Draft Environmental Assessment

PROPOSED LANAI AFFORDABLE HOUSING PROJECT

(TMK (2)4-9-002:058(por.))

Prepared for:

County of Maui,
Department of Housing and Human Concerns

October 2009

MUNEKIYO HIRAGA, INC.

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Executive Summary

Project Name:	Proposed Lanai Affordable Housing Project
Type of Document:	Draft Environmental Assessment
Legal Authority:	Chapter 343, Hawaii Revised Statutes
Anticipated Determination:	Anticipated Finding of No Significant Impact (FONSI)
Applicable Environmental Assessment review "Trigger":	Use of County Lands and Funds
Location:	TMK (2)4-9-002:058 (por.) Lanai City Island of Lanai
Landowner:	County of Maui
Applicant:	County of Maui, Department of Housing and Human Concerns
Approving Agency:	County of Maui, Department of Housing and Human Concerns 2200 Main Street, Suite 546 Wailuku, Hawaii 96793 Contact: JoAnn Ridao, Deputy Director Phone: (808) 270-7805
Consultant:	Munekiyo & Hiraga, Inc. 305 High Street, Suite 104 Wailuku, Hawaii 96793 Contact: Colleen Suyama, Project Manager Phone: (808) 244-2015
Project Summary:	The County of Maui, Department of Housing and Human Concerns proposes the Lanai Affordable Housing Project to be located on 73 acres of a larger 115-acre parcel owned by the County of Maui. The project will consist of approximately 412 residential units. According to the project's conceptual master plan, there will be 239 house lots of approximately 5,000 square feet on 29.15 acres and 173 multi-family units on 14.48 acres with a proposed density of 12 units per acre. The project will also include two (2) park

sites consisting of 2.83 acres and 2.08 acres. In addition, a 4.94-acre public/quasi-public site for a future community center and 4.0-acre detention pond are proposed. Approximately 15.52 acres will be for street right-of-way.

Access to the project site will be via an extension of Fifth Street. Additionally, a Ninth Street extension is proposed to facilitate long-term traffic circulation in the vicinity of the project site.

I. PROJECT OVERVIEW

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A. BACKGROUND

The applicant, the County of Maui, Department of Housing and Human Concerns (DHHC), proposes a Section 201H-38, Hawaii Revised Statutes (HRS) Affordable Housing Project located in Lanai City, Lanai, Hawaii.

The proposed Lanai Affordable Housing Project will be located on the western side of Lanai City, Island of Lanai, County of Maui. The project site, consisting of approximately 73 acres of land, is part of a larger 115-acre parcel. See **Figure 1**. The subject property is currently designated "Single-Family" on the Lanai Community Plan, zoned "Interim District" by the County of Maui, while the State Land Use District designation is currently "Agricultural".

The 115-acre parcel was donated to the County of Maui by Castle & Cooke Resorts, LLC as fulfillment of Condition No. 2 of Change in Zoning Ordinance No. 2140, adopted on August 13, 1992 for the Koele Project District. See **Figure 2**.

Condition No. 2 states: *"The Declarant shall donate in fee simple absolute, at no cost and free and clear of all mortgage and lien encumbrances, 115 acres of land adjacent to the Lower Waialua single-family site to the County as shown in Exhibit "A" (shaded area) attached hereto and by reference made a part hereof, for an affordable housing project. The project shall be similar in design, quality and density to the recent affordable housing developments on Lanai."*

It is noted that the remaining 42 acres of the 115-acre site has been set aside for use by the State Department of Education (DOE) for the planned expansion of the Lanai High and Elementary School.

B. PROPERTY LOCATION, EXISTING USE, AND LAND OWNERSHIP

Identified by TMK 4-9-002:058(por.), the subject property is located within Lanai City. Land uses surrounding the subject property include the Lanai High School and Elementary School, a Department of Hawaiian Home Lands subdivision, Olopua Woods Subdivision,

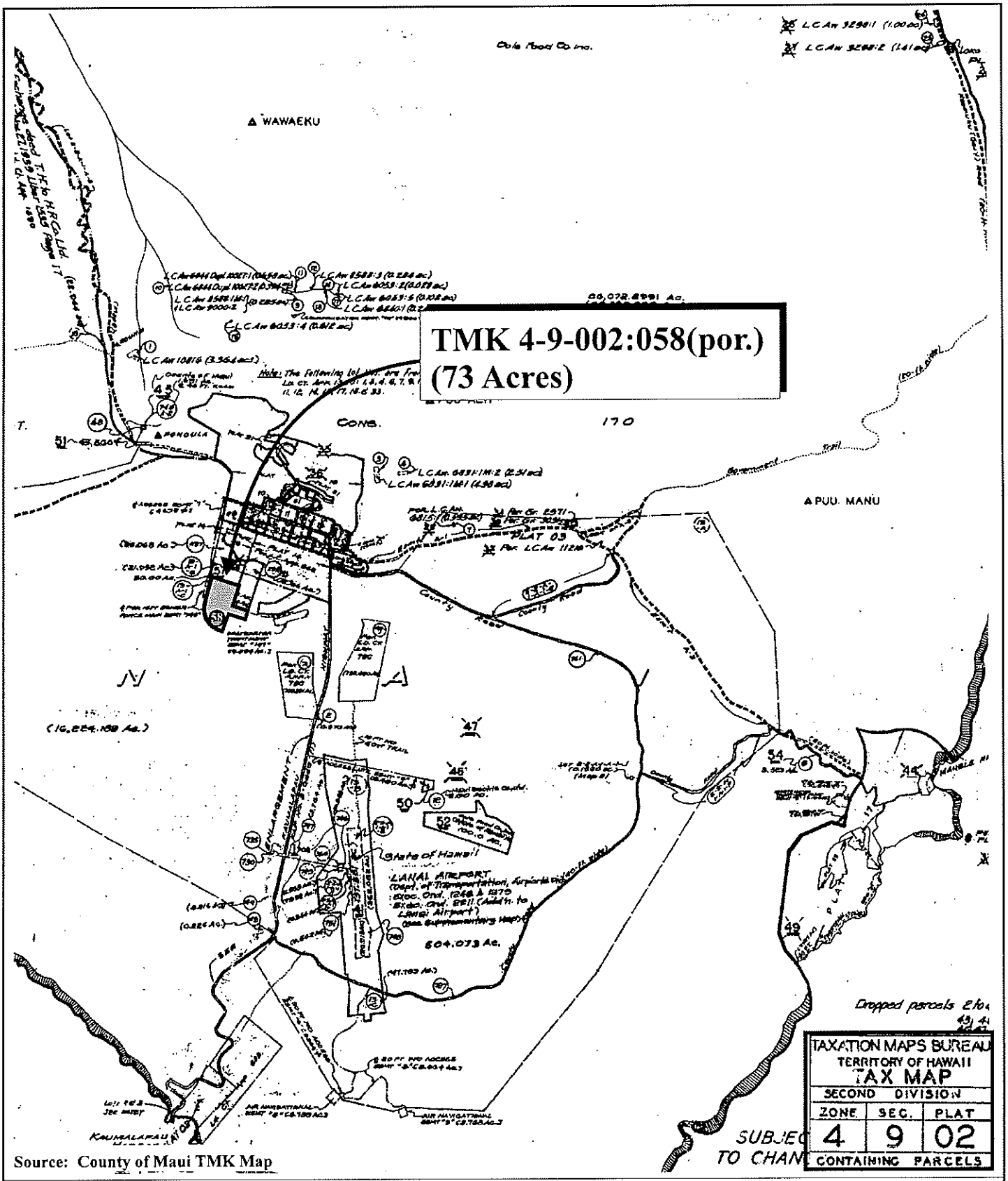

Figure 1 Proposed Lanai Affordable Housing Project

Regional Location Map

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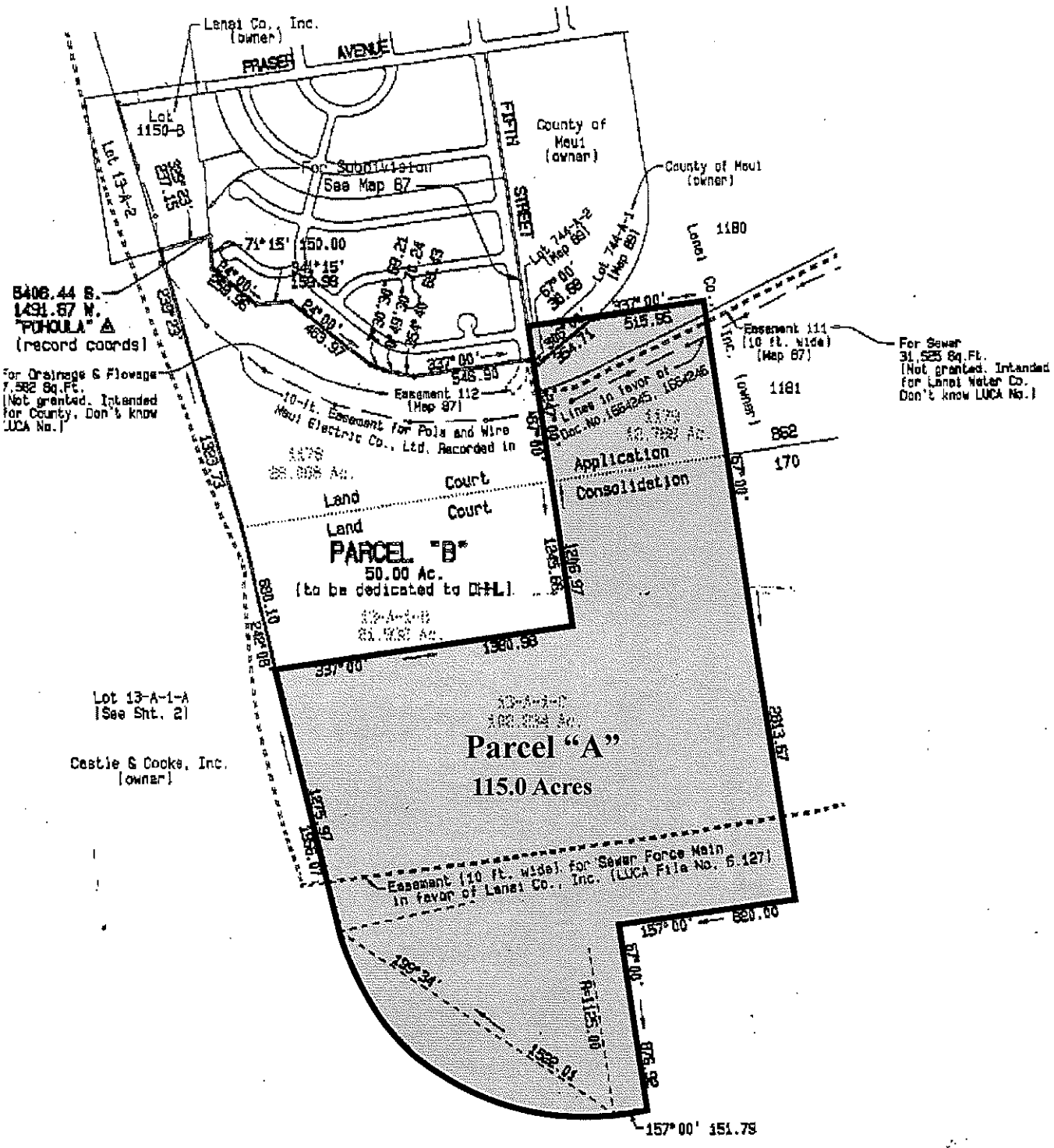

Source: Belt Collins Hawaii

Figure 2 Proposed Lanai Affordable Housing Project

Property Site Map

NOT TO SCALE

Prepared for: County of Maui, Dept. of Housing and Human Concerns

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PAI/LanaiCityHousing/propsitemap

and vacant agricultural lands. The 73-acre project site, as delineated in **Figure 3**, is currently vacant. The County of Maui is the owner of the subject property.

C. PROPOSED ACTION

1. Project Need

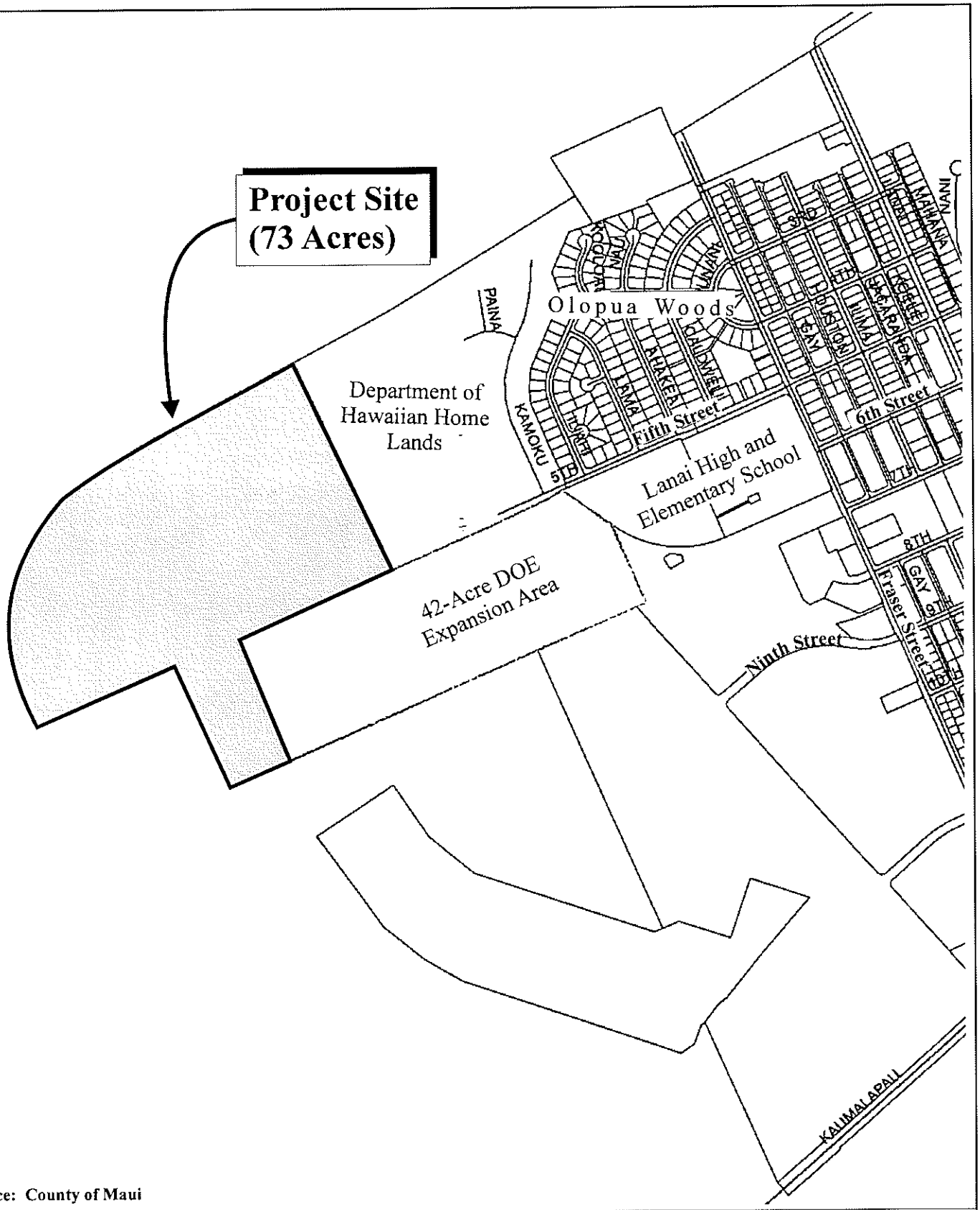
Housing on Lanai is separated into two (2) distinct segments: resort and workforce or resident housing. Workforce housing is located within the limits of Lanai City.

ACM Consulting, Inc. conducted a Lanai Affordable Housing Survey and interviews with representatives of the island's real estate market. Of the respondents in the survey, 41 percent currently rent. According to the survey results and interviews, the community expressed a desire for affordably priced three-bedroom and two-bathroom single-family home, of between 1,200 and 1,400 square feet. The proposed Lanai Affordable Housing Project is viewed as a means to meet the long-term housing needs and desires of the island's residents.

