibly some use in the early 1800s. [LCA 5665 to Ohule is within this site. 1906 Monsarrat map shows multiple springs at the top of the site.]

5646[10] Spring and rectanglar stone terrace with soil overlooking Kūmaipō Stream. Immediately across from site 5521. Irrigated kalo field. Precontact age. Limited tunnel modification of spring, likely in late 1800s by plantation..

On Gradual Slope Between Hiu and Kūmaipō Streams, Downslope from Site 5767 & Well I

5841[11] Semi-circular walled-in area with canal entering from site 5767. Rectangular , low stone terraces enclosing soils descend down slope along Kūmaipō Stream (above bluff). Irrigated kalo fields. Pre-contact age.

5852[12] Semi-circular walled-in area with canal entering from site 5841.
a) Low stone terraces enclosing rectangular soils descend down slope along Kūmaipō Stream (above bluff). Irrigated kalo fields. Pre-contact age.
b) Low stone-walled enclosure and adjacent features on higher flat rise next to the irrigated kalo fields. Permanent house site. Pre-contact age.

5651[17] Stone wall, linear. (The tiny weather station is built next to this wall.) The wall continues across the road (where it is severely damaged) and then down and across Kūmaipō's drainage and out diagonally across the Ranch. Major boundary wall, apparently built in 1870s to keep cattle at lower elevations and possibly to plant coffee above.
[This wall is shown on the 1878 and 1906 Monsarrat maps.]

Between Kumaipo and a Small Tributary to Kūmaipō (Possibly short & spring-fed). Seaward of Weather Station and Bulldozed Clearing along Access Road at the base of the drop to the Stream Drainage – On Flat Area Below

5662[13] Low stone terraces enclosing field soils descend down slope, between this tributary and Kūmaipō. (Much of this site is on the Ranch.). Irrigated kalo fields. Pre-contact age.
[This corresponds to the lower part of the area marked "Formerly in taro fields" of apparently 9 acres on Monsarrat's 1906 map. We have yet to cover the upper part, where the map shows springs.]

5642[14] Stone/cement dam and stone-faced diversion channel with metal flume remnants. Built across Kūmaipō. Dam. Late 1800s, Plantation era.

SITES ON UP-VALLEY SIDE OF ACCESS ROAD

Behind Waiʻanae Well I

7110[15] Two large rectangular enclosures, and other features. Reconn only. Interpretation uncertain, likely agricultural. Likely 1800s.
[Bordner, 1988, sketch-mapped these features.]

Just Downslope of Wells

7111[16] Low mounds, irregular terraces, clearings. Reconn only. Likely dryland agriculture. Likely pre-contact age.

Kōlealiʻiliʻi Hill

____[18] Outcrops of volcanic glass, possibly quarried in pre-contact times.
A low cave is up on the hill, no artifacts or food remains were visible.

SITES ON RIDGELINE ABOVE UPPER VALLEY

Mount Kaʻala

____ The mountain is associated with deities, particularly Kaiona. It is also famed in oral literature – mythology (Pele and Hiʻiaka) and oral history. Pre-contact in age.
This is a traditional cultural place. No attempt has been made to fix its borders at this point.

Puʻu Kawiwi

____ This is the high point on Kamaile unu that is near the low point into Mākaha. It was a famed puʻu kaua (war refuge) in traditional Hawaiian times, used at least in the reign of Haka (mid-1500s) and in 1785 (during the revolt against Maui). Pre-contact age.
This is a traditional cultural place. No attempt has been made to fix its borders at this point.
[Not yet visited by archaeologists.]

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1. Summer 1997 UH – West Oʻahu (UHWO) volunteers (Cordy), Fall 1997 & Fall 1998 Waiʻanae High School (WHS) (Cordy). Detailed sketch map.
2. Summer 1997 UHWO volunteers (Cordy), Fall 1997-Spring 1998 WHS detailed map/excavations (Cordy/Lee) (Cummings et al. 1998).

3. Summer 1997 UHWO volunteers (Cordy). Reconn with measurements.
4. Summer 1997 UHWO volunteers (Cordy). Fall 1997-Spring 1998 WHS detailed map/excavations (Cordy) (Akiu et al. 1998).
5. Summer 2000 WHS reconn (Cordy). Limited info.
6. WHS Spring 1998 reconn (Cordy), WHS 1998-1999 school year (Cordy/Lee) (Bell et al 1999), Summer 1999 (Cordy) & WHS Fall 1999-2000 school year (Cordy/Herrmann and Lee/Kaleleiki) detailed maps/excavations.
7. Summer 1997 UHWO volunteers (Cordy), WHS Spring 1999 detailed map/excavation (Cordy)(Kuhia et al 1999), Summer 2001 WHS reconn (Cordy) after fire, January 2002 sketch map WHS (Cordy), Summer 2009 observations (Cordy).
8. Summer 1997 UHWO volunteers (Cordy) & Spring 1998 and Fall 1999 UHWO Field Archaeology classes w/detailed maps/excavations and sketch maps (Cordy) (Cordy 2003b).
9. Sinoto (1979) identified with limited description, December 1999 Wai'anae High (reconn & sketch map) (Cordy). Spring 2000 WHS detailed mapping/excavation (Cordy/Herrmann), Summer 2000 WHS reconn of up-stream border (Cordy).
10. December 1999 WHS reconn (Cordy).
11. Spring 2000 WHS (Cordy/Lee/Kaleleiki) & Fall 2000 (Lee/Cordy/Langford) detailed mapping/excavation .
12. Fall 2000 WHS detailed mapping/excavation (Cordy/Choy).
13. May 1998 SHPD ranch survey (Cordy). (Cordy 2001).
14. May 1998 SHPD ranch survey (Cordy) (Cordy 2001).
15. March 2000 WHS reconn & scale sketch map (Cordy). Identified and sketched by Bordner (1988).
16. Fall 2000 WHS reconn (Cordy).
17. Ranch SHPD work (Cordy 2001). Also on maps of Monsarrat (1878, 1906).
18. WHS brief recon, Sept. 21, 2000 (Cordy/Komori).

TABLE 2

HISTORIC SITES IN THE WAIʻANAE KAI FOREST RESERVE SOUTH (KAʻALA FARMS) SIDE OF UPPER VALLEY

Site #	Brief Description	[All numbers officially preceded by 50-80-07-]

SITES FROM HONUA STREAM ACROSS THE SLOPES TO KAUAʻOPUʻU STREAM BEHIND KAʻALA FARMS (BEHIND THE DHHL LANDS)

5965[1] Canal out of Honua Stream diverted into low stone terraces with rectangular field soils descending down low flat ridge (Olive Tree ridge) and adjacent slopes to south. At Kaʻala Farms below the Forest Reserve, the site splits, part going around to the south of the modern houses and part going north where the currently active loʻi are part of this site. Rejoins below the modern houses of Kaʻala Farms and extends across the entire slope from Honua to Kauaʻōpuʻu streams. Irrigated kalo fields. Pre-contact in age, possibly partly used in 1800s.
[NW and SE limits not yet fully surveyed.]
[This site corresponds to part of the area marked as "Formerly in taro" of 21, 104 and 23 acres on Monsarrat's 1906 map.]

7070[2] Two low, stone rectangular enclosures with adjacent food-pounding stone. Permanent house site. Pre-contact age.
[Within site 5965 area on "Olive Tree" ridge.]

6405[3] Canal out of Honua Stream and from top of 5965 into low stone terraces with rectangular field soils descending down a broad intermittent gulley below and just north of the Olive Tree ridge. Irrigated kalo fields. Pre-contact in age.
[Work to date = reconn work with sketch map.]
[This site corresponds to part of the area marked as "Formerly in taro" of 104 acres on Monsarrat's 1906 map.]

5752[4] Large rectangular enclosure. Uncertain function. Uncertain age.

5967[8]
a. Canal from Honua Stream at join with Kalalua tributary, canal enters area of descending, low stone terraces retaining rectangular soil areas. Irrigated kalo fields. Pre-contact in age, possibly with use to ca. 1900.
b. One large earthen walled depression fed by branch of canal. Possible reservoir for cultivation. Age uncertain.
c. Cluster of large rectangular enclosures (some with internal rectangular terraces and platforms). Permanent house yards. Likely pre-contact age, with one having use in early 1900s. Only reconn and sketch map level work, except Features B and F which have detailed maps, surface collection, and test excavations.

[This site roughly corresponds with LCA 3131 to Kuapuu.]
[This site also corresponds to part of the area marked as "Formerly in taro" of 104 acres on Monsarrat's 1906 map.]

7112[9] Canal in 5967 continues downslope through an area with cluster of low mounds, clearings, irregular terraces and with an earthen walled deep depression at the base. Agricultural, with possible water reservoir. Likely Pre-contact in age.
[This site also corresponds to part of the area marked as "Formerly in taro" of 104 acres on Monsarrat's 1906 map.]