2. Proposed Development

Preliminarily, the project will consist of approximately 412 residential units. According to the project's conceptual master plan, there will be 239 house lots of approximately 5,000 square feet on 29.15 acres and 14.48 acres of multi-family with a proposed density of 12 units/acre. At this density, approximately 173 multi-family units can be accommodated within the project site. The project will also include two (2) park sites consisting of 2.83 acres and 2.08 acres. In addition, a 4.94-acre public/quasi-public site will be for a future community center and a 4.0-acre detention pond are proposed. Approximately 15.52 acres will be for street right-of-way. See **Figure 4**.

The first increment of the project will consist of approximately 58 single-family lots, 23 multi-family units, a 2.83-acre park, a 4.94-acre public/quasi-public site, and a 4.0-acre open space (detention pond). See **Figure 5**.



Source: County of Maui

Figure 3 Proposed Lanai Affordable Housing Project

Property Location Map

NOT TO SCALE

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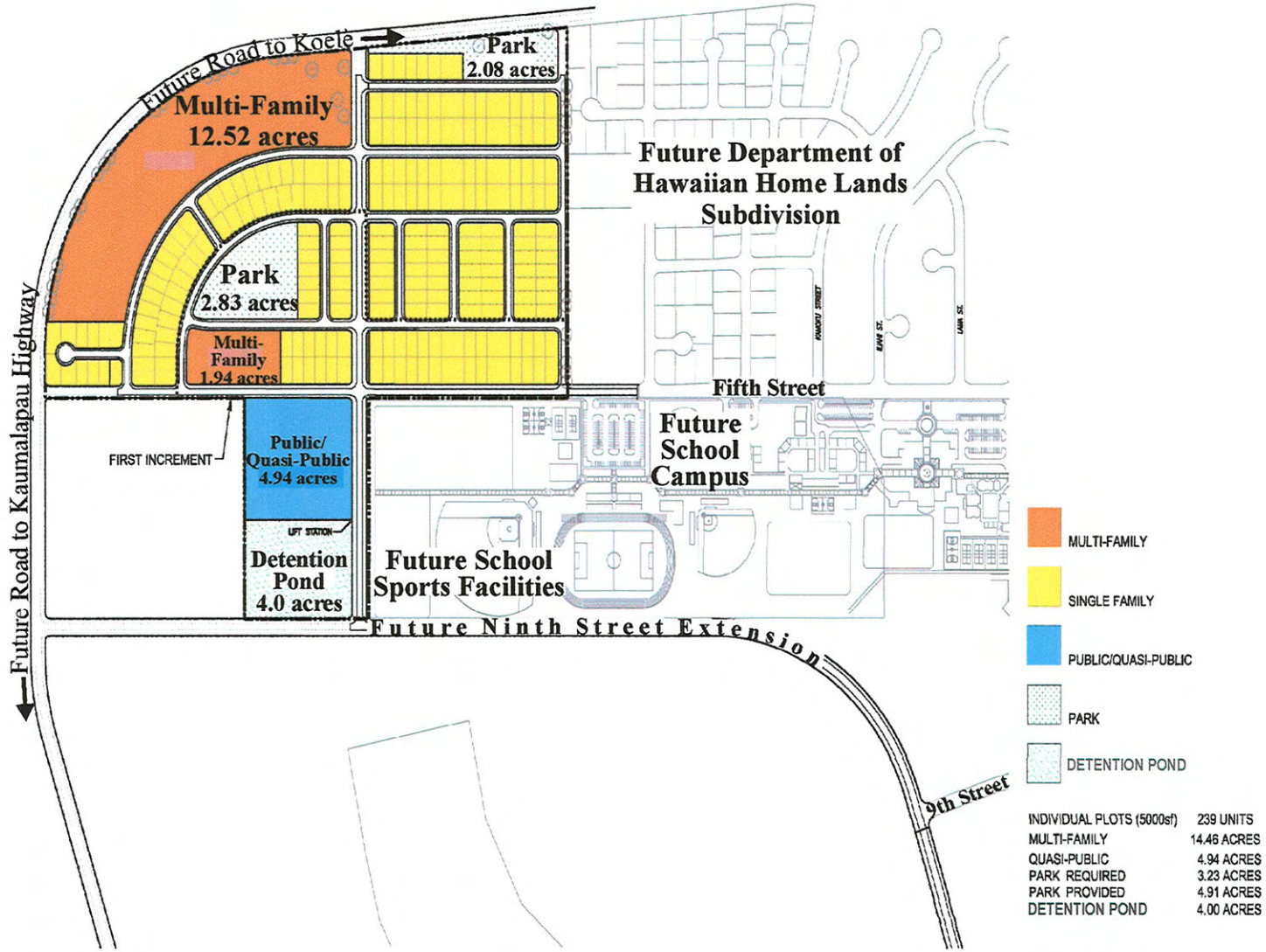

Source: Pacific Architects, Inc.

Figure 4 Proposed Lanai Affordable Housing Project

Conceptual Master Plan

NOT TO SCALE

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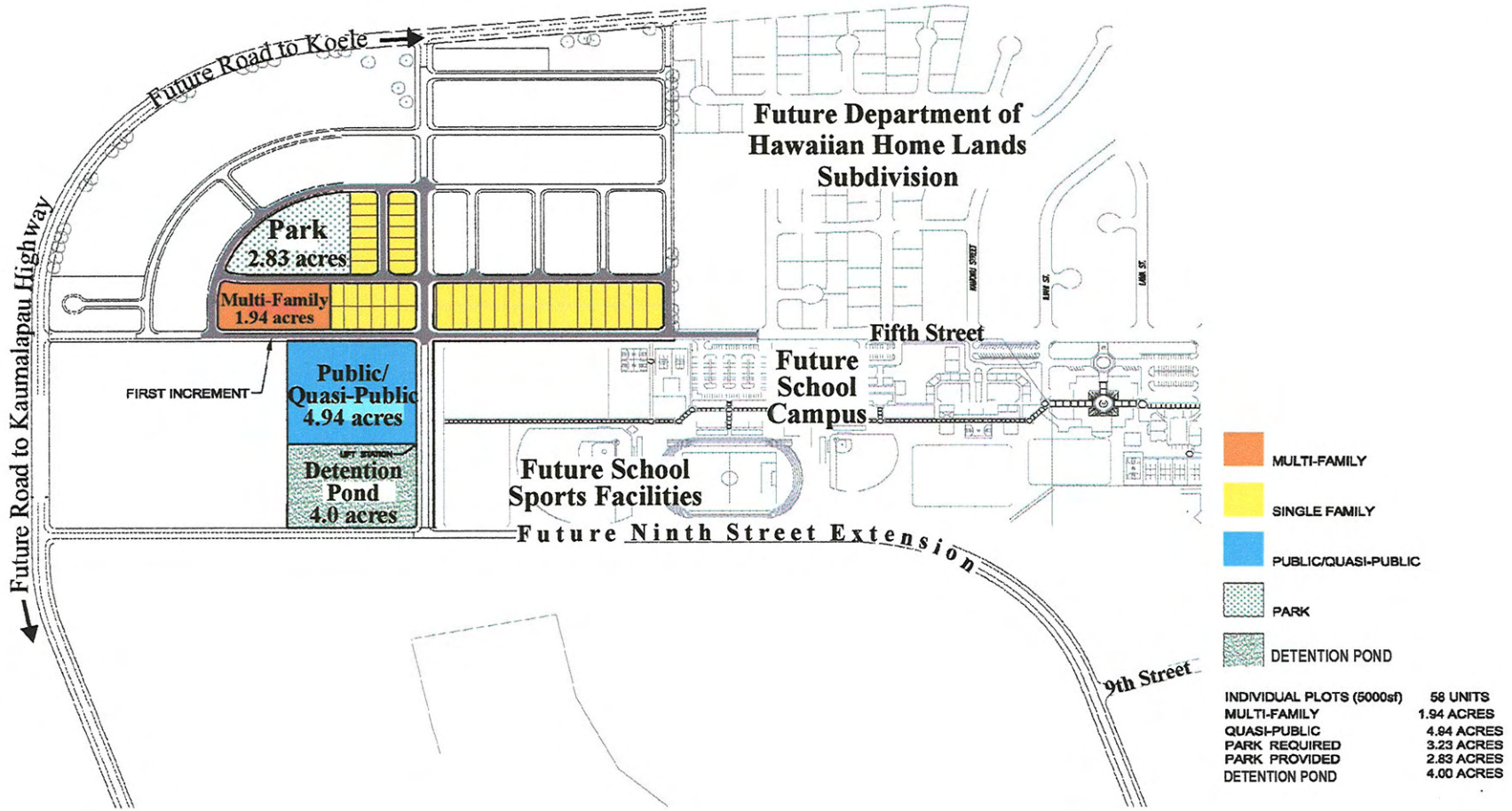
PAI/LanaiCityHousing/siteplan



Source: Pacific Architects, Inc.

Figure 5 Proposed Lanai Affordable Housing Project

First Increment Development Concept

NOT TO SCALE

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MUNEKIYO & HIRAGA, INC.

PAI/LanaiCityHousing/firstincrement

The conceptual plans for the project reflect the architectural details recommended in the Lanai City Community Design Guidelines dated April 1997. The plan proposes three (3) wood frame one-story single-family models and a handicap accessible model unit. The single-family dwellings will include three (3) bedrooms and two (2) bathrooms. Except for the handicap accessible unit, the dwellings will be constructed on post and pier reflecting the plantation architecture of the older homes in Lanai City. See **Figure 6**. The project also includes three (3) wood-frame multi-family models consisting of two-story units with living areas on the ground floor and sleeping areas on the second floor. See **Figure** 7.

Access to the project site will be via an extension of Fifth Street. Additionally, a Ninth Street extension is proposed to facilitate long-term traffic circulation in the vicinity of the project site.

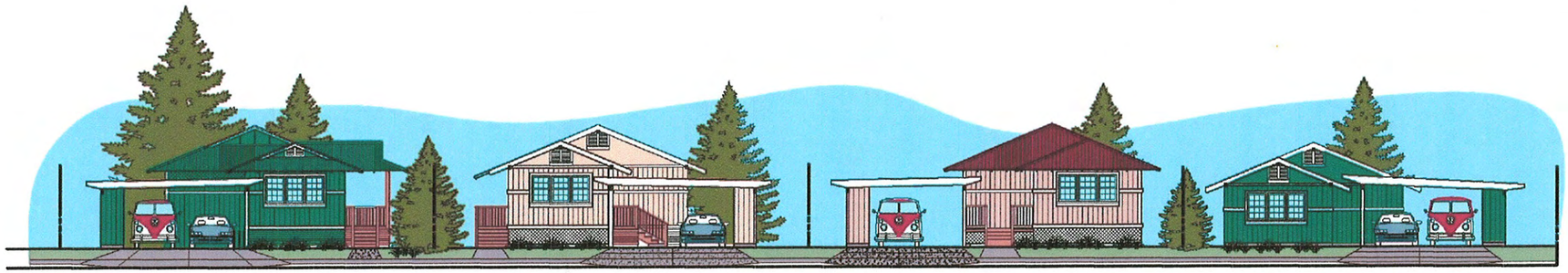
D. ENTITLEMENTS REQUIRED

The Lanai Affordable Housing project has been developed to meet the criteria for a Section 201H-38, HRS project by the DHHC. Section 201H-38, HRS promotes the delivery of affordable housing by allowing the exemption of endorsed project from:

> *"... all statutes, ordinances, charter provisions, and rules of any governmental agency relating to planning, zoning, construction standards for subdivisions, development and improvement of land and the construction of units thereon."*

As such, a Section 201H-38, HRS application will be filed with the Maui County Council to seek exemptions from the Community Plan Amendment and Change in Zoning processes, as well as other County requirements to support the timely implementation of the project, without compromising public health, safety, or welfare considerations. Proposed exemptions are presented in **Appendix "A"**.

The current State Land Use designation for the plan area is "Agricultural". Concurrent with the County's 201H-38, HRS processing, a petition for a State Land Use Commission (SLUC) District Boundary Amendment (DBA) from the "Agricultural" to "Urban" District will be processed. The SLUC petition will encompass the 73-acre project area and follow the provisions of Section 15-15-97 of the Land Use Commission Rules, pertaining to Section 201H-38, HRS processing.



Model 'A' Model 'B' Model 'C' Accessible Unit

TYPICAL STREET SCENE

TYPICAL MODEL UNITS

Source: Pacific Architects, Inc.

Figure 6

Proposed Lanai Affordable Housing Project

Conceptual Plans of Single Family

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Prepared for: County of Maui, Dept. Of Housing and Human Concerns

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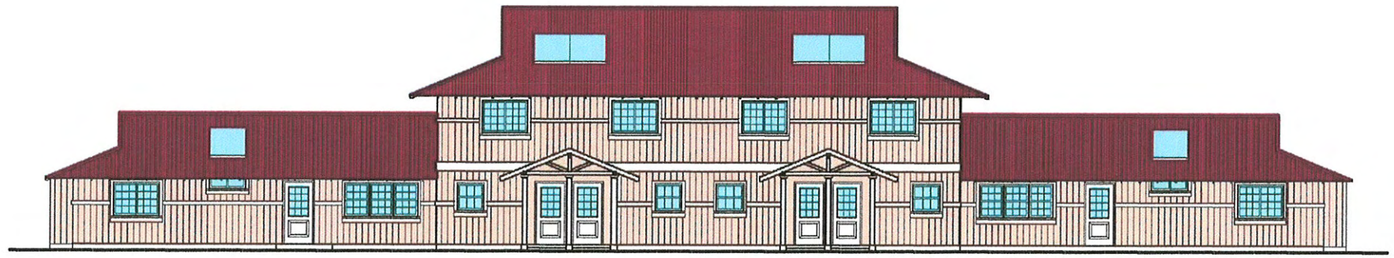
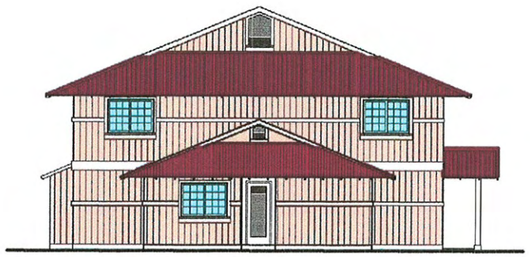


Front Elevation



Typical Side Elevation

Rear Elevation

Source: Pacific Architects, Inc.

Figure 7

Proposed Lanai Affordable Housing Project
Conceptual Plans of Multi Family

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

Prepared for: County of Maui, Dept. Of Housing and Human Concerns

Subdivision design and construction of the proposed improvements will be initiated upon completion of the SLUC DBA and County Section 201H-38, HRS processes.

E. REGULATORY CONTEXT AND CHAPTER 343, HAWAII REVISED STATUTES

The Lanai Affordable Housing project will involve the use of County lands and funds. As such, the processing of an Environmental Assessment (EA) pursuant to Chapter 343, Hawaii Revised Statutes (HRS) will be required. This EA is being prepared pursuant to both HRS, Chapter 343 and Chapter 200 of Title 11, Department of Health Administrative Rules, Environmental Impact Statement Rules. Accordingly, this document addresses the project's technical characteristics, environmental impacts and alternatives, and advances findings and conclusions relative to the significance of the proposed action. The approving agency for the EA is the DHHC.

F. ANTICIPATED DEVELOPMENT SCHEDULE

Additional funds will be required before construction can be initiated. The DHHC will need to include the project into the County of Maui budget process as the project proceeds through the proposed entitlements.

The project will be developed over a multi-phase time horizon anticipated to be approximately 17 years in duration.

The total estimated cost of the proposed project is approximately $23 million for the site development.

II. DESCRIPTION OF EXISTING CONDITIONS, POTENTIAL IMPACTS AND MITIGATION MEASURES

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A. PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

a. Existing Conditions

As previously indicated, the subject property is situated within Lanai City. The area is characterized by vacant agricultural lands, single-family uses, as well as park, public uses, and open space. Single- and multi-family residential properties surround the town's commercial core located across Dole Park. Project District 2 (Koele) is located north of Lanai City.

Other urban areas of Lanai include Lanai Airport, situated about 3.2 miles to the southwest, Kaumalapau Harbor, the commercial seaport situated about seven (7) miles to the southwest, and Lanai Project District 1 (Manele) situated about 8.0 miles to the south of Lanai City.

b. Potential Impacts and Proposed Mitigation

The proposed action enhances the residential component of Lanai City. The proposed action will complement existing surrounding land uses, as well as other permitted uses which may be developed in the area in the future. The project shall be similar in design, quality, and density to other workforce housing developments on Lanai.

The project site is in close proximity of Lanai High and Elementary School and the first phase Department of Hawaiian Home Lands Residential Subdivision, as well as Olopua Woods. The proposed project will be an extension of the existing residential use of the area. The close proximity

of the school will encourage future students in the project to walk or bike to school.

2. Climate, Topography, and Soil Characteristics

a. Existing Conditions

Like most areas of Hawaii, Lanai's climate is relatively uniform year-round. The region's tropical climate, its position relative to storm tracts and the Pacific anticyclone, and the surrounding ocean combine to produce this stable climate. Variations in climate among different regions then, is largely left to local terrain.

Temperature data collected at Lanai Airport indicates that August is typically the warmest month, with an average temperature of 75.4 degrees Fahrenheit, while January is the coolest month of the year with an average temperature of 62.4 degrees Fahrenheit (Maui County Data Book, 2008).

Rainfall at Lanai City is highly seasonal, with most precipitation occurring between November and April when winter storms hit the area. Precipitation data collected at Lanai City Airport in 2007 shows that January was the wettest month, with 5.3 inches of precipitation, while June was the driest with 1.26 inches of precipitation. The average annual total rainfall is 41.55 inches (Maui County Data Book, 2008).

The subject property is characterized as having a level to gently sloping topography. The property lies at an elevation of approximately 1,562 feet above mean sea level (amsl). The project site is located within the Molokai-Lahaina association of soils. See **Figure 8**. Found on small areas that are subject to ponding, this soil association is characterized as deep, nearly level to moderately steep sloping, and well drained that have a moderately fine course texture. Waihuna clay, 0 to 3 percent slopes (WoA), defines the soil type for the project site. It is characterized by moderately slow permeability, slow runoff, and slight erosion hazard. See **Figure 9.**

SOIL ASSOCIATIONS

1 — Jaucas-Mala-Pulehu association: Deep, nearly level and gently sloping, excessively drained and well-drained soils that have coarse-textured to fine-textured underlying material; on alluvial fans and in drainageways

2 — Molokai-Lahaina association: Deep, nearly level to moderately steep, well-drained soils that have a moderately fine textured or fine textured subsoil; on uplands

3 — Kahanui-Kalae-Kanepuu association: Deep, gently sloping to moderately steep, well-drained soils that have a dominantly fine-textured subsoil; on uplands

4 — Very stony land-Rock land association: Gently sloping to very steep, rocky and stony land types; on uplands and in gulches and valleys

5 — Rough broken land-Oli association: Shallow to deep, very steep to precipitous soils in gulches and moderately deep to deep, gently sloping to steep, well-droined soils that have a medium-textured and moderately fine textured subsoil; on uplands

6 — Rough mountainous land-Amalu-Olakui association: Shallow, very steep lands of mountains and gulches and deep to shallow, gently sloping to hilly, poorly drained soils over soft weathered rock; on uplands

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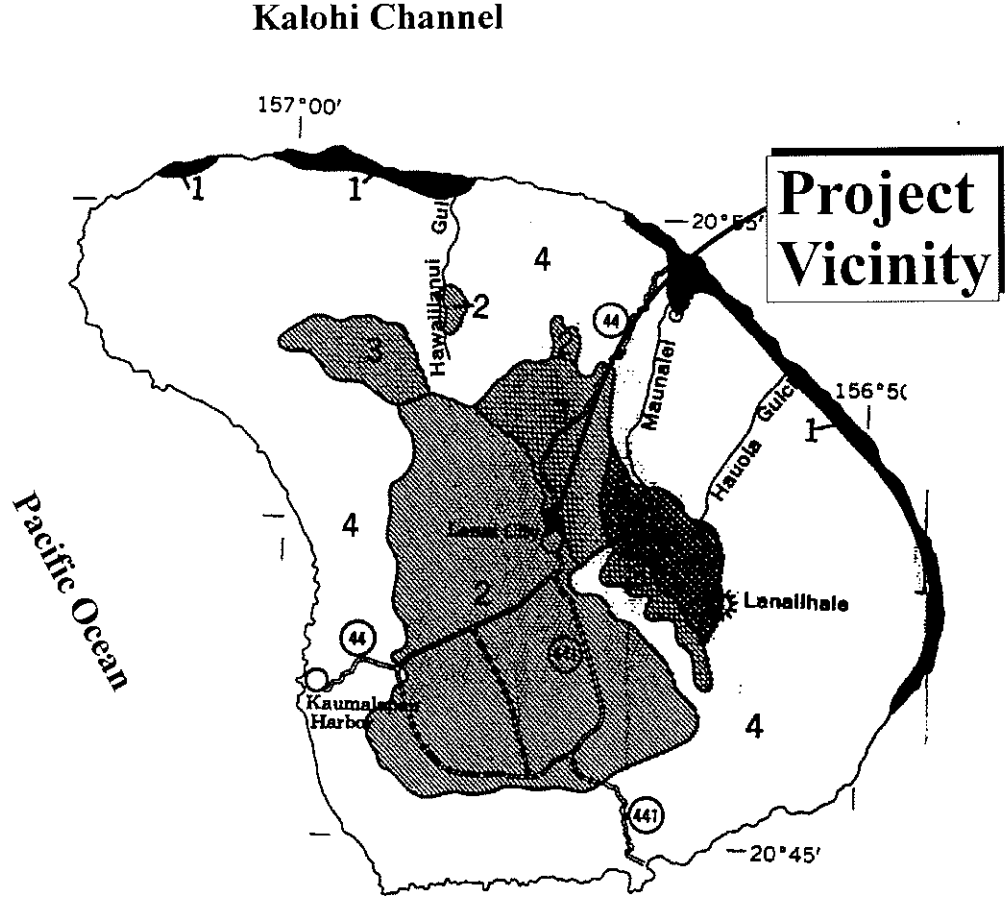

Source: USDA Soil Conservation Service

Figure 8 Proposed Lanai Affordable Housing Project

Soil Association Map

NOT TO SCALE

Prepared for: County of Maui, Dept. Of Housing and Human Concerns

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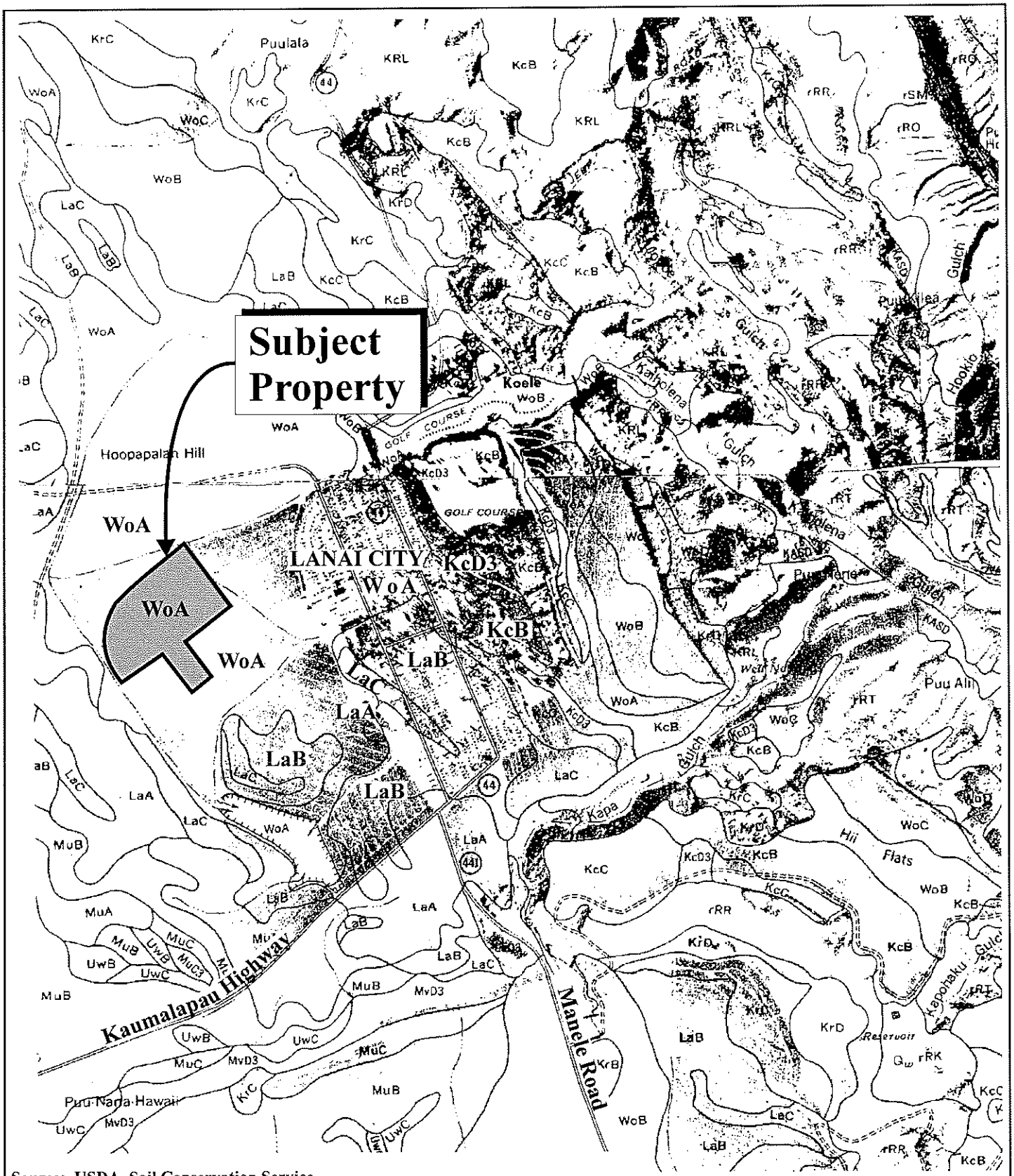
PAI/LanaiCityHousing/Soil Association Map



Source: USDA, Soil Conservation Service

Figure 9

Proposed Lanai Affordable Housing Project

Soil Classification Map

NOT TO SCALE

Prepared for: County of Maui, Dept. of Housing and Human Concerns

MUNEKIYO & HIRAGA, INC.

PAI/LanaiCityHousing/Soil Classification

The State Department of Agriculture has established three (3) categories of Agricultural Lands of Importance to the State of Hawaii (ALISH). "Prime" lands are those lands which possess the soil quality, growing season, and moisture supply needed to produce high yields of crops economically, when treated and managed according to modern farming techniques.

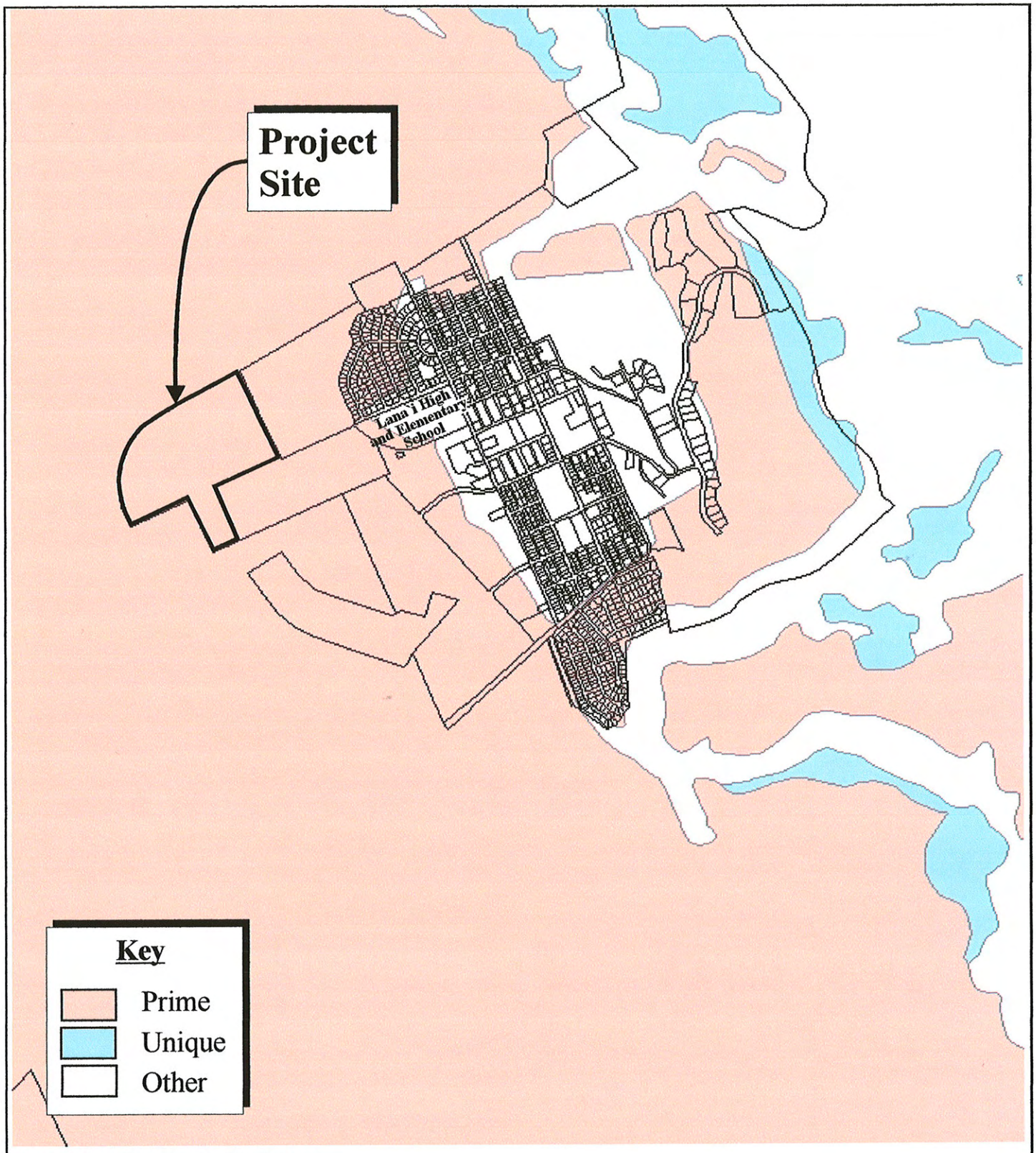
"Unique" lands have similar crop specific characteristics, while lands rated "Other" are not classified as "Prime" or "Unique", but are of Statewide or local agricultural importance. Lands not rated "Prime", "Unique", or "Other" are "Unclassified". According to the ALISH map, the lands underlying the project site are designated "Prime". See **Figure 10.**

The University of Hawaii, Land Study Bureau (LSB) developed the Overall Productivity Rating, in association with the Detailed Land Classification for the island of Lanai, which classifies soils according to five (5) levels, with "A" representing the class of highest productivity soils, and "E" representing the lowest. These letters are followed by numbers which further classify the soil types by conveying such information as texture, drainage, and stoniness.

The subject property is located on lands primarily designated as "C" by the LSB. The "C" designation reflect lands in the moderate range of productivity. The specific designation of "C6" indicates that these lands are non-stony, fine textured and moderately well-drained. See **Figure 11**.

b. <u>Potential Impacts and Proposed Mitigation</u>

The proposed project is not anticipated to have any substantial adverse impacts on climate, topography or soil conditions. Erosion control measures and Best Management Practices (BMPs) will be implemented during the construction period to minimize soil erosion and control sedimentation. An application for a National Pollutant Discharge Elimination System (NPDES) permit for construction-related activities will be submitted to the State Department of Health for review and approval as applicable.