5754[13] Small roughly rectangular platform and terrace on high point in lower site 7112 area. Possibly temporary habitation. Likely Pre-contact in age.

7113[6] Canal from Honua Stream leading to low stone terraces retaining rectangular soils. Single linear set descending along Honua Stream. Appears to run into site 5965 in Ka‘ala Farms into the northernmost active lo‘i. Irrigated kalo fields. Pre-contact age, with possible use in early 1800s.
[This site also corresponds to part of the area marked as "Formerly in taro" of 104 acres on Monsarrat's 1906 map.]

6853[5] Two rectangular platforms, small rectangular enclosure with upright and flat faced yard around them. On high area above prior irrigated kalo site. Permanent house. Pre-contact age.

7040[7] Large rectangular enclosure with internal small rectangular platform. Next to 6853. Permanent house yard. 1810-1850s in age.
[Possibly may corresponds with lower part of LCA 3131 or 3087.

____ Stone wall, marking upslope boundary of today's DHHL/Ka‘ala Farms parcel. Likely to be late 1800s in age (overlies the 5965 irrigated kalo fields).

SITES IN THE LOWER, NARROW KAUA‘ŌPU‘U DRAINAGE – ON STREAM FLATS

7114[10] Single descending line of low stone terraces retaining rectangular field soils. On Ka‘ala Farms side of stream. Reconn level work only. [Part may not be in Forest Reserve]

SITES ON THE KŌLEALI‘ILI‘I SIDE OF HONUA STREAM

A Flat Area Along One of Tributaries leading off Honua onto the Kōleali‘ili‘i Ridge Upslope of the Jeep Road

____[12] A number of sites (agricultural, house, corral). [for details see note.]

Upper Kanewai Drainage adjacent to the Kōleali‘ili‘i Ridge

1179[14] Descending low stone terraces retaining rectangular field soils.
[Identified by Earl Neller, apparently with no survey, very brief recon]
[Needs re-inspection, especially regarding borders.]

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1. WHS reconn Fall 2001 (Cordy) and January 2002 (Cordy/Kamohali‘i; Lee/Kanui). Lower portion just above Ka‘ala Farms upslope wall identified at reconn level in Summer 1999 (WHS Interns/Cordy/Lee). UHWO Spring 2004 (Cordy, D. Cordy, D. Byerly, K. Van Ryzin), WHS Fall 2005 (Cordy/Kanaka‘ole-Aperilla), UHWO Summer 2008 (Cordy, D. Cordy, T. Davan), WHS Fall 2008-Spring 2009 (Cordy, K. Uyeoka, T. Davan), UHWO Summer 2009 (Cordy, D. Cordy) detailed mapping/excavations. WHS Summer 2009 Intern (Cordy, T. Davan). WHS Spring 2007 reconn of upslope edges (Cordy).
2. WHS Fall 2008-Spring 2009 (Cordy, K. Uyeoka, T. Davan) and UHWO Summer 2009 (Cordy, D. Cordy) detailed mapping/excavations.
3. Summer 2002 WHS reconn/sketch map (Cordy/Simpliciano).
4. Spring 2007 WHS detailed map/excavations (Cordy).
5. Summer 1999 WHS Interns reconn (Cordy/Lee), Sinoto/Lee reconn 2004 or 2005. WHS Spring 2006 (Cordy/Kanaka‘ole-Asperilla) & Fall 2006 (Cordy/Sana) detailed mapping/excavations.
6. Fall 2006 WHS (Cordy/Sana) detailed mapping.
7. Fall 2006-Spring 2008 WHS (Lee) reconn and excavation. Fall 2007-Spring 2008 WHS detailed mapping/excavation (Cordy).
8. July 2000 WHS interns reconn/sketch map (Cordy/Herrmann/Kaleleiki). 2005-2008 WHS reconn work (Lee/A. Sinoto). Fall 2009 additional reconn and detailed mapping of Enclosure B (Cordy/WHS).
9. 2005-2008 WHS compass mapping and excavations (Lee/A. Sinoto). See Lee for details and reservoir interpretations.
10. April 1999 WHS Interns (Cordy).
11. Summer 2009 UHWO reconn (Cordy).
12. Fall 2000 WHS reconn/GPS mapping (under Eric Komori of the State Historic Preservation Division (SHHPD). These were placed on a SHPD GIS overlay for Wai‘anae valley. They will have one or more site numbers. I am not familiar with the details. Eric Komori should be contacted.
13. Summer 1999 (WHS interns), 2005-2008 WHS compass mapping (Lee/A. Sinoto).
14. SHPD hanging site file 50-80-08-1179 “Wet Taro System”. This might be the same as 13.

TABLE 3

LIST OF SITES
KAʻALA FARMS/DHHL PARCEL, KAʻALA FARMS PARCEL, AND CITY & COUNTY PARCEL

Site Number	Formal Type	Function	Age^
Kaʻala Farms/DHHL Parcel [N = 4]			
____	Descending sets of rectangular terraces. [Downslope parts of sites 7113 & 5965 enter and join here, covering the entire valley floor between Honua & Kauaʻōpuʻu Streams	Irrigated kalo fields	Precontact & Postcontact
____	Habitation area were large hale, & small modern houses are in Kaʻala Farms	Permanent habitation	Precontact
____	Descending rectangular terraces in single line along Lualualei side of Kauaʻōpuʻu Stream	Irrigated kalo fields	Precontact
____	Rock shelter (Between Kauaʻōpuʻu Stream and Ridge).	Temporary habitation & adze making site	Precontact
City & County of Honolulu Parcel (North side of Kaʻala Farms access road – Between Honua and Kūmaipō streams. Former LCA 3132) [N = 1]			
____	Descending sets of rectangular terraces,	Irrigated kalo fields	Precontact & Postcontact
	2 small platforms with upright stones	Agricultural shrines	
	Area with short irregular terraces mounds, & clearings	Dryland agriculture	
	Rect. feature w/artifacts	Habitation	Postcontact
Kaʻala Farms Parcel (South side of Kaʻala Farms access road – Between Honua and Kūmaipō streams) [N=1]			
____	Remnants of terrace lines	Irrigated agriculture	Precontact

TABLE 4

LIST OF SITES
WAIANAE VALLEY RANCH

Site Number	Formal Type	Function	Age^
Kūmaipō Drainage [N = 6]			
5642	Cut stone & cement dam, ditch & flume	Water diversion	Post-1900
5662	Descending rectangular terraces w/2 canals	Irrigated kalo fields	Precontact
5663	Complex of walled oval clearings	Dryland agricultural (informal)	Precontact
5664	Complex of walled oval clearings	Dryland agricultural (informal)	Precontact
5665	Low, rectangular paving	Permanent habitation?	Precontact
5865	2 rectangular enclosures	Permanent habitation	Precontact
Kūmaipō – Punana‘ula Ridge [N = 29]			
5649	Linear terraces	Dryland agriculture (formal)	Precontact
5703	Complex of small mounds & terraces	Dryland agriculture (informal)	Precontact
5645	Complex of rect. enclosures	Permanent habitation	1840s-1880
5647	Rectangular enclosure	Corral	1900s
5648	Notched enclosure	Medium-sized heiau?	Precontact
5650	Rectangular enclosure	Permanent habitation	Precontact
5651	Long linear wall from Kūmaipō Stream to Kamaile ‘unu ridge	Ranch boundary wall	1880s
5666	Rectangular enclosure	Permanent habitation	Precontact
5667	Rectangular enclosure	Uncertain	Precontact
5668	Oval enclosure	Ranch, uncertain	Post-1880
5669	2 rectangular enclosures	Permanent habitation & corral	Precontact-1800s
5819	Long linear wall down edge of Kūmaipō Stream	Ranch boundary wall	1880s-1906
5700*	2 rectangular enclosures & 2 small rect. platforms	Permanent habitation & possible burial	Precontact
5701	Remnant rectangular enclosure	Permanent habitation	Precontact
5702	Rectangular platform	Temporary habitation (field shelter)	Precontact