Source: State Department of Agriculture

Figure 10

Proposed Lanai Affordable Housing Project

Agricultural Lands of Importance to the State of Hawaii

NOT TO SCALE

Prepared for: County of Maui, Dept. of Housing and Human Concerns

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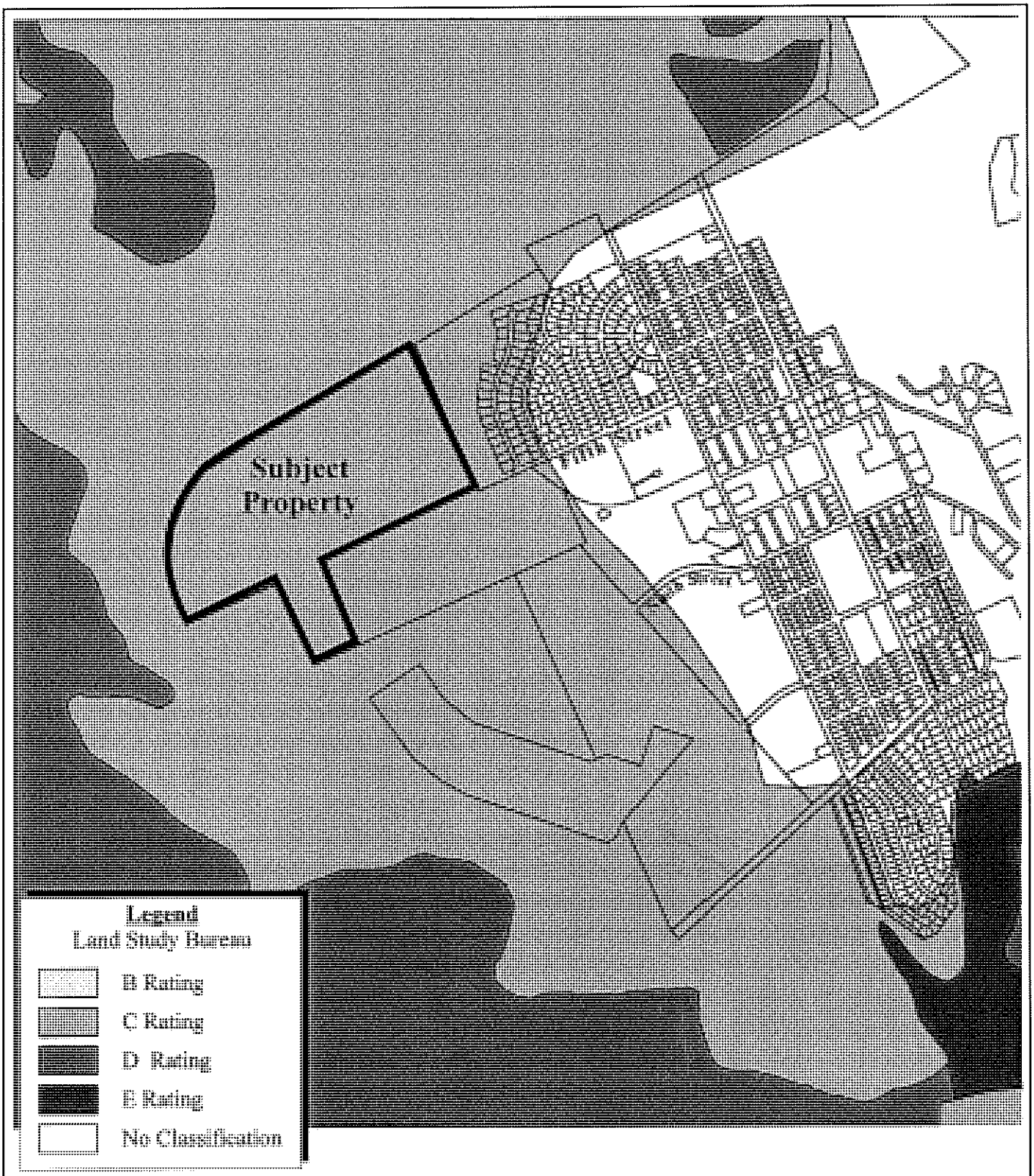


Source: Land Study Bureau, University of Hawaii

Figure 11

Proposed Lanai Affordable Housing Project

Detailed Land Classification Map

NOT TO SCALE

Prepared for: County of Maui, Dept. Of Housing and Human Concerns

MUNEKIYO & HIRAGA, INC.

PAI/LanaiCityHousing/DetailLandClass

3. Flood and Tsunami Hazards

a. Existing Conditions

The Maui County Department of Planning has indicated that a flood zone designation for the project site is unavailable as the Federal Emergency Management Agency (FEMA) has not prepared Flood Insurance Rate Maps for the island of Lanai. Lanai City is located at an elevation of approximately 1,620 feet above mean sea level (amsl). The tsunami evacuation map for this area of Lanai indicates that the project site is located beyond the limits of coastal flooding.

b. Potential Impacts and Proposed Mitigation

The use of the subject property for residential use is not anticipated to create adverse flood hazard conditions. Post-development drainage mitigation measures will be implemented to ensure that adjacent and downstream properties will not be adversely affected by the proposed action. Because the project site is located in an upland region of the island, there are no threats to the surrounding area from coastal wave action.

4. Flora and Fauna

a. Existing Conditions

The Flora and Fauna Study conducted for the property indicates that all vestiges of any native flora and fauna have since disappeared from the vicinity of the project site. The vegetation in the project area is dominated by non-native species. No endangered, threatened or candidate plant species or their habitat were found on the property. See **Appendix "B"**.

During a walk-through of the site, four (4) species of mammals were detected which included the Axis deer, mouse, cat, and horse. No evidence was found of the native Hawaiian hoary bat. Eleven non-native birds were identified within the project area. The habitat on the property is not suitable for Lanai's native forest birds or seabirds.

A range of insects were observed on the property. The host plant species for the endangered Blackburn's sphinx moth was not found on the property and no Blackburn's sphinx moths or their larvae were observed. Refer to **Appendix "B"**.

b. Potential Impacts and Proposed Mitigation

The Lanai Affordable Housing project will not have a significant negative impact on any endangered, threatened or candidate species or their habitats. However, it is recommended that any outdoor lights in the proposed project should be shielded to direct the light downward.

5. Noise and Air Quality

a. Existing Conditions

The project site does not experience adverse noise or air quality conditions. Noise and airborne pollutants that do exist can largely be attributed to noise and exhaust from occasional construction activities or vehicle traffic in the area.

b. Potential Impacts and Proposed Mitigation

Air quality impacts associated with the project include dust generated by short-term construction related activities. Site work, such as grading and grubbing as well as excavation and fill, are associated with the generation of airborne particulates. BMPs, such as regular watering and sprinkling, will be implemented to minimize fugitive dust.

In the long term, there will be no significant impacts to air quality associated with the proposed project.

As with air quality, ambient noise conditions will be impacted by construction activities. Noise from construction activities will be unavoidable during the construction period. To aid in the mitigation of noise impacts, construction activities will be conducted only during daylight hours. In addition, the use of sound attenuating equipment and

proper vehicle and equipment maintenance will be utilized, as necessary, to minimize impacts to ambient noise levels during construction.

In general, the project will not generate adverse long-term noise conditions.

6. Scenic and Open Space Resources

a. Existing Conditions

The project area is not a part of, nor does it lie within a scenic view corridor. Lanai City is located approximately 1,575 feet in elevation and stands in the shadow of Lanai Hale, Lanai's highest mountain. Norfolk pines that line the streets give the city a park-like appearance. The houses within the vicinity of the project site maintain a plantation-style architecture with neatly trimmed landscaping.

b. Potential Impacts and Proposed Mitigation

The project area is former pineapple cultivated lands located on the outskirts of the city and is not part of a scenic corridor and would not affect views from inland vantage points.

The proposed project will not alter the essential country town ambiance of the city and is consistent and compatible with existing surrounding land uses.

7. Chemical and Fertilizer Use

a. Existing Conditions

The property is agricultural lands previously used for pineapple cultivation. A visual site survey of the property and records review conducted by EnviroQuest, Inc. revealed nothing unusual to indicate any environmental concerns due to the previous agricultural use of the property or illegal dumping. There was no visible staining to indicate release of hazardous materials, nor were there any observed illegal dump sites on the property. See **Appendix "C"**.

b. Potential Impacts and Proposed Mitigation

A Phase 1 Environmental Site Assessment prepared by EnviroQuest, Inc. in conformance with accepted American Society for Testing and Materials (ASTM) standards, revealed no evidence of recognized environmental conditions in connection with the property. With implementation of the proposed Lanai Affordable Housing Project, no adverse effects to surface, underground and marine resources are anticipated. Refer to **Appendix "C"**.

8. Archaeological Resources

a. Existing Conditions

The subject property for the Lanai Affordable Housing project and the proposed extension of Fifth Street to the project site was previously disturbed during its former commercial agricultural use during pineapple cultivation. Portions of the future Ninth Street extension was also disturbed during its former commercial agricultural use.

An Archaeological Inventory Survey (AIS) has been prepared by Cultural Surveys Hawaii. See **Appendix "D"**. Results of the AIS, discussed below, revealed no significant finds.

b. Potential Impacts and Proposed Mitigation

The project site has been heavily modified by agriculture activities associated with pineapple cultivation and recent bulldozing. No surface indications of significant historic properties were identified on the project site. Due to the dense vegetation growth and low overhead shrubbery, subsurface testing of the project site was not feasible. Refer to photographs in Section 5. Previous intensive cultivation of the site indicates little to no potential for encountering *in situ* significant subsurface cultural deposits.

The AIS also studied the proposed access corridor for the future extension of Ninth Street to the project site which included subsurface testing of the undisturbed northeastern portion of the proposed access corridor. One

historic property identified as SIPH 50-40-98-6649 (6649) was identified. Site 6649 is a historic era culvert headwall likely associated with the expansion of Lanai City and development of the drainage system. Site 6649 is considered significant under Criterion D because of the potential to yield information important for understanding the history of the region. The AIS has recorded the information through location documentation, written descriptions, and photographs and no further historic preservation work is recommended.

Due to the potential for undiscovered Hawaiian stone artifacts, the AIS recommends that precautionary archaeological monitoring of the initial grubbing and grading activities associated with the proposed project will be conducted. Refer to **Appendix "D"**.

9. Historic and Cultural Resources

a. Existing Condition

A Cultural Impact Assessment was completed by Cultural Surveys Hawaii, Inc. on July 2009. See **Appendix "E"**. The project area is noted for past agricultural uses from its early historic period to the present. It is a common occurrence for Hawaiian stone artifacts such as *ulu maika*, *pohaku ma'a*, and *imu* stones to be discovered in formerly cultivated pineapple fields. According to several respondents, it is highly likely that such stone artifacts will be uncovered during development of the Lanai Affordable Housing project.

Game mammals and birds populate the island. Axis deer are known to use the project site. Lanai residents hunt as a subsistence practice which is a strong tradition in the community.

The nearby Lanai High and Elementary School is the center of community activities, such as sports, dances, and social events. Several women interviewed at the Lanai Senior Center spoke fondly of their memories of activities at the school which continues to be the center of the community. Refer to **Appendix "E"**.

b. Potential Impacts and Proposed Mitigation

According to the Cultural Impact Assessment prepared for the project, it is believed that the affordable housing project will not adversely impact traditional/cultural practices. On the contrary, some individuals consulted believe that additional affordable housing units will enhance and benefit the community. As a result of the consultation process, it was found that no traditional or cultural resources will be adversely impacted by the proposed project. Refer to **Appendix "E"**.

B. SOCIO-ECONOMIC ENVIRONMENT

1. Regional Land Use and Community Character

The island of Lanai is the sixth largest island of the populated Hawaiian Islands, with a land area of about 90,000 acres or 141.3 square miles. Of this total area, lands within the State "Agricultural" District occupy 72.9 square miles, while lands within the "Conservation" District encompass 59.7 square miles. "Urban" and "Rural" designated lands comprise 5.0 and 3.7 square miles, respectively.

Historically, Castle & Cooke, Inc. acquired more than 98 percent of the island and had established a 16,000-acre pineapple plantation surrounding its company town, Lanai City by the 1920s. For most of the 20th century, Lanai remained a plantation community. In the early 1990s, the declining profitability from pineapple cultivation resulted in a transition from an agricultural to visitor industry-based economy.

The island of Lanai is accessible by commercial inter-island flights, barge and ferry services, and private boats and aircraft. Lanai City is the island's town center and its residential and commercial core. Lanai Airport, located 3.2 miles southeast of the project site, is the island's only airport linking Lanai to Oahu and other neighbor islands. Kaumalapau Harbor is a privately owned small barge harbor located approximately seven (7) miles southwest of the property on the southwest coast of Lanai. It is the island's only commercial seaport. Fuel and commodities for the island's residents come through this harbor. The Manele Small Boat Harbor accommodates various recreational and commercial boating activities, and a daily ferry shuttle service to and from Lahaina, Maui.

Lanai's attraction to visitors is attributed to its comfortable year-round climate and its world renown, first class golf course resorts, which include The Lodge at Koele and the Manele Bay Hotel. Hotel Lanai in Lanai City also offers accommodations for visitors to the island.

2. Population and the Economy

a. Existing Conditions

The resident population of Lanai has grown steadily within the past 20 years. This gain was particularly evident during the period from 1990 to 2000 as the island's emerging visitor industry attracted new employees for its resort operations.

In 1990, the resident population of Lanai was at 2,426. In 2000, the population was 3,193, an increase of 31.6 percent (Maui County Data Book, 2008).

Growth on Lanai is expected to continue with the resident population projected to 3,735 by 2010, 4,046 by 2015 and 4,308 by 2020 (Maui Planning Department, 2006).

With its shift to a visitor industry-based economy, the island of Lanai has emerged as one of the foremost luxury golf resort destination areas in the world. Conde Nast Travel magazine has ranked in the past the Manele Bay Hotel and the Challenge at Manele number one and the Lodge and The Experience at Koele number four in golf resorts in North America and the Carribean.

The Hawaii jobless rate (seasonally adjusted) in May 2008 was 3.4 percent statewide and 5.2 percent on Lanai. In May 2009, the statewide jobless rate was 7.2 percent and 11.5 percent for Lanai, an increase of 3.8 percent and 6.3 percent, respectively (State Department of Labor and Industrial Relations Labor and Occupational Information Hawaii, 2009).

b. Potential Impacts and Proposed Mitigation

On a short-term basis, the project will support construction and construction-related employment. Accordingly, the project will have a beneficial impact on the local economy during the period of construction.

The proposed project is not anticipated to have an adverse impact upon the population. In the long-term, the proposed project will provide both direct and indirect economic benefits to the island's economy.

3. Housing

a. Existing Conditions

Currently, Lanai lacks enough resident housing affordable to the community. Although the real estate industry had been robust on Lanai before the economie downturn, much of the housing sales have been to off-island buyers seeking vacation homes primarily in Koele and Manele Resorts as evidenced by the historic condominium sales and sales prices for the island. Similarly, the median sale prices of single-family residences in recent years have been above $400,000.00 and well out of the affordable range of most residents. The scarcity of affordable housing for residents has resulted in multiple families living under one roof.

The Lanai Housing Survey conducted with the Lanai Community and interviews with individuals familiar with the housing situation on Lanai indicated the following:

- Fifty (50) single-family housing units would be appropriate for the initial phase.
- Housing demand on Lanai is directly influenced by tourism, as the hotels need more workers when it is busy.
- Many current and former Castle & Cooke employees have subsidized rent; therefore, they may not want a mortgage.
- Affordable rental units should see good demand.

- Multi-family housing units may not be as readily accepted as single-family housing units.

The preferred housing unit has been concluded to be a three-bedroom and two-bathroom single-family home, between 1,200 to 1,400 square feet in size. See **Appendix "F", Market Study**.

b. Potential Impacts and Mitigation Measures

If sales for the Lanai Affordable Housing project were to be initiated today, its absorption rate would likely be low, reflecting current economic down-side conditions. However, there are numerous pre-construction entitlement requirements that need to be addressed before any housing units could be built. While this work is being conducted, it is anticipated that the economic climate will improve. Many economists have estimated 2011 to be a possible turning point. If so, the project may be well positioned to capture a potential upswing in the real estate market, provided the entitlement process is completed by that time. Refer to **Appendix "F"**.

With the help of the Lanai Community, the first increment of the project was identified through meetings with a steering committee of Lanai residents and a community meeting. The first increment is proposed to include approximately 58 single-family lots and 23 multi-family units. It is anticipated that 15 to 20 additional units will be constructed annually after completion of the first increment.

The construction of the Lanai Affordable Housing project will enable the Island's residents to purchase or rent housing units and relieve the existing problem of multiple families living in the same unit.

C. PUBLIC SERVICES

1. Police, Fire Protection and Medical Services

a. Existing Conditions

Police and security services for island residents are provided by the Maui County Police Department (MPD). The Lanai Police Station is situated in

Lanai City and is staffed by two (2) Commanders, six (6) patrol officers, and a school resource officer.

Fire prevention, protection, and suppression services for the island of Lanai are provided by the Maui County Department of Fire and Public Safety. Located in Lanai City, the Lanai Fire Station is staffed by fire fighters on alternating work shifts and is equipped with two (2) vehicles with a storage capacity of 700 gallons per vehicle. The station is manned by three (3) Captains, six (6) drivers, and 12 firefighters.

The Lanai Community Hospital is the only major medical facility on the island. The 14-bed facility provides acute and long-term medical care, as well as 24-hour emergency medical service.

Also in Lanai City is the Lanai Health Center which provides out-patient medical care for the island's residents. In addition, air ambulance service is provided by Mercy Air Hawaii, Inc., while surface ambulance and emergency medical care services are provided by American Medical Response, Inc.

There are no adult residential care homes on the island. Persons needing long-term residential care are accommodated off-island.

b. Potential Impacts and Proposed Mitigation

Police, fire protection and medical services are not expected to be adversely impacted by the proposed project. The project will not extend existing service area limits. The project will be implemented over an anticipated 17 year horizon. The incremental increase in demand for police and fire services can be addressed through new property taxes generated by the project.

The length of time to complete the project will allow the County of Maui and State of Hawaii to plan for the incremental increase in demand for police, fire, and medical service. Such services may be funded through additional real property and income taxes attributed to the proposed action.

2. Recreational Facilities

a. Existing Conditions

Public parks and recreational facilities in Maui County are administered and maintained by the Department of Parks and Recreation (DPR). DPR parks and facilities in Lanai City include: the Lanai Community Center, the Lanai Gym and Tennis Courts, and the Lanai Little League Field, Fraser Avenue Park and Kaumalapau Highway/Fraser Avenue Park.

There are also a number of privately owned and maintained recreational facilities that are available for public use. Situated in Lanai City, Dole Park is a privately owned park utilized by the public. Additional privately owned parks utilized by the public include Waialua Park and Hulopoe Beach Park. Olopua Woods Park and Waialua Park are located in Lanai City, while Hulopoe Beach Park is situated near Manele Small Boat Harbor in the Manele Project District.

The Lanai Recreation Center is a privately owned and maintained recreational complex which is utilized by the public. The Center encompasses a heated swimming pool, basketball court, exercise track, fitness course, softball fields, recreational building, and playground.

Other privately operated recreational facilities on Lanai include two (2) 18-hole championship golf courses and a 9-hole golf course. The Experience at Koele and the Challenge at Manele adjoin The Lodge at Koele and the Manele Bay Hotel, respectively. In addition to guests, these privately operated facilities are also available for use by the public. The 9-hole Cavendish Golf Course is a privately operated facility in Lanai City which provides recreational opportunities for Lanai residents at no cost.

b. Potential Impacts and Proposed Mitigation

The master plan for the project includes two (2) park sites consisting of 2.83 acres and 2.08 acres. The 2.83-acre park site is planned to be constructed as part of the first increment of the project. The two (2) park sites will provide a recreational area for the project as well as for residents in nearby neighborhoods.

3. Educational Facilities

a. Existing Conditions

The Lanai region is served by the State Department of Education's (DOE's) public school system.

Located in Lanai City, Lanai High and Elementary School provides elementary and secondary educational facilities and services for children from kindergarten through the twelfth grade. The 2008-2009 enrollment for the school was 559 students.

b. Potential Impacts and Mitigation Measures

The project will be implemented over an anticipated 17 year horizon which allows the State of Hawaii to plan for the increase in students. The State of Hawaii is in the process of developing a Master Plan for the Lanai High and Elementary School and has funds budgeted for the first increment of the Master Plan. The County of Maui is in the process of donating 42 acres to the DOE for expansion of the school. The DHHC and DOE along with the Department of Hawaiian Home Lands (DHHL) are in discussions relative to the coordination of their master plans and infrastructure needs for their respective projects.

4. Solid Waste Disposal

a. Existing Conditions

Single-family solid waste disposal on Lanai is provided by the Maui County Department of Environmental Management (DEM) on a weekly basis, while commercial disposal service is provided by a private disposal service. Opened in 1974, the 35.67-acre Lanai landfill has approximately 30 years of remaining capacity (Source: Public Facilities Assessment Update County of Maui, 2007).

In addition, programs for recycling diverted waste, such as glass, tires, cardboard, green waste, scrap metal, used oil, newspapers, and aluminum, have been undertaken by individuals, school students, the 4-H Club, and the Castle & Cooke Resorts, LLC.

b. Potential Impacts and Proposed Mitigation

As applicable, coordination will be undertaken with the Solid Waste Division of the County Department of Environmental Management (DEM) for the disposal of construction waste for the project. In the long term, the proposed action is not anticipated to adversely impact the capacity of the existing landfill.

D. INFRASTRUCTURE

1. Roadway System

a. Existing Conditions

Vehicular access to the property is off of Fifth Avenue, a two-lane, two-way County road. Traffic circulation within the Lanai City is provided by a system of connecting streets. The Lanai Community Plan identifies a future by-pass road along the northern and western perimeter of Lanai City, connecting Kaumalapau Highway and Keomoku Road. The master plan for the project includes a future connection of Fifth Street to the proposed by-pass roadway. The master plan includes a central roadway traversing the Fifth Street extension that is proposed to connect to a future corridor that extends Ninth Street to the project area which will provide a future alternative access roadway to the project, as well as Lanai High and Elementary School.

The following are brief descriptions of the existing roadway network in the vicinity of the Project:

Fifth Street is a two-lane, east-west, County roadway. Fifth Street is a connector road that provides a link between the two (2) major north-south roadways, Lanai Avenue and Fraser Avenue. All intersections along Fifth Street, except at Lanai Avenue and Fraser Avenue, are two-way stop-controlled intersections with the intersecting streets being the stop-controlled approach. At Lanai Avenue and Fraser Avenue, it is a two-way stop-controlled intersection with Fifth Street as the stop-controlled approach.

Fraser Avenue is a two-lane, primary north-south, County roadway. All intersections are two-way stop-controlled with the intersecting streets being stop-controlled, with the exception of its intersection with Kaumalapau Highway in which Fraser Avenue is the stop-controlled approach.

Lanai Avenue is a two-lane, primary north-south, County roadway. All intersections along Lanai Avenue are two-way stop-controlled intersections with the intersecting streets being stop-controlled, with the exception of its intersection with Kaumalapau Highway in which Lanai Avenue is the stop controlled approach.

Currently, at the Fraser Avenue/Fifth Street and Lanai Avenue/Fifth Street intersections, vehicles experience minimal delays at the stop-controlled approaches.

b. Potential Impacts and Proposed Mitigation

A Traffic Impact Analysis Report (TIAR) was prepared by Austin, Tsutsumi & Associates, Inc. dated October 16, 2009. See **Appendix "G"**. The TIAR selected Year 2017 and 2026 as the base years to reflect the Project Phase I and Phase II projected completion years, respectively. Projects identified to be completed within the base years included the proposed Department of Hawaiian Home Lands (DHHL) residential subdivision and the Lanai High and Elementary School expansion.

As the population of Lanai continues to grow and housing opportunities increase, an increase in traffic volumes in Lanai City will gradually increase. According to the TIAR at buildout year 2026, it is estimated that approximately 260 trips during the AM peak hour of traffic and 326 trips during the PM peak hour of traffic will occur. The Fraser Avenue/Fifth Street intersection is projected to increase in traffic volumes approximately 260 percent during the AM and PM peak hours of traffic. Without mitigation, the Level of Service (LOS) for this intersection will reach LOS E.

The following **Table 1** shows the LOS for the project without mitigation:

Table 1. Level of Service Without Mitigation

	Existing Conditions		Year 2017				Year 2026			
	AM Peak	PM Peak	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	LOS	LOS		LOS		LOS		LOS	
Fraser Avenue/5th Street			W/O	W	W/O	W	W/O	W	W/O	W
East Bound LT/TH/RT	A	A	B	B	B	B	C	E	B	E
West Bound LT/TH/RT	B	B	B	B	B	C	C	C	C	E
Lanai Avenue/ 5th Street										
East Bound LT/TH/RT	A	A	B	B	B	B	B	B	B	B
West Bound LT/TH/RT	B	B	B	B	B	B	B	B	B	B

The TIAR analyzed mitigation measures to accommodate the increased traffic volumes. Restriping the intersection would mitigate the AM peak hour traffic volumes but would minimally improve the intersection during PM peak hour traffic. The all-way stop controlled intersection would accommodate the projected increase in traffic during both AM and PM peak hours of traffic with LOS B or better. The following **Table 2** shows the LOS for both mitigation measures:

Table 2. Level of Service With Mitigation at Fraser Avenue/Fifth Street Intersection

	AM Peak	PM Peak
With Restriped Eastbound Approach		
East Bound LT/TH	C	E
East Bound/RT	B	A
West Bound LT/TH/RT	C	E
With All-Way Stop-Control		
East Bound LT/TH	B	B
East Bound/RT	A	A
West Bound LT/TH/RT	B	B
North Bound LT/TH/RT	B	B
South Bound LT/TH/RT	B	B

The TIAR recommends that a warrant study be conducted prior to installation of an all-way stop control to verify that it is warranted at the Fraser Avenue/Fifth Street intersection at the appropriate time.

Alternatively, to accommodate the project and other known developments if the master planned bypass road with a second connection to Ninth Street can be implemented by Year 2026, a secondary connection would provide an alternate route and restriping of the eastbound approach and an all-way stop-control may not be needed.

The TIAR recommended the following by Year 2026:

1. Restripe the Fraser Avenue/Fifth Street intersection eastbound approach to provide a shared left-turn/through lane and an exclusive right-turn lane.

2. Perform an all-way stop-controlled warrant at the Fraser Avenue/Fifth Street intersection.

2. Water System

a. Existing Conditions

A Preliminary Engineering Study has been completed for the project by Okahara & Associates, Inc. See **Appendix "H"**. Domestic water service for the island of Lanai is provided by the Lanai Water Company (LWC), a privately owned utility regulated by the Public Utilities Commission. Service to the Lanai City service area consists of two (2) reservoirs: the Koele Reservoir and the Lanai City Reservoir.

The Koele Reservoir has a capacity of 0.75 million gallons (MG) and is fed by Well No. 8 and will also be fed by Well No. 3 when it is back on line. A portion of this system connects to Kaunaoa Drive serving the residences on the street, as well as the Villas at Koele. This line tees off at Ninth Street and connects to a pressure reducing valve (PRV) which is normally closed and serves as an emergency backup for Lanai City.

Another portion of this system connects to the Lalakoa Subdivision and heads away from Lanai City and eventually services the Palawai Basin and the Hii Reservoir which has a capacity of 0.5 MG. The valve to the Hii Reservoir is normally closed, and is used as an emergency backup for the reservoir.

The Lanai City Reservoir is located near the eastern edge of the Koele Project District and is fed by Well No. 6. This system provides service to the Lodge at Koele and services Lanai City through a PRV located along Ninth Street and a valve located near the Cavendish Golf Course. Under normal operating conditions, the Lanai City Reservoir will provide service to the project, with the Koele Reservoir serving as a back-up water supply. Refer to **Appendix "H"**.

The Lanai Water Advisory Committee was established by the Board of Water Supply to assist in the development of the Water Use and Development Plan. The Draft Water Use and Development Plan for Lanai

(February 1997), estimated the future demand for potable water for residential use as 0.494 million gallons per day (MGD).

b. Potential Impacts and Proposed Mitigation

The project will be serviced by extending the existing 8-inch water line on Fifth Street to the project site. Maui County regulations require that any development greater than 100 parcels need a second feed into the system. If this requirement is to be followed, the Ninth Street water line may need to be utilized as the second connection route.

The water line requirements for the project are being coordinated by DHHC, DOE, and DHHL to meet the requirements of the three (3) projects. Preliminary findings indicate that both peak hour flow and fire flow show favorable pressure and velocity values in the 8-inch water line. Refer to **Appendix "H"**.

3. Wastewater Systems

a. Existing Conditions

Wastewater on the island is treated at the County of Maui's Lanai Wastewater Treatment Facility (WWTF) located in Lanai City. The WWTF has a design capacity of 0.5 million gallon per day (MGD). The current usage is 0.297 MGD. The Lanai sewerage system is a gravity flow system serving Lanai City. The WWTF and treatment ponds are located southwest of Lanai City and provide secondary (R-2) treatment of incoming flows. The Auxiliary Wastewater Treatment Facility (AWWTF) takes the R-2 effluent from the County WWTF and treats it to R-1 quality which allows for unrestricted reuse for irrigation. The R-1 system was completed in November 1994 by Castle & Cooke Resorts, LLC and is located to the east of the County WWTF. Since the time it was put into operation, R-1 effluent has been the sole source of irrigation supply for The Experience at Koele Golf Course. The AWWTF is owned and operated privately by Castle & Cooke Resorts, LLC.

The closest sewer line to the project site is located in the Waialua Annex Subdivision and Phases 1 and 2A of the Lanai Residence Lots. This sewer

line is located on Fifth Street and consist of an 8-inch line that increases to a 10-inch diameter pipe, and increases again to a 12-inch diameter pipe that connects to the main sewer trunk line that conveys wastewater to the WWTF. The existing 8-inch sewer line is estimated at 45 percent capacity. Refer to **Appendix "H"**.

b. Potential Impacts and Proposed Mitigation

According to County of Maui regulations, when actual sewer usage exceeds 75 percent of the WWTF's capacity, an implementation plan for additional capacity needs to be performed, and when the actual usage exceeds 90 percent of capacity, the plan needs to be initiated. The projected 0.135 MGD to be generated by this project will theoretically bring the sewer usage to 0.432 MGD, or 86 percent of capacity which will require development of the implementation plan. As a project projected to take approximately 17 years to complete, this threshold will not be met in the near future and allows the County of Maui adequate time to plan for the incremental increases in sewage.

The Lanai Affordable Housing project is being targeted to existing Lanai City residents, and it is anticipated that the system sewage load will remain relatively constant. It is difficult to predict when these thresholds will be met in the projected 17 years for build-out and action needs to be taken only when actual usage exceeds these thresholds.

To accommodate the projected 0.135 MGD of sewage to be generated by the project, 8- to 10-inch PVC pipes connected to the existing 10-inch sewer line is proposed. The existing 10-inch sewer line has a capacity of approximately 2.126 MGD, and with full build-out of the proposed project 63 percent of its capacity will be utilized. Elevation differences between the existing sewer manhole and the project site will require a lift station and force main, which is planned for the first increment of the project. Refer to **Appendix "H"**.

The Lanai High and Elementary School Expansion, as well as the future phases of the Lanai Residence Lots Subdivision proposed by DHHL, will have the same lift station requirements as the project. The DHHC, DOE, and DHHL are in discussions to have one (1) sewer lift station designed to

service all three (3) projects. Discussions among the three (3) agencies involve timing, costs, and other related design and integration parameters.

4. Drainage

a. Existing Conditions

A low trough runs through the middle of the site in which nearly all of the on-site runoff generated collects and exits the site in a southeasterly direction. The runoff flows past the WWTF and collects in an area known as "Mississippi", which acts as a natural retention basin. Although Iwiole Gulch is located north of the project site, very little runoff is directed to that location. Refer to **Appendix "H"**.

Currently, off-site runoff is entering the project site from the DHHL and Lanai High and Elementary School parcels. Based on a 50-year storm occurrence, the amount of runoff currently entering the site from the DHHL and Lanai High and Elementary School parcels is approximately 24 cubic feet per second (cfs) and 14 cfs, respectively.

b. Potential Impacts and Proposed Mitigation

It is estimated that the post-development runoff from the proposed project for a 50-year, 1-hour rainfall occurrence will be approximately 137.75 cfs which equates to a one hour volume of 496,000 cubic feet (cf). To handle the estimated storm water runoff, a 4.0-acre site has been included in the project for an on-site retention basin. Based on County of Maui standards, the retention basin will be a six (6) foot deep trapezoidal basin with a top area of 3.26 acres. The basin will be able to handle the required volume, including two (2) feet of freeboard. The total volume on the basin will be 800,000 cf. The capacity of the basin exceeds the storm water volume from the project. An overflow pipe will be provided to allow any runoff exceeding this volume to discharge to the natural outfall point. Refer to **Appendix "H"**.

As the DHHL and Lanai High and Elementary School parcels are developed, off-site runoff entering the project will eventually diminish. In the interim, mitigative measures may need to be implemented in case either

or both projects are delayed. While the quantities of storm runoff is not large, it could cause roadway flooding and place extra burden on the on-site drainage structures. Ditches, berms, culverts, or a combination of these, may need to be considered to direct this runoff around the site, or allow it to pass through safely and effectively. Drainage requirements for the three (3) projects are being coordinated between DHHC, DOE, and DHHL.