Site Number	Formal Type	Function	Age
5802*	Rectangular enclosure & rect. terrace w/upright stones	Permanent habitation w/household shrine	Precontact
5803*	Rectangular terrace with internal oval enclosure w/upright stones	Permanent habitation w/household shrine	Precontact
5705*	Rectangular enclosure & oval enclosure around boulders	Permanent habitation w/household shrine	Precontact
5704*	Rectangular enclosure	Permanent habitation	Precontact
5706*	Rectangular enclosure	Permanent habitation	Precontact
5804*	Rectangular terraced platform	Permanent habitation	Precontact
5707*	Rectangular enclosure	Permanent habitation	Precontact
5782*	Rectangular enclosure & rectangular platform	Permanent habitation	Precontact-1800s
5783*,**	Very large walled area w/4 rectangular enclosures & many small clearings and short terraces	Permanent habitation & dryland agriculture (informal gardens)	Precontact-1800s
5784**	Very large walled area w/rect. enclosure and rectang. paving & many small clearings and short terraces	Permanent habitation & dryland agriculture (informal gardens)	Precontact-1800s
5785**	Very large walled area w/2 rectang. terraced platforms & 3-4 linear terraces	Permanent habitation & dryland agriculture (informal gardens)	Precontact-1800s
5786**	Very large walled area w/rectangular paving, modern fenced cemetery & small clearings and short terraces	Permanent habitation & cemetery (Manini-Lopez) & dryland agriculture (informal gardens)	Precontact-1900s
5787	Very large walled area w/trapezoidal enclosure, low walled clearings, and low linear terraces across small drainage	Dryland agriculture (informal)	Precontact-1800s
5788*	Very large walled area in 3 sections w/ rectangular enclosure and rect. terrace & many small clearings and short terraces, and channel-like feature	Permanent habitation & dryland agriculture (informal)	Precontact-1800s
6397*	Rect. terraced platform & small associated features	Permanent habitation	Precontact

Site Number	Formal Type	Function	Age
Steeper Ridge Slopes & Shallow Intermittent Drainages Between Punana‘ula Stream and the First Large Kawiwi Drainage [N = 20]			
Ridge 1 [N = 2]			
165	2 large abutted rectangular platforms w/2 adjacent rectangular enclosures	Large major heiau (Punana‘ula heiau)	Precontact
5523	Portion of descending terraces w/drainage canal	Portion of Irrigated kalo system along Punana‘ula Stream	Precontact
Ridge 2 [N = 2]			
5655	Linear terraces, rectangular soil terraces, small irregular terraces	Dryland agriculture (formal & informal)	Precontact
5656	Two tiered large rectangular platform	Moderate-sized major heiau (?)	Precontact
Ridge 3 [N = 4]			
5657	Linear terraces and irregular terraces, oval clearings	Dryland agriculture (formal & informal)	Precontact
5658	Rectangular terrace and rect. platform	Permanent habitation & Possible burial	Precontact
5659	2 rectangular enclosures & C-shaped enclosure	Temporary habitation	Precontact
5660	1 rectangular platform & 3 rectangular enclosures	Permanent habitation	Precontact
Ridge 4 [N = 11]			
5821	Low mounds and oval enclosures on rockier terrain & small curved mounds/terraces on terrain with soil	Dryland agriculture (informal)	Precontact
5708	Small rectangular mound	Possible burial	Precontact
5710	3 rectangular enclosures & 1 rectangular platform	Permanent habitation	Precontact
5709	Terrace around large natural boulder	Small shrine	Precontact

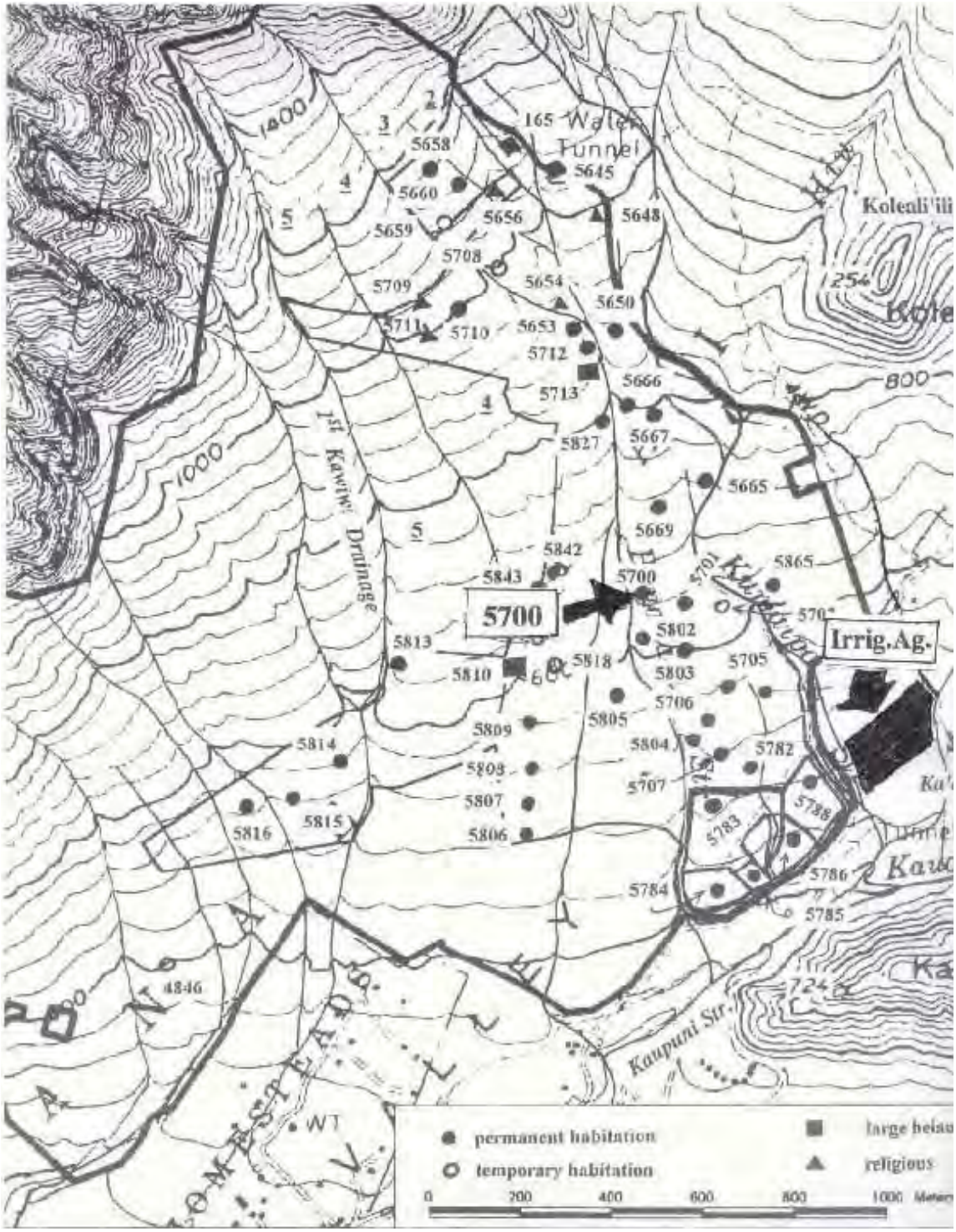
Site Number	Formal Type	Function	Age
5711	Terrace around large natural boulder	Small shrine	Precontact
5654	Notched enclosure	Small shrine	Precontact
5653	2 rectangular enclosures & 1 rectangular platform	Permanent habitation & Possible burial	Precontact
5713	Large rectangular enclosure	Possible large, major heiau	Precontact
5712	1 rectangular platform, 2 rect. enclosures, 1 notched enclosure	Permanent habitation & Possible burial	Precontact
5822	Linear terraces on lower ridge	Dryland agriculture (formal)	Precontact
5827	Irregular shaped enclosure	Unknown	?
<u>Ridge 5 [N = 1]</u>			
5823	Small irregular terraces & oval enclosures on rockier terrain	Dryland agriculture (informal)	Precontact

The Flatter Valley Floor from Punana‘ula Stream to Beyond the First Kawiwi Drainage [N = 19]

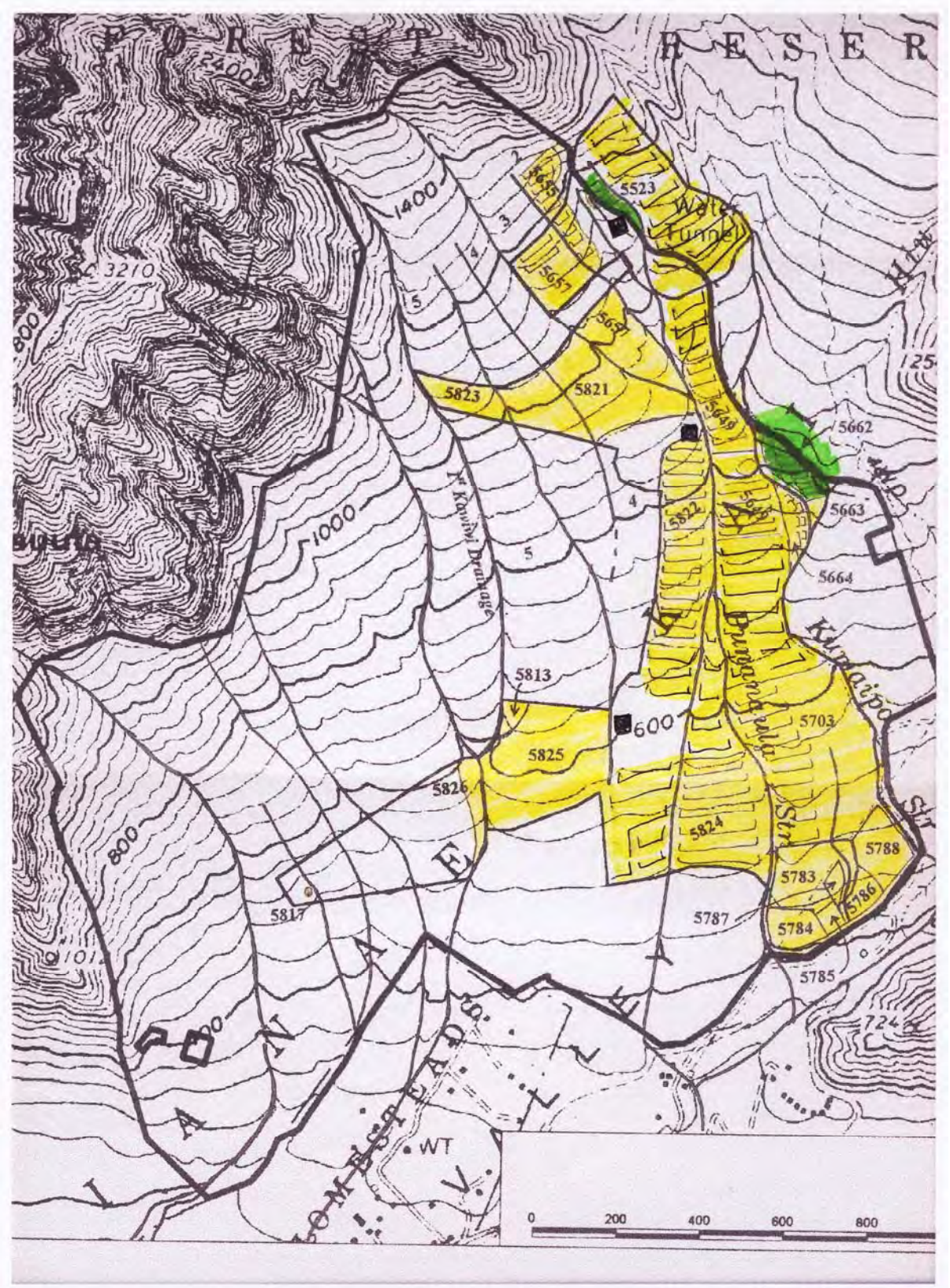
<u>Between Punana‘ula Stream & Its Down-valley Branch [N = 2]</u>			
5824	Linear terraces	Dryland agriculture (formal)	Precontact
5805	Rectangular enclosure	Permanent habitation	Precontact
<u>Between Punana‘ula Stream & The First Kawiwi Drainage [N = 12}</u>			
5806*	2 rectangular platforms & rectangular alignment	Permanent habitation	Precontact
5807*	2 rectangular enclosures	Permanent habitation	Precontact
5808	Rectangular enclosure	Permanent habitation	Precontact
5809	Rectangular enclosure	Permanent habitation	Precontact
5810*	Large massive rect. enclosure w/internal rect. enclosure & 2 rectangular platforms	Large, major heiau (?)	Precontact
5811	Rectangular enclosure & rectangular platform	Permanent habitation	Precontact

Site Number	Formal Type	Function	Age
5812	Rectangular enclosure & rectangular platform	Temporary habitation	Precontact
5843	Rectangular enclosure	Permanent habitation	Precontact
____	Rect. stepped platform	Small religious structure	Precontact
5842	2 rectangular enclosures & curved enclosure	Permanent habitation	Precontact
5818	2 rectangular enclosures on terrace	Temporary habitation	Precontact
5825	Short irregular terraces and mounds	Dryland agriculture (informal)	Precontact
5813	Complex of rectangular enclosures & 1 rectangular platform & rectangular enclosure w/soil, linear terraces, small clearings, short irregular terraces	Permanent habitation & Possible burial & Dryland agriculture (formal & informal)	Precontact
Down-Valley of First Kawiwi Drainage [N = 5]			
5826	Mounds and short, irregular terraces	Dryland agriculture (informal)	Precontact
5814	Rectangular enclosure	Permanent habitation (?)	Precontact
5815	Rectangular enclosure & rectangular platform	Permanent habitation	Precontact
5816	Rectangular platform w/ possible upright stone, 4 rectangular enclosures & 1 small, rect. platform	Permanent habitation w/possible family shrine and possible burial	Precontact
5817	Small platforms/mounds	Dryland Agriculture ((?) (informal)	Precontact

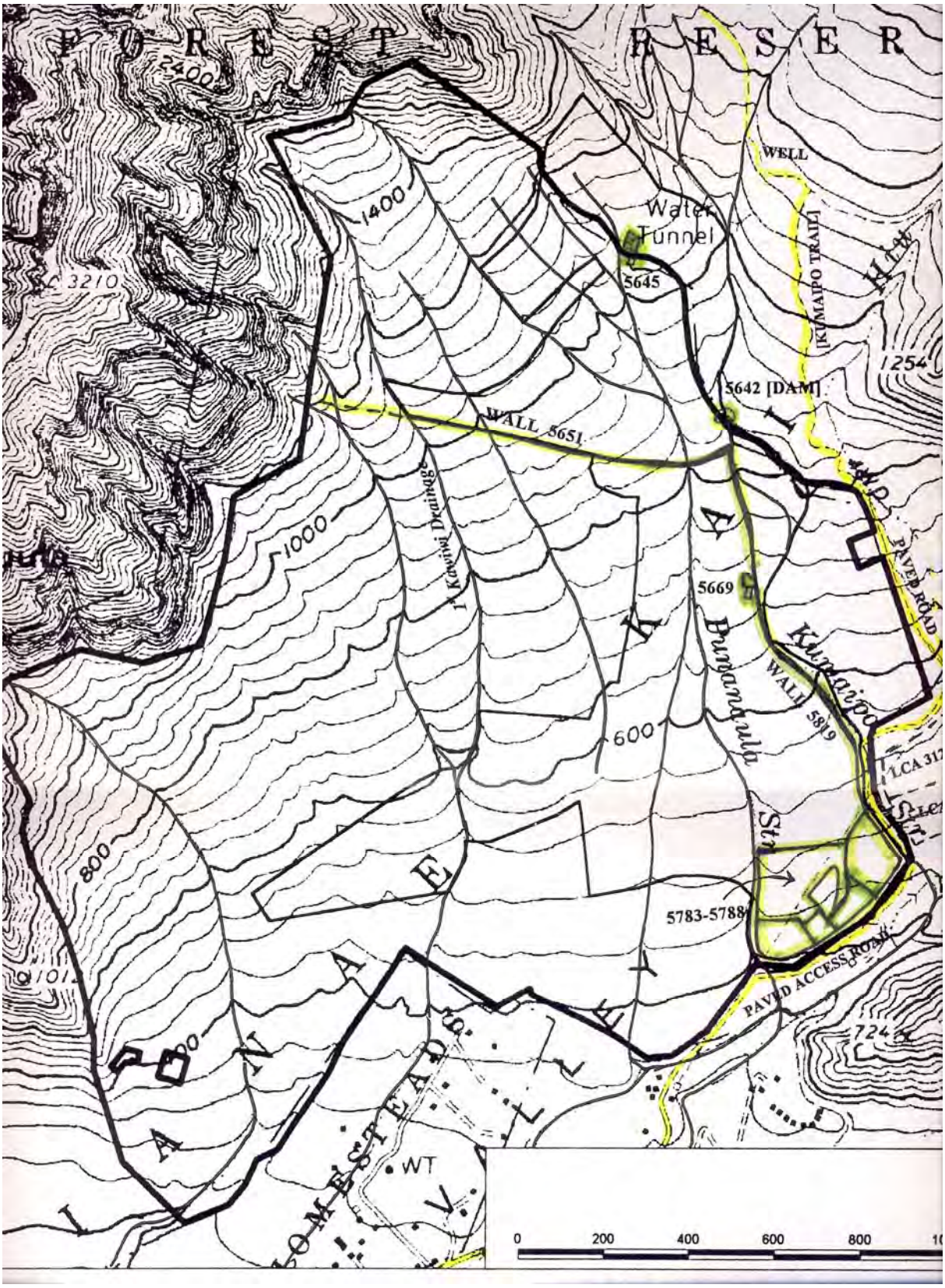
^ Precontact age is noted here. These sites had no Euro-Asian artifacts, nor architectural styles of the mid-1800s on. But these sites could have seen use into the early 1800s before Euro-Asian artifacts became widespread and new architectural styles developed.
* Sites that saw detailed mapping and test excavations by Wai‘anae High 2001-2005.
**Sites that saw detailed mapping and test excavations by UH West O‘ahu 2001-2005.