5. Electrical, Telephone Systems, and Cable Television Systems

a. Existing Conditions

Electrical and telephone services on Lanai are provided by Maui Electric Company and Hawaiian Telcom, Inc., respectively. There are no electrical and telephone services to the property. Cable television service is available in Lanai City through Time Warner Cable, Cox and Charter Communications.

b. Potential Impact and Proposed Mitigation

Electrical and telephone distribution systems will be upgraded to accommodate the housing project. Cable television service will be coordinated with a local vendor. Development of the project site is not expected to adversely impact or disrupt services being provided by these utilities.

E. CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts are defined as impacts on the environment which result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. In addition to the Lanai Affordable Housing project, the DOE and DHHL are in the process of developing their master plans. Although each agency proposes to process an environmental assessment for their projects, the agencies are in discussions relative to the coordination of their master plans and infrastructure requirements. The studies prepared for the projects include the potential impacts that can be reasonably anticipated from these projects. Although the Lanai Affordable Housing project is anticipated to be completed in various phases over a 17-year period, the infrastructure requirements for total build out have been considered and will be implemented as the project progresses.

Secondary impacts are those which have the potential to occur later in time or farther in distance, but are still reasonably foreseeable. They can be viewed as actions of others that are taken because of the presence of the project. The secondary impacts associated with the proposed action relate to future infrastructure requirements, as well as public service and environmental elements which may be affected by development in the vicinity of the project. As previously noted, DHHC is in coordination with DOE and DHHL relative to each agency's master plan and infrastructure and public service requirements. Through this cooperative effort, the provision of infrastructure and public service in advance or concurrent with the development of each project is envisioned.

III. RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

III. RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

Chapter 205A, Hawaii Revised Statutes, relating to the State Land Use Commission (SLUC), establishes the four (4) major land use districts in which all lands in the State are placed. These districts have been designated "Urban", "Rural", "Agricultural" and "Conservation". The SLUC classifies the majority of lands on Lanai for "Agricultural" and "Conservation" uses. The island of Lanai encompasses a total land area of approximately 90,000 acres. Of this total area, "Agricultural" lands occupy 46,639 acres, "Conservation" lands encompass 38,197 acres, "Urban" lands comprise 3,257 acres, and "Rural" lands consist of 2,407 acres (Maui County Data Book, 2008). The lands underlying the subject property are presently designated "Agriculture". See **Figure 12**.

A State Land Use District Boundary Amendment from the "Agricultural" District to the "Urban" District will be requested as part of the entitlement requirements to bring consistency between the State Land Use District boundaries and the Lanai Affordable Housing project. Refer to **Figure 4**. This 73-acre area will contain an affordable housing component integrated with two (2) park sites, a 4.9-acre public/quasi-public site and 4.0-acre detention pond.

Criteria considered in the reclassification of lands are set forth in the State Land Use Commission Rules (Chapters 15-15-58 and 15-15-21, Hawaii Administrative Rules). The proposed reclassification of the 73 acres within the project area from "Agricultural" to "Urban" has been analyzed with respect to the criteria, as discussed below.

B. LAND USE COMMISSION RULES, CHAPTER 15-15, HAWAII ADMINISTRATIVE RULES (HAR)

The proposed reclassification of the subject property has been analyzed with respect to standards of the Urban District set forth in Chapter 15-15-18, HAR.

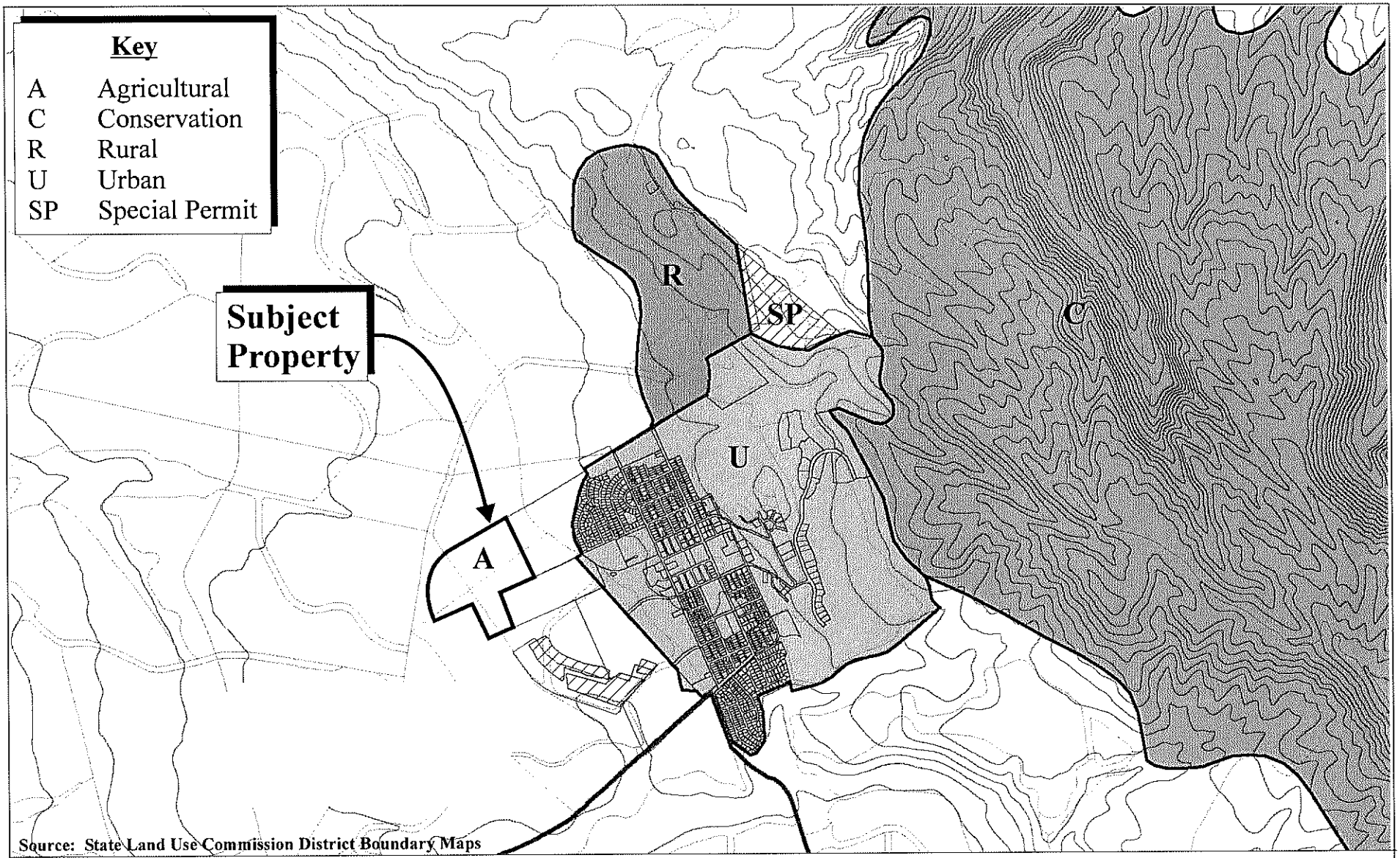


Figure 12

Proposed Lanai Affordable Housing Project

State Land Use District Classifications

NOT TO SCALE

Prepared for: County of Maui, Dept. of Housing and Human Concerns

MUNEKIYO & HIRAGA, INC.

PAI/LanaiCityHousing/SLUD

Urban District Standards (Chapter 15-15-18, HAR)

Chapter 15-15-18, HAR pertains to standards for determining Urban District Boundaries.

(1) It shall include lands characterized by "city-like" concentrations of people, structures, streets, urban level of services and other related land uses.

Response: The subdivision property is in proximity to residential subdivisions of a similar character and the Lanai High and Elementary School, with structures, streets, and services of an urban type. In this context, the subject property is in immediate proximity to developed residential and public/quasi-public areas.

(2) It shall take into consideration the following specific factors:

A. Proximity to centers of trading and employment except where the development would generate new centers of trading and employment.

Response: The area proposed for reclassification is located at the outskirts of Lanai City. The proposed Lanai Affordable Housing project will provide a residential community in close proximity to the key employment centers of Lanai City and the Koele Resort, as well as generate employment opportunities associated with home building and maintenance services.

B. Availability of basic services such as schools, parks, wastewater systems, solid waste disposal, drainage, water, transportation systems, public utilities, and police and fire protection.

Response: The area proposed for reclassification will be serviced by infrastructure and public services without creating capacity and operational constraints. Appropriate onsite and offsite infrastructure improvements will be provided by the applicant as reported in the Preliminary Engineering Report. Refer to **Appendix "H"**. The area is located in close proximity to existing roadways, such as Fraser Avenue, Fifth and Ninth Streets, and includes a planned internal system of collector and local roads.

The project area requiring reclassification will be served by neighboring Lanai High and Elementary School and facilities located in Lanai City. Fire and police protection services are also available nearby.

C. Sufficient reserve areas for foreseeable urban growth.

Response: The project site is identified on the Lanai Community Plan as future urban lands for single-family residential use.

(3) It shall include lands with satisfactory topography, drainage, and reasonably free from the danger of any flood, tsunami, unstable soil conditions, and other adverse environmental effects.

Response: The project site has satisfactory topography, drainage, and is reasonably free from the danger of any flood, tsunami, unstable soil conditions, and other adverse environmental effects.

(4) Land contiguous with existing urban areas shall be given more consideration than non-contiguous land, and particularly when indicated for future urban use on state or county general plans.

Response: The 73-acre site proposed to be reclassified is in close proximity with existing Urban district lands to the east. This area contains the Lanai High and Elementary School, Department of Hawaiian Home Lands residential subdivision and Olopua Woods Subdivision.

(5) It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on the state and county plans.

Response: This 73-acre site lies in close proximity to areas of public/quasi-public and single-family residential uses designated in the Lanai Community Plan. The Lanai Community Plan designates the project site as "Single Family". The proposed area for reclassification is in close proximity to other urban uses, which include the Lanai High and Elementary School, Department of Hawaiian Home Lands residential subdivision, and Olopua Woods Subdivision.

(6) It may include lands which do not conform to the standards in paragraphs (1) to (5):

A. When surrounded by or adjacent to existing urban development; and

B. Only when those lands represent a minor portion of this district.

Response: The area proposed for reclassification is in close proximity to existing urban development and activity. The 73 acres proposed for reclassification represent a minor portion of the 46,639 acres of Agricultural classified lands on the island of Lanai (Maui County Data Book, 2008).

(7) It shall not include lands, the urbanization of which will contribute toward scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services.

Response: The area proposed for reclassification will be implemented as an affordable housing project meeting the intent of the Lanai Community Plan for future housing. The property's location in close proximity to developed and future urban lands does not contribute to spot development or burdensome infrastructure investments.

(8) It may include lands with a general slope of twenty percent or more if the commission finds that those lands are desirable and suitable for urban purposes and that the design and construction controls, as adopted by any federal, state, or county agency, are adequate to protect the public health, welfare and safety, and the public's interest in the aesthetic quality of the landscape.

Response: The proposed affordable housing units will be developed on lands that are relatively flat with slopes ranging from flat to 10 percent. County grading regulations will be followed to ensure the protection of public health, safety and welfare.

(9) The extent to which the proposed reclassification conforms to the applicable goals, objectives, and policies of the Hawaii State Plan and relates to the applicable priority guidelines of the Hawaii State Plan and adopted functional plans.

Response: The proposal to incorporate the land uses as envisioned in the Lanai Affordable Housing project is in alignment with overall theme, goals, objectives and policies of Chapter 226, Hawaii Revised Statutes, relating to Hawaii State Planning Act. The applicable objectives, policies and priority guidelines are set forth in Section C of this Chapter.

(10) The extent to which the proposed reclassification conforms to the applicable district standards.

Response: The proposed reclassification conforms to Urban District standards as identified in Chapter 205-2 and in keeping with the Maui County General Plan.

(11) The impact of the proposed reclassification on the following areas of State concern:

A. Preservation or maintenance of important natural systems or habitats.

Response: There are no important systems or habitats within the reclassification area.

B. Maintenance of valued cultural, historical or natural resources.

Response: An archaeological inventory survey was carried out on the subject property. An archaeological monitoring plan for the property will be developed, reviewed and approved by SHPD and implemented during construction. Additionally, the Cultural Impact Assessment prepared for the project concluded that no traditional or cultural resources will be adversely impacted by the proposed action.

C. Maintenance of other natural resources relevant to Hawaii's economy, including, but not limited to, agricultural resources.

Response: The use of the subject property for affordable housing purposes will not compromise agricultural productivity for the island. The subject property has been used historically for pineapple cultivation, but is currently fallow. Moreover, other natural resources are not anticipated to be adversely affected by the proposed action.

D. Commitment of State funds and resources.

Response: The proposed reclassification will not require commitment of State funds or resources.

E. Provision for employment opportunities and economic development.

Response: The Lanai Affordable Housing project as a whole will provide new employment opportunities for Lanai residents. The residential projects will provide construction and service-related employment.

F. Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups.

Response: The Lanai Affordable Housing project as a whole will provide a variety of housing types, including affordable single-family "starter" homes and multi-family units for rent and purchase.

C. HAWAII STATE PLAN

Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive planning document which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies and priorities, as well as implementation mechanisms. The proposed Lanai Affordable Housing Project is in concert with the following goals of the Hawaii State Plan:

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social and economic well-being for individuals and families in Hawaii that nourishes a sense of community responsibility, of caring and of participation in community life.

1. Objectives and Policies of the Hawaii State Plan

The proposed reclassification is in conformance with the following objectives and policies of the Hawaii State Plan:

Chapter 226-5, HRS, Objectives and Policies for Population

226-5(b) (1), HRS: Manage population growth statewide in a manner that provides increased opportunities for Hawaii's people to pursue their physical, social and economic aspirations while recognizing the unique needs of each county.

226-5(b)(3), HRS: Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.

226-6, HRS, Objectives and Policies for the Economy—in General

226-6 (b)(6), HRS: Strive to achieve a level of construction activity responsive to, and consistent with, State growth objectives.

226-11, HRS, Objectives and Policies for the Physical Environment—Land-based, Shoreline and Marine Resources

226-11 (a)(2), HRS: Effective protection of Hawaii's unique and fragile environmental resources.

226-11 (b)(3), HRS: Take into account the physical attributes of areas when planning and designing activities and facilities.

226-11(b)(8), HRS: Pursue compatible relationships among activities, facilities and natural resources.

226-12, HRS, Objectives and Policies for the Physical Environment—Scenic, Natural Beauty and Historic Resources

226-13(b)(5), HRS: Encourage the design of developments and activities that complement the natural beauty of the islands.

226-13, HRS, Objectives and Policies for the Physical Environment—Land, Air and Water Quality

226-13(b)(2), HRS: Promote the proper management of Hawaii's land and water resources.

226-13(b)(6), HRS: Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.

226-13(b)(7), HRS: Encourage urban developments in close proximity to existing services and facilities.

226-19, HRS, Objectives and Policies for Socio-Cultural Advancement—Housing

226-19(a)(2), HRS: The orderly development of residential areas sensitive to community needs and other land uses.

226-19(b)(1), HRS: Effectively accommodate the housing needs of Hawaii's people.

226-19(b)(3), HRS: Increase homeownership, rental opportunities and choices in terms of quality, location, cost, densities, style and size of housing.

226-19(b)(5), HRS: Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.

226-19(b)(7), HRS: Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the culture and values of the community.

Chapter 226-23, HRS, Objectives and Policies for Socio-Cultural Advancement—Leisure

226-23(b)(4), HRS: Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.

2. **Priority Guidelines of the Hawaii State Plan**

The proposed action is in keeping with the following priority guidelines of the Hawaii State Plan:

Chapter 226-103, HRS, Economic Priority Guidelines:

226-103(1), HRS: Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.

A. Encourage investments which:

(i) Reflect long-term commitments to the State;

(ii) Rely on economic linkages within the local economy;

(iii) Diversify the economy;

(iv) Reinvest in the local economy;

(v) Are sensitive to community needs and priorities; and

(vi) Demonstrate a commitment to management opportunities to Hawaii residents.

Chapter 226-104, HRS, Population Growth and Land Resources Priority Guidelines

226-104(a)(1), HRS: Encourage planning and resource management to ensure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people.

226-104(b)(1), HRS: Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.