Location map of Pre-contact sites on Waianae Valley Ranch (excluding agricultural sites). The block labeled Irrig. Ag. is the City and County parcel. (Cordy 2001)



Location map of Pre-contact agricultural sites on Waianae Valley Ranch. (Cordy 2001).



Location map of Post-contact sites on Waianae Valley Ranch. (From Cordy 2001)

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APPENDIX C

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 15, 2013

Townscape Inc.
Attn: Ms. Tina Speed
900 Fort St. Mall Suite 1160
Honolulu, HI 96813

email to: mail@townscapeinc.com

Dear Ms. Speed,

SUBJECT: Draft Environmental Assessment for Wai`anae Valley Ranch

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

At this time, enclosed are comments from (1) Land Division – Oahu District; and the (2) Commission on Water Resource Management. No other comments were received as of our suspense date. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION

2013 AUG -7 PM 3:23

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON

WILLIAM D. BALFOUR, JR.
KAMANA BEAMER
LORETTA J. FUDDY, A.C.S.W., M.P.H.
MILTON D. PAVAO
JONATHAN STARR
TED YAMAMURA

WILLIAM M. TAM
DEPUTY DIRECTOR

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

August 2, 2013

TO: Russell Tsuji, Administrator
Land Division

FROM: William M. Tam, Deputy Director
Commission on Water Resource Management

SUBJECT: Draft Environmental Assessment for Waianae Valley Ranch, Waianae, Oahu

FILE NO.: N/A
TMK NO.: 8-5-006:004

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

Our comments related to water resources are checked off below.

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

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

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

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

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

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

☒ 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/programs/achieving-efficiency/green-business-program

☒ 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://landscapehawaii.org/_library/documents/lich_irrigation_conservation_bmps.pdf

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

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

☐ 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

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

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

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

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

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

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

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

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

☒ OTHER:

1. Please provide an estimate of the water demands of the project and provide estimates of the flow from the various sources that will fulfill those demands—BWS, Existing Permitted Stream Diversion, New Stream Diversion, new well, restored existing well, restored Tunnel discharge.

2. Pumpage of groundwater from Waianae Valley is near the Valley's Sustainable Yield of 3 Mgal/d. Development of new wells or new/restored Tunnel sources may require the Water Commission to judge between competing uses.

3. Section 3.1.7 of the Draft Environmental Assessment states that the Sustainable Yield of Makaha Valley is 4 Mgal/d. Please correct—the Sustainable Yield of Makaha Valley is 3 Mgal/d.

If there are any questions, please contact Paul Eyre at 587-0251.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 10, 2013

MEMORANDUM

TO:

DLNR Agencies:
X Div. of Aquatic Resources
__ Div. of Boating & Ocean Recreation
X Engineering Division
X Div. of Forestry & Wildlife
__ Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment for Wai`anae Valley Ranch
LOCATION: Wai`anae Valley, O`ahu, TMK: 8-5-006:004. (8-5-005:036 for parking lot)
APPLICANT: Ka`ala Farm, Inc. and Ho`omau Ke Ola

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document.

The document can be found here:

1. Go to: https://sp01.ld.dlnr.hawaii.gov/LD
2. Login: Username: LD\Visitor Password: 0pa$$word0 (first and last characters are zeros)
3. Click on: Requests for Comments
4. Click on the subject file "Draft Environmental Assessment for Wai`anae Valley Ranch", then click on "Files" and "Download a copy".

Please submit any comments by August 13, 2013. If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Supervising Land Agent Steve Molmen at (808) 587-0439. Thank you.

Attachments

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

Signed: Barry Cheng
Print Name: Barry Cheng
Date: 8/5/2013

c: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 5, 2013

Ref: 12OD-114

MEMORANDUM

TO: Russell Y. Tsuji, Administrator
Land Division

FROM: Barry Cheung, Oahu District Land Agent
Land Division

SUBJECT: Draft Environmental Assessment for Waianae Valley Ranch, Ka'ala Farm, Inc. and Ho'omau Ke Ola, Applicants; Waianae, Oahu; TMK (1) 8-5-006:004

We have the following comments on the subject matter.

Para.2.2.1 mentions a "Conservation Officer" will monitor the access into the valley from a guard shack on DHHL land. The Conservation Officer will be educating people on treatment of land, trash disposal, and use of hunting dogs etc. To avoid any possible confusion with the enforcement branch of this Department, please clarify if the "Conservation Officer" as noted in the DEA is actually an employee of the applicants.

Para.2.2.5 provides a possible long term use as a solar farm, which can power the operation of the leased premises and surplus power would be sold back to the power grid. Please note that any transfer of the interests, including but not limited to subleases, under the proposed long term lease would require the prior approval of the Land Board. Generally, such requests for transfer would only be entertained if the transferee is another non-profit entity. A commercialized solar farm, notwithstanding the production of such solar farm would power the operation of the leased premises, would not fit into the category of a possible transferee. Applicant needs to elaborate on the possible solar farm in this section.

Para.3.1.2 says DLNR revoked the lease, which is an incorrect statement. In fact, the subject land has been set aside to the Department of Agriculture for Waianae Agriculture Park pursuant to Governor's Executive Order No. 3481. Board of Agriculture, at its meeting of July 28, 2011, canceled the lease over the subject land and requested the Land Board withdraw the subject lands from GEO 3481. Attached is the copy of the submittal of the Land Board. Please revise this paragraph accordingly.

We do not have any other comments. If you have any questions, please feel free to contact us at 587-0430. Thank you.

Enclosure

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Land Division
Honolulu, Hawaii 96813

January 13, 2012

Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

PSF No.: 11od-122

OAHU

Withdrawal from Governor's Executive Order No. 3481 to the Department of Agriculture; Issuance of Right-of-Entry to Ka'ala Farm, Inc. for Maintenance Purposes, Waianae-Kai, Waianae, Oahu, Tax Map Key: (1) 8-5-006:004 por.

APPLICANT:

Department of Agriculture (DOA) Controlling Agency

Ka'ala Farm, Inc., a domestic nonprofit corporation, whose mailing address is P.O. Box 630, Waianae, Hawaii 96792.

LEGAL REFERENCE:

Section 171-11 and 55, Hawaii Revised Statutes, as amended.

LOCATION:

Portion of Government lands situated at Waianae-Kai, Waianae, Oahu, identified by Tax Map Key: (1) 8-5-006:004 por. as shown on the attached map labeled Exhibit A.

AREA:

Lot 18, File Plan 1932, 1,121.465 acres, more or less.

ZONING:

State Land Use District: Agricultural
City and County of Honolulu LUO: AG-2

January 13 2018

TRUST LAND STATUS:

Section 5(b) lands of the Hawaii Admission Act
DHHL 30% entitlement lands pursuant to the Hawaii State Constitution: No

CURRENT USE STATUS:

Governor's Executive Order No. 3481 setting aside the subject lands to the Department of Agriculture for agricultural park purposes ("Waianae Agricultural Park Subdivision").

PURPOSE FOR REVOCABLE PERMIT:

Maintenance purposes.

COMMENCEMENT DATE:

January 1, 2012

[Note: The proposed right-of-entry permit is set to commence immediately after the expiration of the right-of-entry issued to the Applicant by DOA. See Remarks Section.]

MONTHLY RENTAL:

Gratis. See Remarks Section.

COLLATERAL SECURITY DEPOSIT:

Not applicable.

CHAPTER 343 - ENVIRONMENTAL ASSESSMENT:

In accordance with Hawaii Administrative Rule Sections 11-200-8(a)(1) & (4) and the Exemption List for the Department of Land and Natural Resources approved by the Environmental Council and dated December 4, 1991, the subject request is exempt from the preparation of an environmental assessment pursuant to Exemption Class No. 1, that states "Operations, repairs or maintenance of existing structures, facilities, equipment, or topographical features, involving negligible or no expansion or change of use beyond that previously existing" and Class No. 4, that states "Minor alteration in the conditions of land, water, or vegetation." (See **Exhibit B**)

APPLICANT REQUIREMENTS:

None

REMARKS:

Pursuant to the Governor's Executive Order No. 3481, Lots 1 to 18 of File Plan 1932 with a total area of about 1,166.384 acres of State lands have been set aside to DOA for agricultural park purposes. Waianae Valley Ranch LLC used to lease Lot 18 from DOA for pastoral grazing purposes.

In November 2010, Department of Hawaiian Home Lands (DHHL) inquired the possibility of transferring Lot 18 from DOA to DHHL. Staff noted the reason underlying DHHL's request was due to its "natural and cultural resources". DOA had no objection to the request in 2010.

On June 28, 2011, the Board of Agriculture approved the cancellation of the lease to Waianae Valley Ranch LLC effective on September 26, 2011. Staff understands the former lessee failed to comply with the terms and conditions of the lease regarding the maintenance of the property.

At the time of writing this submittal, staff did not receive any further correspondence from DHHL pertaining to the proposed transfer of Lot 18.

Applicant has been conducting cultural programs in the community for a long time. Currently, the Applicant owns the adjacent property. Before the former DOA's lessee was removed from the property, the Applicant has approached DOA requesting for permission to maintain the property. A right-of-entry was issued by DOA to the Applicant expiring on December 31, 2011 **(Exhibit C)**.

The Applicant has indicated that it intends to obtain a direct lease from the Board to expand its cultural program. Applicant is aware of the compliance with the environmental assessment before the request for a direct lease is considered by the Board. During the interim period, the Applicant plans to continue the maintenance of the property. Further, the Applicant is also willing to use its resources to protect the cultural sites on the property. Therefore, the Applicant requests the Board for a right-of-entry permit to conduct the above mentioned activities.

Staff has solicited comments from the following agencies:

<u>Department of Agriculture</u>

DOA has issued a revocable permit to Diamond J Ranch allowing the capture and removal of cattle from the former ranch. The permit expired on December 31, 2011. The permittee has removed approximately 68 cattle from the property. The permittee is collaborating with the applicant in clearing an access road for the installation of a pen to capture the cattle.

<u>Staff Response</u>

Upon approval of the subject right-of-entry, the applicant will continue coordinate with the relevant party in relation to the capture and removal of cattle. If

necessary, staff will bring any request for permit capturing and removing cattle at a later date.

Division of Forestry and Wildlife
DOFAW raised its concerns on the future management plan of the subject property. The issues include wildfire, cattle, and access for DOFAW personnel.
Staff Response
The applicant is aware of DOFAW's concern and is willing to engage DOFAW in developing a management plan mutually agreed. Therefore, staff recommends the Board authorize adding of a condition requiring the applicant to develop a management plan with the consultation of DOFAW.

Department of Hawaiian Home Lands and Office of Hawaiian Affairs
Both agencies have not submitted response at time of drafting the submittal.

The purpose of the requested right-of-entry is to maintain the property before a lease is approved. The Applicant requests the Board waive the permit fee, and such waiver is further supported by the nonprofit status of the Applicant. Staff has no objection to the permit fee waiver.

Staff will bring the request for a direct lease upon receipt of an application from the Applicant. There are no other pertinent issues or concerns to the subject request.

RECOMMENDATION: That the Board:

1. Approve of and recommend to the Governor issuance of an executive order withdrawing 1,121.465 acres from the Governor's Executive Order No. 3481, subject to:

   A. The standard terms and conditions of the most current executive order form, as may be amended from time to time;

   B. Disapproval by the Legislature by two-thirds vote of either the House of Representatives or the Senate or by a majority vote by both in any regular or special session next following the date of the setting aside;

   C. Review and approval by the Department of the Attorney General; and

   D. Such other terms and conditions as may be prescribed by the Chairperson to best serve the interests of the State.

2. Declare that, after considering the potential effects of the proposed disposition as provided by Chapter 343, HRS, and Chapter 11-200, HAR, this project will probably have minimal or no significant effect on the environment and is therefore exempt

from the preparation of an environmental assessment.

3. Authorize the issuance of a right-of-entry permit to Ka'ala Farm, Inc. covering the subject area for maintenance purposes under the terms and conditions cited above, which are by this reference incorporated herein and further subject to the following:

   A. The standard terms and conditions of the most current right-of-entry permit form, as may be amended from time to time;

   B. Ka'ala Farm, Inc. shall consult with the Division of Forestry and Wildlife to develop a management plan; and

   C. Such other terms and conditions as may be prescribed by the Chairperson to best serve the interests of the State.

Respectfully Submitted,

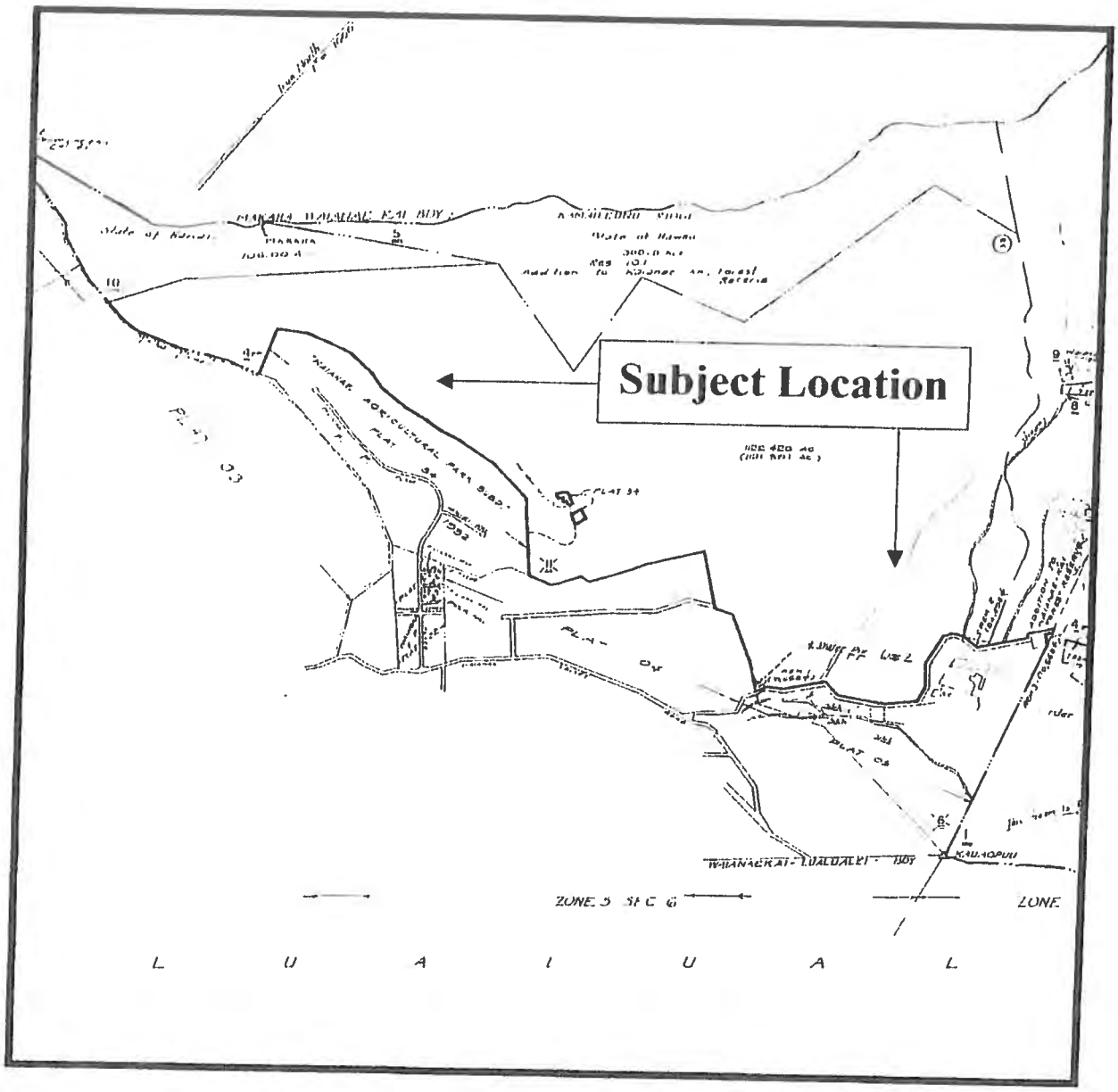
Barry Cheung

Barry Cheung
District Land Agent

APPROVED FOR SUBMITTAL:

for

William J. Aila, Jr., Chairperson



TMK (1) 8-5-006:004 portions

EXHIBIT A

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

January 13, 2012

EXEMPTION NOTIFICATION
regarding the preparation of an environmental assessment pursuant to Chapter 343, HRS and Chapter 11-200, HAR

Project Title:	Withdrawal from Governor's Executive Order No. 3481 and Issuance of Right-of-Entry Permit for Maintenance Purposes.
Project / Reference No.:	PSF 11od-122
Project Location:	Waianae-Kai, Waianae, Oahu, Tax Map Key: (1) 8-5-006:004 por.
Project Description:	Right-of-Entry Permit for Maintenance Purposes,
Chap. 343 Trigger(s):	Use of State Land
Exemption Class No.:	In accordance with Hawaii Administrative Rule Sections 11-200-8(a)(1) & (4) and the Exemption List for the Department of Land and Natural Resources approved by the Environmental Council and dated December 4, 1991, the subject request is exempt from the preparation of an environmental assessment pursuant to Exemption Class No. 1, that states "Operations, repairs or maintenance of existing structures, facilities, equipment, or topographical features, involving negligible or no expansion or change of use beyond that previously existing" and Class No. 4, that states "Minor alteration in the conditions of land, water, or vegetation."