226-104(b)(2), HRS: Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

226-104(b)(12), HRS: Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline conservation lands, and other limited resources for future generations.

Chapter 226-106, HRS, Affordable Housing Priority Guidelines

226-106(1), HRS: Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.

226-106(8), HRS: Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.

D. STATE FUNCTIONAL PLANS

The State Functional Plans implement the Hawaii State Plan by identifying needs, problems and issues, and by recommending policies and priority actions which address the identified areas of concern. The proposed reclassification request is consistent with the following State Functional Plans:

1. State Agricultural Functional Plan

The proposed action will reclassify approximately 73 acres of land from the State Agricultural district to the State Urban district. Agricultural pursuits associated with

pineapple cultivation are no longer economically viable. The proximity of the subject property to existing and planned urban land uses provide a reasonable nexus and an appropriate foundation for the proposed reclassification request, particularly in the context of meeting affordable housing needs of the Lanai community.

2. State Housing Functional Plan

The growing public demand for affordable housing indicate a current shortage of single-family and multi-family housing on Lanai. The affordable housing units proposed by the project will help to address a critical community need.

3. State Recreational Functional Plan

Outdoor recreation is recognized by the Hawaii State Plan as an important part of life for Hawaii's residents. As the population rises and residential land uses increase, creating areas dedicated to outdoor recreation becomes increasingly vital. The State Functional Plan for Recreation urges the improvement and expansion of recreational facilities in urban areas and local communities. The proposed action for the affordable housing project includes provisions to provide two (2) park sites and a public/quasi-public site for a community center to address tbis need.

E. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As indicated by the Maui County Charter, the purpose of the general plan shall be to:

> *... indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density; land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.*

The Maui County General Plan developed five (5) major themes that focus on the overall goals of the plan. These themes were devised to reflect the general scope and priorities of the Maui County General Plan. The proposed project responds to the following theme:

Theme Number 5

Provide for needed resident housing:

- Amendments to the General Plan address the development of resident housing as a major social need in our community.

The proposed action is in keeping with the following General Plan objectives relating to population, land use, economic activity, housing and urban design:

POPULATION

Objective

To plan the growth of resident and visitor population through a directed and managed growth plan so as to avoid social, economic and environmental disruptions.

Policies

a. Manage population growth so that the County's economic growth will be stable and the development of public and private infrastructures will not expand beyond growth limits specified in the appropriate community plans or negatively impact our natural resources.

b. Balance population growth by achieving concurrency between the resident employee work force, the job inventory created by new industries, affordable resident/employee housing, constraints on the environment and its natural resources, public and private infrastructure, and essential social services such as schools, hospitals, etc.

LAND USE

Objective

1. To preserve for present and future generations existing geographic, cultural and traditional community lifestyles by limiting and managing growth through environmentally sensitive and effective use of land in accordance with the individual character of the various communities and regions of the county.

Policies

a. Provide and maintain a range of land uses districts sufficient to meet the social, physical, environmental and economic needs of the community.

Objective

2. To use the land within the County for the social and economic benefit of all the County's residents.

Policies

a. Encourage land use patterns that foster a pedestrian oriented environment to include such amenities as bike paths, linear parks, landscaped buffer areas and mini-parks.

b. Encourage land use methods that will provide a continuous balanced inventory of housing types in all price ranges.

c. Encourage programs to stabilize affordable land and housing prices.

ECONOMIC ACTIVITY (General)

Objective

Utilize an equitable growth management program which will guide the economic well-being of the community.

Policies

a. Encourage the adoption of a resource allocation program which gives a high priority to affordable residential projects.

HOUSING

Objective

To provide a choice of attractive, sanitary and affordable homes for all our residents.

Policies

a. Provide or require adequate physical infrastructure to meet the demands of present and planned future affordable housing needs.

b. Encourage the construction of housing in a variety of price ranges and geographic locations.

c. Encourage the use of innovative performance standards and building methods to reduce housing costs to the consumer.

d. Streamline or "fast-track" the governmental review process for affordable single-family housing projects.

e. Make full use of State and Federal programs that provide financial assistance to renters and homebuyers.

f. Ensure that each community plan region contains its fair share of affordable housing.

URBAN DESIGN

Objective

To encourage development that reflects the character and culture of Maui County's people.

Policies

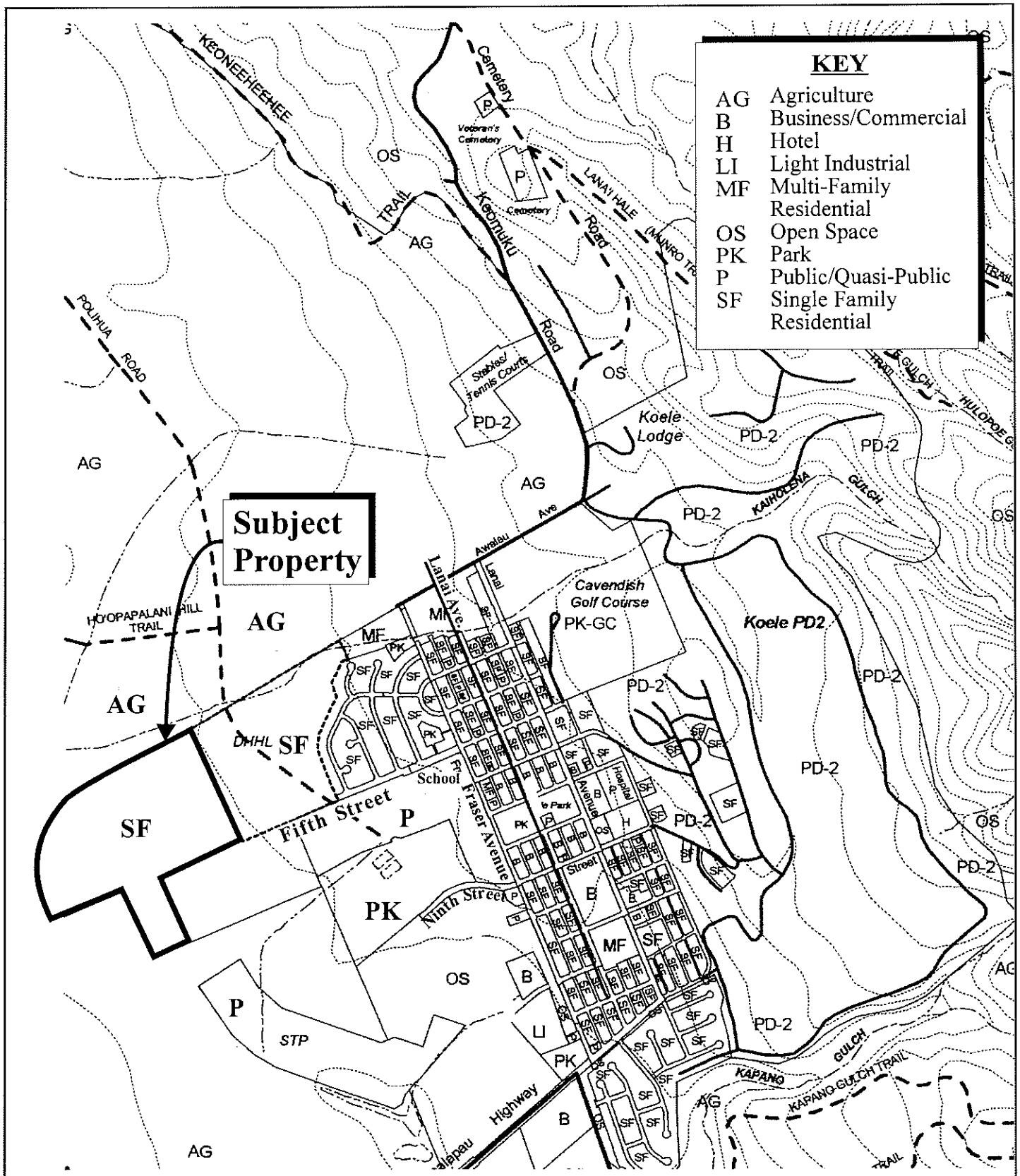
a. Encourage community design that establishes a cohesive identity.

b. Encourage the establishment of continuous green areas, bike-paths, active and passive recreation areas and mini-parks in new subdivision development.

F. LANAI COMMUNITY PLAN

The project site is located in the Lanai Community Plan region, one (1) of the nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns, and characteristics of future development in the region.

Land use guidelines are established by the Lanai Community Plan land use map. The subject property is designated for "Single-Family" use. See **Figure 13**. One of the problems identified in the Community Plan is a need to provide a range of affordable housing opportunities, the lack of inventory, high cost of renting, and the limited choice of housing choices.



Source: Lana`i Community Plan Map

Figure 13

Proposed Lanai Affordable Housing Project

Community Plan Designations Map

0 750 Feet 375 1800

Prepared for: County of Maui, Dept. of Housing and Human Concerns

MUNEKIYO & HIRAGA, INC.

PA\LanaiCityHousing\Community Plan Designation

The Lanai Community Plan sets forth goals, objectives and policies which are statements identifying preferred future conditions. Goals, objectives and policies associated with the proposed use of the subject property include the following:

LAND USE

Goal

Maintain and enhance Lanai's rural atmosphere, respecting its vast open space character and small island town environment which are unique in the State of Hawaii.

Objectives and Policies

- Limit State Urban District boundary expansion to areas which are designated for urban uses on the Lanai Community Plan Land Use map.
- Recognize and respect the Community Plan land use map as an expression of residents' needs and desires.
- Provide an adequate supply of aecessible fee-simple lands designated for residential use to address the housing needs of local residents.
- Provide for a mix of multi-family land use and single-family land use designations, sensitively integrated to provide a range of housing opportunities for Lanai residents.

CULTURAL RESOURCES

Goal

Identify, preserve, and where appropriate, restore and promote cultural resources and practices which reflect the rich and diverse heritage found on Lanai.

Objectives and Policies

- Recognize the importance of historically and archaeologically sensitive sites and encourage their preservation.

URBAN DESIGN

Goal

Preserve and enhance the unique urban design character of Lanai through consideration of planning, land use and design standards which respect the island's rural plantation history.

Objectives and Policies

- Establish design standards in the commercial/civic center area of Lana'i City to provide special treatment in the maintenance and/or enhancement of the unique visual and physical identity of the town. Design standards should be based on the following guidelines:
    - Maintain the existing scale and street layout pattern of Lanai City.
- Encourage the use of wood construction for residential and commercial projects.
- Minimize urban design restrictions for single family residential projects.
- Maintain existing road rights-of-way within Lanai City.
- Encourage the development and utilization of subdivision and roadway design criteria and standards which are compatible with the rural character of Lanai.
- Promote the appropriate use of street lighting to ensure public safety and to preserve the rural ambiance of Lanai.
- Utilize strategically placed and designed neighborhood parks as a key element in preserving the unique design character of Lanai.
- Ensure that proposed land use patterns in Lanai City will preserve and complement the existing town design qualities.

PHYSICAL INFRASTRUCTURE

Goal

Provide adequate, reliable and well-designed public infrastructure systems in a timely fashion to meet the social, economic and public safety and welfare needs of the Lanai community.

Transportation

Objectives and Policies

- Support and construct a paved by-pass road along the northern and western perimeter of Lanai City, connecting Kaumalapau Highway and Keomoku Road.

- Establish safe pathways connecting schools, recreation facilities, and commercial and residential areas for use by walkers, joggers and bicyclists.

Water

Objectives and Policies

- Encourage and support comprehensive planning and management of Lanai's water resources, consistent with the Water Use and Development Plan for Lanai as approved by law, to ensure long-term economic stability and diversification, and sufficient water allocated for, but not limited to:

    a. the agricultural park;

    b. the Hawaiian Home Lands;

    c. those lands designated for affordable housing;

    d. the community gardens; and

    e. the Lanai Horse Owner's Association paddock.

Housing

Goal

Provide for the housing needs of all Lanai residents in order to ensure a healthy and vibrant social and economic environment.

Objectives and Policies

- Provide sufficient land area in appropriate areas to promote the development of affordable housing and elderly care homes for Lanai residents.

- Support self-help housing as a means of addressing affordable housing needs for Lanai residents.

- Recognize and address the social implications associated with the lack of decent and affordably priced housing.

- Provide housing types which are consistent with Lanai's rural community lifestyle.

SOCIAL INFRASTRUCTURE

Goal

Provide a public facilities and services system which is responsive to the needs of Lanai's rural island environment and lifestyle.

Recreation

Objectives and Policies

- Provide neighborhood parks which serve a variety of needs, including, but not limited to, active play fields and passive areas which may be used for community gardens.

G. COUNTY ZONING

The proposed affordable housing site is zoned "Interim" by Maui County zoning. While the current zoning does not allow for the proposed Lanai Affordable Housing project, the Section 201H-38, HRS application, which will be filed with the Maui County Council, will include an exemption from the County's Title 19 zoning provisions which would allow for the proposed project.

When evaluated based on the housing shortage that exists on Lanai, coupled with the scarcity of entitled, undeveloped residential lands on Lanai island, the conversion of the project's County designated interim lands into residential development presents a beneficial opportunity. The expansion of the urban district boundary in Lanai City will allow residential use and supply additional housing units at a site deemed less than optimal for sustained, long-term agricultural use.

H. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

As set forth in Chapter 205A, HRS, this section addresses the project's relationship to applicable coastal zone management considerations. It is noted that the project site is not located within the County's Special Management Area or SMA.

1. Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

a. Improve coordination and funding of coastal recreational planning and management; and

b. Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

i. Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

ii. Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;

iii. Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

iv. Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

v. Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

vi. Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

vii. Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

viii. Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.

Response: The proposed project will not affect access to the shoreline as it is not a shoreline property, nor is it in the near vicinity of the island's shoreline.

2. **Historic Resources**

Objective: Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

a. Identify and analyze significant archaeological resources;

b. Maximize information retention through preservation of remains and artifacts or salvage operations; and

c. Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: An archaeological inventory survey has been conducted within the subject property. Archaeological monitoring will be carried out during ground altering activities. Should cultural materials be found during construction, work shall stop in the area of the find and the State Historic Preservation Division shall be notified to determine appropriate mitigation measures. It is further noted that the Cultural Impact Assessment prepared for the project concludes that no traditional or cultural resources will be adversely impacted by the proposed action. Refer to **Appendix "E"**.

3. **Scenic and Open Space Resources**

Objective: Protect, preserve, and, where desirable, restore, or improve the quality of coastal scenic and open space resources.

Policies:

a. Identify valued scenic resources in the coastal zone management area;

b. Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

c. Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

d. Encourage those developments that are not coastal dependent to locate in inland areas.

Response: The proposed project will be developed to ensure visual compatibility with the surrounding environs. The project site is not a shore-fronting property. The proposed project is not anticipated to negatively impact coastal and scenic open space resources.

4. **Coastal Ecosystems**

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

a. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

b. Improve the technical basis for natural resource management;

c. Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

d. Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

e. Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: Proposed improvements to the subject property are not expected to adversely impact coastal ecosystems. Drainage improvements will be engineered to meet County standards. Drainage improvements will also be designed to include a detention basin for storm water runoff. Mitigative measures for soil erosion control will be implemented during and after construction. Storm water runoff will be captured in drainage systems to minimize adverse impacts to adjacent and downstream properties.

5. **Economic Uses**

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

a. Concentrate coastal dependent development in appropriate areas;

b. Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

c. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

   i. Use of presently designated locations is not feasible;

   ii. Adverse environmental effects are minimized; and

   iii. The development is important to the State's economy.

Response: The proposed housing project is located in Lanai City and is not a coastal dependent development.

6. **Coastal Hazards**

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.

Policies:

a. Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidenee, and point and nonpoint source pollution hazards;

b. Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;

c. Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

d. Prevent coastal flooding from inland projects.

Response: The subject property is not located in any tsunami, flood, erosion, or subsidence area. The master plan for the project includes a 4.0-acre detention pond to reduce point and non-point pollution from storm water runoff.

7. **Managing Development**

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

a. Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

b. Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

c. Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: Opportunities for public review and consideration of the proposed action is provided through the EA, 201H-38 and State District Boundary Amendment processes. In this connection, DHHC presented an overview of the project to the Lanai Planning Commission on February 18, 2009. The Lanai Planning Commission recommended that the Lanai Community be involved in the planning for the project. The project team assembled a steering committee of Lanai residents to obtain initial

input from the community on preliminary plans for the project. Based on the comments of the steering committee, the preliminary plans were revised and phasing of the first increment was developed. The revised plans and first increment were presented to the Lanai community at a community meeting held on June 16, 2009. At the community meeting the Lanai community expressed their support of the revised plans presented.