The subject property used to be occupied by a rancher leased from the Department of Agriculture. The lease was cancelled by the Board of Agriculture effective September 26, 2011. The Applicant obtained a right-of-entry from the Department of Agriculture to maintain the property from vandalism. The subject request is to issue a revocable permit to the Applicant to continue the ongoing maintenance after the said right-of-entry expired on December 31, 2011. The Applicant does not plan to change any use of the subject property during the revocable permit. Staff does not

EXHIBIT B

anticipate the request will result in major alterations in the conditions of land, water and vegetation. Therefore, this action is exempt from the provisions of Chapter 343, HRS, relating to environmental impact statements.

Consulted Parties

Not applicable

Recommendation:

That the Board finds this project will probably have minimal or no significant effect on the environment and is presumed to be exempt from the preparation of an environmental assessment.

For William J. Aila, Jr., Chairperson

Date

RIGHT OF ENTRY AGREEMENT

1. Date of this Agreement: September 23, 2011

2. Parties to this Agreement:

Owner:	State of Hawaii Department of Agriculture
Contact:	Randy Teruya, Ag Resource Mgmt. Division
Entrant:	KA'ALA FARMS, INC.
Contact:	Eric Enos
Authorized Contractor for:	N/A

3. Property: TMK: 1st DIV/8-5-005:004

4. Activities to be Conducted on the Property:

Entrant has requested permission from Owner to enter the Property to conduct the following activities:

Maintain a presence on the subject property to prevent or mitigate unauthorized trespass, malicious vandalism and property damage.

5. Term of this Agreement:

The term of this Agreement shall begin on the date of this Agreement set forth above and shall terminate on December 31, 2011 unless sooner terminated pursuant to the terms set forth in this paragraph 5 or in other provisions of this Agreement. Entrant or Owner may sooner terminate this Agreement, with or without cause, after furnishing to the other party ten (10) days prior written notice of such.

6. Permission to Enter Property:

Owner hereby gives Entrant permission to enter the Property to conduct the activities listed in paragraph 4 above, subject to the terms and conditions contained in this Agreement.

7. Conditions to Entry:

Entrant may enter the Property subject to the following conditions:

a. Entrant shall conduct only those activities listed in paragraph 4 above and no other activities.

EXHIBIT "C"

b. Entrant shall not interfere with or disrupt any of Owner's or Owner's lessees' or tenants' activities on the Property.

c. Entrant shall exercise due care for public and private safety on the Property.

d. The activities conducted on the Property by Entrant shall be conducted in a manner that is unobtrusive and blends in with the surroundings to the extent possible.

e. Upon expiration or earlier termination of this Agreement, Entrant shall remove all equipment and other items of Entrant's and shall restore the Property to the same condition existing prior to Entrant's entry on the Property.

f. Prior to exercising the rights granted under this Agreement, the Entrant shall give the Owner at least forty-eight (48) hours prior written notice of the desire to exercise the rights granted under this Agreement, which notice shall indicate the dates of the intended access and use of the Property pursuant to the terms of this Agreement.

8. Indemnification:

Entrant agrees to indemnify Owner and tenants occupying the Property, against all loss, damage, costs, expenses, charges, reasonable attorneys' fees and liability for injury to property or persons, including wrongful death, arising out of or caused by any accident on or in connection with activities as described above in paragraph four, or the entry or use of Entrant, of the Property and improvements thereon, or arising out of failure of Entrant to observe and perform any term, covenant or condition herein contained and on the part of Entrant to be observed and performed, or caused by Entrant in the exercise of the rights and duties granted hereunder. The term "Entrant" as used in this paragraph shall mean and include the Entrant and its employees, agents, and contractors who enter the Property to exercise the rights granted under this Agreement.

9. Self-Insurance:

Notwithstanding anything to the contrary that may be contained in this Agreement, the insurance required to be carried by Entrant under this Agreement or any part or portion thereof, may be carried under any plan or plans of self-insurance.

If Entrant shall maintain such plan or plans of self-insurance, Entrant shall furnish to Owner a letter by a duly authorized signatory of Entrant certifying: 1) the plan or plans of self-insurance meet or exceed the insurance coverage required to be maintained by Entrant pursuant to this Agreement and 2) the procedure for Entrant to report any claims under such plan or plans of self-insurance.

10. Preservation of Historic and Archaeological Sites:

Entrant shall take every reasonable precaution to preserve and leave unaltered all places, if any, of historic and/or archaeological interest, including without limitation structures and sites listed on the Hawaii State Register of Historic Places and/or the National Register of Historic Places, ponds, reservoirs, heiau, altars, agricultural terraces, lo'i, walls, auwai, house platforms, imu, petroglyph sites, cemeteries; and all objects, if any, of historic and/or archaeological interest, including without limitation antiquities and specimens of Hawaiian or other ancient art or handicraft which may be found in or on the Premises. Upon the discovery of such objects or of any human remains in or on the Premises, the Lessee will leave the same untouched and will immediately notify the Lessors of the type and location of such discovery.

11. No Assignment:

Entrant shall not assign or transfer any right under this Agreement.

12. Termination of Agreement:

In the event that Owner, in Owner's judgment, determines that any of the terms or conditions contained in this Agreement have been breached, or upon the condemnation of the Property or any portion thereof, Owner shall have the right to terminate this Agreement without having to furnish Entrant prior notice.

13. No Real Property Interest:

Entrant agrees that Entrant does not and shall not claim at any time any real property interest in the Property. THIS AGREEMENT IS NOT A LEASE OR A GRANT OF AN EASEMENT.

14. Compliance With Law: Entrant shall comply with all federal, state, and county laws, ordinances, and regulations associated with the exercise of Entrant's rights under this Agreement, and shall indemnify and hold Owner harmless from and against any and all violations by Entrant of such laws, ordinances, and regulations.

15. Insurance: Entrant shall procure and maintain throughout the term of this Agreement worker's compensation insurance on all of Entrant's employees and shall provide Owner with certificates of insurance evidencing such worker's compensation insurance. Entrant shall secure for the term of this Agreement liability insurance for all operations directly or indirectly connected with Entrant's operations contemplated under this Agreement including, but not limited to, if applicable, the transportation of Entrant's employees, agents or contractors to the Property with limits not less than $1,000,000.00 each occurrence for bodily injury, and $2,000,000.00 in the aggregate with $100,000.00 for property damage and excess general liability coverage of $3,000,000.00. Before commencement of Entrant's operations under this Agreement, Entrant shall file with Owner certificates of insurance acceptable to Owner showing Owner as an additional insured. All certificates to be provided Owner under this Agreement shall contain a provision that the coverage afforded under the policies will not be canceled or materially changed until at least ten (10) days prior written notice has been given to Owner.

16. No Offensive Use: Entrant will not suffer, make, commit, or permit any waste or strip or unlawful or improper or offensive use of the Property or any part thereof. Entrant will ensure that any and all material such as, but not limited to, paper products, soda cans, etc., brought to the Property by Entrant or its employees, agents, or contractors shall be removed from the Property each day of Entrant's exercise of the rights granted under this Agreement.

17. Operation and Control: Entrant shall be responsible for the actions and activities of its employees, agents, and contractors acting in the course of their employment and operations pursuant to this Agreement. Entrant's operations will be conducted in a professional, workmanlike and orderly manner.

18. No Warranties and Assumption of Risk: Owner makes no representations as to the present or future condition of the Property. Entrant assumes all risks of personal injury or damage to Entrant, its employees, agents, and contractors in connection with the operations contemplated under this Agreement.

19. Attorney's Fees and Costs: Should any litigation be commenced between the parties concerning this Agreement between them or the rights and duties of either in relation thereto, the prevailing party in such litigation shall be entitled, and in addition to such other relief as may be granted, a reasonable sum for its attorney's fees and costs for litigation which will be determined by the Court.

20. Amendments: This Agreement may not be amended or modified in any respect except by an instrument in writing executed by the parties.

21. Notices: Any notice under this Agreement shall be sufficient if mailed by U.S. mail, first-class postage, prepaid, to any party at the address given below or such other address as either party may designate from time to time by notice similarly given:

To Owner: Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

To Entrant: KAALA FARMS, INC.
~~85-555 Farrington Highway~~ PO BOX 630 one
Waianae, Hawaii 96792

22. Counterparts: This Agreement may be executed in one or more counterparts, and when so executed each counterpart shall be deemed to be an original, and said counterparts together shall constitute one and the same instrument.

23. No Party Deemed Draftsperson: Since all parties to this Agreement have had their respective legal counsel review this Agreement or have had an opportunity to have such legal counsel review the Agreement for purposes of construing the terms and conditions of this Agreement, no party shall be deemed the draftsperson of this Agreement.

24. Section Headings: Headings at the beginning of each section of this Agreement are solely for the convenience of the parties and are not a part of this Agreement.

25. Governing Law: This Agreement shall be governed by the laws of the State of Hawaii and any question arising hereunder shall be construed or determined according to such law.

ACCEPTED:

Signature

Name: Eric Enos
Director

Date: September 23, 2011

APPROVED:

Signature

Brian Kau, P.E.
Administrator and Chief Engineer

Date: SEP 2

TOWNSCAPE, INC.
ENVIRONMENTAL AND COMMUNITY PLANNING

900 Fort Street Mall, Suite 1160, Honolulu, HI 96813
Telephone (808) 536-6999 Facsimile (808) 524-4998
email address: mail@townscapeinc.com

August 26, 2013

Mr. Russell Y. Tsuji, Administrator
Land Division
Department of Land and Natural Resources
1151 Punchbowl St., Room 220
Honolulu, HI 96813

Dear Mr. Tsuji,

SUBJECT: Draft Environmental Assessment for Wai‘anae Valley Ranch

Thank you for your compiled comments of August 15, 2013 relating to the subject project. In response to DLNR comments, we offer the following:

1. *General Recommendations from CWRM*

   We will advise our client to follow the recommended BMPs and other sustainability recommendations made by the Commission and will incorporate these into the Final Environmental Assessment.

2. *Permits Required by CWRM*

   All necessary water use related permits will be obtained prior to beginning any potential well or stream diversion work. At this time, there is no proposal to construct any wells. If existing well(s) are not planned to be used, the proper procedures will be followed to seal the abandoned well(s).

3. *Request for Estimate of Water Demands*

   We will provide the requested estimate of project water demands in the Final Environmental Assessment.

4. *Correction of Incorrect Sustainable Yield Number for Mākaha Aquifer*

   Apologies for the incorrect number. This came from an outdated DLNR GIS layer. We will correct this number in the Final Environmental Assessment.

5. *Land Division Comment Regarding "Conservation Officer"*

   We will be sure to clarify that the Conservation Officer will be an employee of the applicants and in no way related to the State.

6. *Land Division Comment Regarding Solar Farm*

   As discussed during the preliminary review process, the applicants are aware that there is no potential for a commercialized solar farm. There are no plans to construct a commercialized solar farm on the subject property at any time. The solar farm mentioned in Section 2.2.5 of the Draft EA, along with all other plans mentioned in that section, is a very conceptual long-term idea to help power any potential facilities on the property and is not commercial in nature. We will clarify this in the Final Environmental Assessment. However, no further details on any of the ideas mentioned in Section 2.2.5 are available at this time, as these were just conceptual ideas mentioned as possibilities for future consideration.

7. *Land Division Comment Regarding "Revocation" of Lease*

   We will edit the wording accordingly (change from "revoke" to "cancel") and provide more context on the State procedures preceding this Environmental Assessment.

We will incorporate comments from DLNR into the Final Environmental Assessment. Thank you again for taking the time to review and respond. Please contact the undersigned if there are further questions.

Sincerely,

Tina Speed
Project Coordinator

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
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

Division of Forestry and Wildlife – Oahu Branch
2135 Makiki Heights Drive
Honolulu, Hawaii 96822
Phone: 808-973-9779 | Fax: 808-973-9781

September 20, 2013

Ms. Christina Speed
Townscape, Inc.
Environmental & Community Planning
900 Fort Street Mall, Suite 1160
Honolulu, Hawaii 96813

Dear Ms. Speed,

Thank you for making the extra effort to allow DOFAW to submit comments for the Waianae Valley Ranch EA despite the expiration of the comment deadline. I am pleased with the direction of the management that is being proposed. I humbly submit the comments as follows.

Fire:

- Fire is one of the largest threats to this area. I see that this plan addresses this threat with fire break roads. DOFAW is open to lending some assistance with the maintenance of these roads on the ranch for fire breaks and for access for fire suppression.
- I suggest relocating structures such as the nursery, parking garage, mulch shed, etc. to the center of the orchards, organic farms and community gardens. The farming activity will act as a fuel break between the structures and an oncoming fire. This will negate the requirement of having to control guinea grass around structures.
- A cleared pad, free from vegetation, approximately 100 feet by 100 feet would be useful for fire suppression. Honolulu Fire Department can use this pad to set up their helicopter dip tank and land the helicopter for refueling during fires.
- Fuel management will be a huge challenge for this area. Well managed grazing is an excellent control measure for guinea grass. As the ranch has a history of poor cattle management, utilizing goats in strategically located paddocks may be an effective and community friendly alternative.

Flooding:

- The installation of check dams for flood control is a great concept. Increasing ground cover and soil stabilization through planting trees and shrubs will also greatly aid in flood control. Native flora such as a'ali'i, pili grass, wiliwili, etc. will be appropriate for this area.

Horses:

- Page 27 shows a map with a possible Horse trail for therapeutic programs. If horses are brought in from other ranches or other islands, it is possible that they can introduce invasive weeds to the area through feces and as hitch hikers caught on their coat, tail or in their hooves. Fireweed, *Senecio madagascariensis* is an example of a noxious weed

that is toxic to live stock and has naturalized on the Big Island. It is recommended that imported animals be grained for a few days before transport onto Waianae Valley Ranch and washed and checked for weed seeds the day of the transport.

Access:

- I have concerns with the proposal of a "Large Pohaku Chain" that seems to block access into the valley as depicted in the map on page 21. As it is, I get many requests from kupuna for vehicular access through the Forest Reserve for a variety of reasons, i.e. gathering forest products for cultural purposes, entering the forest for cultural practices, etc. If the public is required to park at this newly designated parking lot, the community will have a very laborious and extended walk to get to the Forest Reserve. This will affect all the members of the community, hunters, cultural practitioners, recreationalists, etc. I request that public access not be stifled.

Once again, thank you very much for accepting these comments past the comment period. Should you have any questions or concerns, feel free to call me at 974-9784.

Aloha,

Ryan K. Peralta
Forest Management Supervisor I

TOWNSCAPE, INC.
ENVIRONMENTAL AND COMMUNITY PLANNING

900 Fort Street Mall, Suite 1160, Honolulu, HI 96813
Telephone (808) 536-6999 Facsimile (808) 524-4998
email address: mail@townscapeinc.com

September 20, 2013

Mr. Ryan Peralta
Division of Forestry and Wildlife
Department of Land and Natural Resources
2135 Makiki Heights Drive
Honolulu, HI 96822

Dear Mr. Peralta,

SUBJECT: Draft Environmental Assessment for Wai‘anae Valley Ranch

Thank you for your comments of September 20th, 2013 relating to the subject project. In response to DOFAW comments, we offer the following:

1. *Fire*

   Thank you for your suggestions regarding fire suppression and prevention. DOFAW’s willingness to lend assistance with firebreak maintenance and fire suppression access is very welcomed. Please note that the locations of structures and facilities as shown in the Conceptual Site Plan (Figure 1) are very preliminary and subject to change. We will advise our clients to take into account your suggestions regarding locations of structures within the farm area and the strategic planting of crops as a fuel break.

2. *Flooding*

   Your comments regarding flood control and ground cover stabilization through native plants were well-received. Our clients are already planning to grow native plants and we will be sure to suggest the recommended native species as part of the flood mitigation measures.

3. *Horses*

   Thank you for expressing your concerns about introduction of noxious weeds through horses. Any equestrian activities are mid-to longterm plans. The number of horses will most likely be small, with horses donated from other horse owners in Wai‘anae and other parts of O‘ahu. We will advise our clients on the need for graining and inspecting the horses for several days before transporting them to the property to avoid introduction of any plants of concern.

4. *Access*

Thank you for pointing out your concerns about kūpuna and other public access to the Forest Reserve. We have taken great care over the course of this entire planning process to be respectful of people's access rights as this was a concern of our clients as well as many other community people and agencies we consulted with. The item you specifically mentioned was actually two separate ones: "Large Pōhaku", which are connected by a "chain" (all conceptual and subject to change). There are no plans to "block" access to the back of the valley as you expressed. There is also not a requirement for kūpuna to park in this parking lot and walk to the back of the valley to gather forest products, but the parking lot is meant to provide a place for people entering the ranch (a mostly vehicle free zone) to park. The idea of the guard shack/conservation officer is to control access in a way that educates anyone entering the valley about what is and what isn't pono (e.g. no littering, careful use of hunting dogs, no trespassing onto private land etc.). This is meant to help ensure sustainable use of the valley and Forest Reserve and is in no way meant to restrict public access for cultural and conservation purposes.

We will incorporate comments from DOFAW into the Final Environmental Assessment. Thank you again for taking the time to review and respond. Please contact the undersigned if there are further questions.

Sincerely,

Tina Speed
Project Coordinator