8. Public Participation

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

a. Promote public involvement in coastal zone management processes;

b. Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

c. Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: Opportunities for public awareness, education, and participation pertaining to significant resources attributes of the coastal zone are provided through the EA, 201H-38 and State District Boundary Amendment processes. As noted above, meetings with community members have been initiated as part of the project planning process.

9. Beach Protection

Objective: Protect beaches for public use and recreation.

Policies:

a. Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

b. Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

c. Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The proposed project is situated inland, away from the shoreline and no adverse effect on beach processes is anticipated. Appropriate Best Management Practices (BMPs) will be implemented to mitigate storm water runoff associated with the project and to ensure that downstream and adjoining properties will not be adversely affected.

10. Marine Resources

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

a. Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

b. Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

c. Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

d. Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

e. Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: The proposed project is not located on or near the shoreline and is not anticipated to adversely affect marine resources.

In addition, to the foregoing objectives and policies, SMA permit review criteria pursuant to Act 224 (2005) provides that:

> *No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights uses for decorative or aesthetic purposes when the light:*
>
> *(1) Directly illuminates the shoreline and ocean waters; or*
>
> *(2) Is directed to travel across property boundaries toward the shoreline and ocean waters.*

Response: The project site is located in Lanai City, a significant distance from the shoreline. No impacts on the shoreline or ocean waters will occur. The project will comply with applicable requirements of the County's Outdoor Lighting Ordinance.

IV. ALTERNATIVES TO THE PROPOSED ACTION

IV. ALTERNATIVES TO THE PROPOSED ACTION

A. MASTER PLAN ALTERNATIVES

The master plan formulation process involved a study of topographic conditions to recognize drainage constraints, as well as access connection considerations to ensure that an appropriate and viable long-term circulation pattern could be assured. Similarly, the relationship of the 73-acre property to the adjacent DHHL subdivision and DOE school site were considered to provide required connectivity among the three (3) parcels. The master plan concepts also involved the study of spatial delineations and relationships among the residential components and park, public/quasi-public, and drainage functions of the site. Basic plan components were compiled and organized for presentation to a steering committee comprised of Lanai residents. The steering committee worked with the DHHC, project architect, civil engineer, and project planner to develop a plan which best met the needs of the local community.

The plan presented in Chapter I of this report represents the plan developed in coordination with the steering committee, with the concurrence of the general community, as discussed at the community meeting held on June 16, 2009.

B. NO ACTION ALTERNATIVE

This alternative means the property which was transferred to the County of Maui as part of a zoning condition placed on Castle & Cooke Resorts, LLC in 1992 for housing purposes will continue to remain vacant. Under this alternative scenario, the current lack of affordable housing will continue to remain a problem on Lanai island.

C. DEFERRED ACTION ALTERNATIVE

This alternative would yield the same result as the No Action Alternative.

V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed project may result in unavoidable construction-related impacts which include noise generated impacts occurring from the proposed improvements. In addition, there may be temporary air quality impacts associated with dust generated from site work and exhaust emissions discharged by construction equipment. These impacts will be mitigated by erosion control measures and Best Management Practices (BMPs) to minimize dust and erosion control. Construction of the proposed project will be carried out in compliance with applicable State Department of Health Community Noise control standards.

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project will result in the irreversible and irretrievable commitment of certain natural and fiscal resources. Major resource commitments include the land on which the project will be developed, as well as fuel, labor, funding, and material resources. Impacts relating to the use of these resources should be weighed against the expected positive socio-economic benefits to be derived from the project versus the consequences of taking no action.

The commitment of resources required for the development of the project includes building materials and labor, both of which are non-renewable and irretrievable. The proposed project will require a commitment for government services or facilities. In general, the proposed action will place additional requirements upon public services and infrastructure. However, these commitments will enable the County of Maui to provide much needed affordable housing to the Lanai community. There are no other irreversible commitment of resources associated with the proposed action.

VII. SIGNIFICANCE CRITERIA ASSESSMENT

VII. SIGNIFICANCE CRITERIA ASSESSMENT

Since the proposed action is on County lands and County funds would be utilized, an Environmental Assessment (EA) has been prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS), and Chapter 200 of Title 11, Administrative Rules of the State Department of Health.

Every phase of the proposed action, expected consequences, both primary and secondary, and the cumulative, as well as the short-term and long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Administrative Rules. Based on the analysis, the proposed project is not anticipated to result in any significant impacts. Discussion of project conformance to the criteria is noted as follows:

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

   Lands bordering the project are vegetated vacant former pineapple lands or contain ornamental landscaping typical of residential communities and public school sites. No wetlands will be impacted by the proposed action.

   From an archaeological standpoint, the lands underlying and immediately surrounding the project site have been previously altered during past pineapple cultivation. An archaeological monitoring plan for the property will be developed, reviewed and approved by SHPD and implemented during construction.

   According to the Cultural Impact Assessment prepared for the project (refer to **Appendix "E"**), no traditional or cultural resources will be adversely impacted by the proposed affordable housing project.

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

   The project encompasses lands which are designated for single-family residential use in the Lanai Community Plan. The proposed action also includes multi-family uses and uses to support the residential component. As a proposed 201H-38 Affordable Housing project, Maui County Council (Council) review and approval is required. Any approval by the

Council will ensure it is beneficial to the environment, and that it meets the needs of its Lanai citizens.

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

The State Environmental Policy and Guidelines are set forth in Chapter 344, HRS. The proposed action is in consonance with the following policies and guidelines:

Environmental Policy:

Enhance the quality of life by:

(C) Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian.

Guidelines:

Land, water, mineral, visual, air, and other natural resources.

(F) Maintain an integrated system of state land use planning which coordinates the state and county general plans.

Community life and housing.

(A) Foster lifestyles compatible with the environment; preserve the variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods which reflect the culture and mores of the community;

(B) Develop communities which provide a sense of identity and social satisfaction in harmony with the environment and provide internal opportunities for shopping, employment, education, and recreation;

(D) Foster safe, sanitary, and decent homes;

(E) Recognize community appearances as major economic and aesthetic assets of the counties and the State; encourage green belts, plantings, and landscape plans and designs in urban areas; and preserve and promote mountain-to-ocean vistas.

Citizen participation.

(B) Provide for expanding citizen participation in the decision making process so it continually embraces more citizens and more issues.

4. **Substantially affects the economic welfare, social welfare and cultural practices of the community or State**

The proposed project will directly benefit the local economy by providing construction and construction-related employment. The proposed project will also have a beneficial effect upon the socio-economic fabric of the community by providing single-family and multi-family affordable housing on Lanai island.

Although the property is used for limited traditional and cultural practices (hunting), the affordable housing will not adversely affect these practices. The hunting practices in the project area will continue in other areas of the island.

5. **Substantially affects public health**.

No adverse impacts to the public's health and welfare are anticipated. Further, the provision of single-family and multi-family housing affordable to the Lanai community will help to alleviate over-crowding experienced in existing housing units.

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

No significant population changes are anticipated as a result of the proposed project. The project is to provide affordable housing to the existing Lanai community. As may be necessary, the DHHC will coordinate infrastructure improvements with County of Maui agencies, the Department of Education (DOE), and Department of Hawaiian Home Lands (DHHL).

7. **Involves a substantial degradation of environmental quality**

Construction activities will create temporary short-term nuisance related to noise and dust. Appropriate dust control and noise mitigation measures will be implemented during construction activities.

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

The proposed project is being coordinated with the State of Hawaii's planned expansion of the Lanai High and Elementary School and the DHHL regional master plan. Preliminary discussions have been held to determine infrastructure needs for the three (3) projects, coordination of the improvements, and opportunities for cost sharing.

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

Rare, threatened or endangered species of flora, fauna, avifauna or their habitats are not expected to be impacted by the proposed project. The subject property is former pineapple cultivated land. A flora and fauna survey assessment of the property was prepared and no rare, threatened, or endangered species were identified. Refer to **Appendix "B"**.

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

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, and erection of dust screens will be implemented to minimize wind-blown emissions. Further, a detention basin will be constructed to handle any increase in storm water runoff and appropriate Best Management Practices (BMPs) will be utilized to reduce impacts on water quality from storm water runoff and its effects on adjacent and downstream properties, as well as any runoff that may exit into gulches and streams and eventually into the ocean. Short-term noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as well as proper equipment and vehicle maintenance, are anticipated to mitigate noise from construction activities. There are no long-term impacts on air, water, or ambient noise levels anticipated after construction has been completed.

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

The proposed project is not located in an environmentally sensitive area and is not anticipated to adversely impact fresh or coastal waters.

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

The proposed project will not affect scenic and open space resources and will not affect scenic viewplanes.

13. **Requires substantial energy consumption**

The proposed project will involve the commitment of fuel from construction equipment, vehicles, and machinery during construction activities. As a new housing project, additional energy consumption will result from the occupancy of the units. Coordination with Maui Electric Company will be undertaken to ensure that electrical power requirements for the project can be addressed in a timely manner.

Based on the foregoing findings, it is concluded that the proposed action is not anticipated to result in any significant impacts. Accordingly, this Draft Environmental Assessment is being processed in anticipation of a Finding of No Significant Impact (FONSI).

VIII. LIST OF PERMITS AND APPROVALS

VIII. LIST OF PERMITS AND APPROVALS

The following approvals will be required prior to implementation of the project:

State of Hawaii

1. State Section 201H-38 District Boundary Amendment

2. State Department of Health

    a. National Pollutant Discharge Elimination Permit, as applicable

    b. Noise Permit, as applicable

County of Maui

1. Section 201H-38, HRS Approval

2. Subdivision Approval

3. Construction Permits (grading permit, building permit)

IX. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED; AND RESPONSES TO SUBSTANTIVE COMMENTS

IX. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED; AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during preparation of the Draft Environmental Assessment (EA). Agency comments and responses to substantive comments are indicated herein:

1. Larry Yamamoto, State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850-0001

2. Ranae Ganske-Cerizo, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
700 Hookele Street, Suite 202
Kahului, Hawaii 96732

3. George Young
Chief, Regulatory Branch
U.S. Department of the Army
U.S. Army Engineer District, Honolulu
Regulatory Branch
Building 230
Fort Shafter, Hawaii 96858-5440

4. Gordan Furutani, Field Office Director
U. S. Department of Housing and Urban Development
500 Ala Moana Boulevard, Suite 3A
Honolulu, Hawaii 96813-4918

5. Patrick Leonard
Field Supervisor
U. S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122
Box 50088
Honolulu, Hawaii 96813

6. Russ K. Saito, State Comptroller
Department of Accounting and General Services
1151 Punchbowl Street, #426
Honolulu, Hawaii 96813

7. Sandra Lee Kunimoto, Chair
Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814-2512

8. Karen Seddon
Executive Director
Hawaii Housing Finance and Development Corporation
677 Queen Street
Honolulu, Hawaii 96813

9. Theodore E. Liu, Director
State of Hawaii
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawaii 96804

10. Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

11. Heidi Meeker
Planning Division
Office of Business Services
Department of Education
c/o Kalani High School
4680 Kalanianaole Highway, #T-B1A
Honolulu, Hawaii 96821

cc: Lindsay Ball, Complex Area Superintendent (Lanai/Molokai/ Hana/Lahaina)

12. Micah Kane, Chairman
Department of Hawaiian Home Lands
P. O. Box 1879
Honolulu, Hawaii 96805

13. Chiyome Fukino, M.D., Director
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

14. Alec Wong, P.E., Chief
Clean Water Branch
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

15. Herbert Matsubayashi
District Environmental Health
Program Chief
State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

16. Laura Thielen, Chairperson
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

17. Dr. Puaalaokalani Aiu, Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

18. **Maui/Lanai Islands Burial Council**
130 Mahalani Street
Wailuku, Hawaii 96793

19. Brennon Morioka, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

cc: Fred Cajigal

20. Major General Robert G.S. Lee, Director
Hawaii State Civil Defense
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

21. Katherine Kealoha, Director
Office Of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawaii 96813

22. Haunani Apoliona, Board of Trustees Chair
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

23. Mary Lou Kobayshi, Planning Program Administrator
State of Hawaii
Office of Planning
P.O. Box 2359
Honolulu, Hawaii 96804

24. Charmaine Tavares, Mayor
County of Maui
200 South High Street
Wailuku, Hawaii 96793

25. Deidre Tegarden, Director
County of Maui
Office of Economic Development
2200 Main Street, Suite 305
Wailuku, Hawaii 96793

26. Gen Iinuma, Administrator
Maui Civil Defense Agency
200 South High Street
Wailuku, Hawaii 96793

27. Jeffrey A. Murray, Fire Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawaii 96732

28. Tamara Horcajo, Director
County of Maui
Department of Parks and Recreatiou
700 Halia Nakoa Street, Unit 2
Wailuku, Hawaii 96793

29. Jeffrey Hunt, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

30. Thomas Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

31. Milton Arakawa, Director
County of Maui
Department of Public Works
200 South High Street
Wailnku, Hawaii 96793

32. Cheryl Okuma, Director
County of Maui
Department of Environmental Management
One Main Plaza
2200 Main Street, Suite 100
Wailuku, Hawaii 96793

33. Jeffrey Eng, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

34. Sol Kahoohalahala, Councilmember
Mani Conuty Council
200 South High Street
Wailuku, Hawaii 96793

35. Danny Mateo, Council Chair
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

36. **Hawaiian Telcom**
60 South Church Street
Wailuku, Hawaii 96793

37. Greg Kauhi, Manager, Customer Operations
Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96733

38. **ILWU Local 142**
896 Lower Main Street
Wailuku, Hawaii 96793

40. **Lanai Community Association**
735 Lanai Avenue 108
Lanai City, Hawaii 96763

41. **Lanai Seniors**
c/o Maggie Masicampo (County)
Margaret Ann Mascicampo
P.O. Box 630867
Lanai City, Hawaii 96763

42. **Lanai Community Hospital**
P.O. Box 630650
625 Seventh Street
Lanai City, Hawaii 96763

43. **Hawaii Governnent Employees Association**
Maui Division Office
2145 Kaohu Street
Wailuku, Hawaii 96793-2257

44. Dayton M. Nakanelua, State Director
United Public Workers
1426 North School Street
Honolulu, Hawaii 96817-1914

45. **United Public Workers**
Maui Division
841 Kolu Street
Wailuku, Hawaii 96793-1436

46. **Lanai Retail Merchants Association**
Len Gambla
c/o Ohana Pottery
Lanai City, Hawaii 96763

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
P.O. Box 5004 Rm. 4-118
Honolulu, HI 96850
808-541-2600

March 17, 2009

Ms. Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms Suyama,

Thank you for providing the NRCS the opportunity to review the early consultation on 201-H Lana`i Housing Project in Lana`i City Hawaii. Please find enclosed the NRCS Soil Survey Map, soil reports, and a map indicating areas of Important Farmlands. The important Farmlands map has been enclosed for your aid in determining if an AD-1006 form, Farmland Impact Conversion Rating Form is needed for this project. Typically, this form is required on projects that convert farmlands into non-farmland uses, and have federal dollars attached to the project. See the website link below for more information on the Farmland Protection Policy Act, and a copy of the AD-1006 form, with instructions. The soil mapping does not identify any hydric soils in this project area. Hydric soils identify potential areas of wetlands. If wetlands do exist, any proposed impacts to these wetlands would need to demonstrate compliance with the "Clean Water Act", and may need an Army Corp of Engineers 404 permit.

The enclosed Soil Survey Map identifies all soil map units in the project area. The soil reports provide selected soil properties and interpretations, i.e. dwellings without basements, soil layers with USDA textures, and engineering classifications. The limitation ratings for the selected uses, i.e. dwellings without basements and local roads and streets are severe and very limited respectively for map unit WoA, and slight and somewhat limited for soil map units LaA and LaB. These ratings do not preclude the intended land use, however they do identify potential limitations for the use, which may require corrective measures, increase costs, and/or require continued maintenance.

The NRCS Soil Survey is a general planning tool and does not eliminate the need for an onsite investigation. If you have any questions concerning the soils or interpretations for this project please call, Tony Rolfes, Assistant State Soil Scientist, (808) 541-2600 x129, or email, Tony.Rolfes@hi.usda.gov.

NRCS - Farmland Protection Policy Act Website:
http://www.nrcs.usda.gov/programs/fppa/

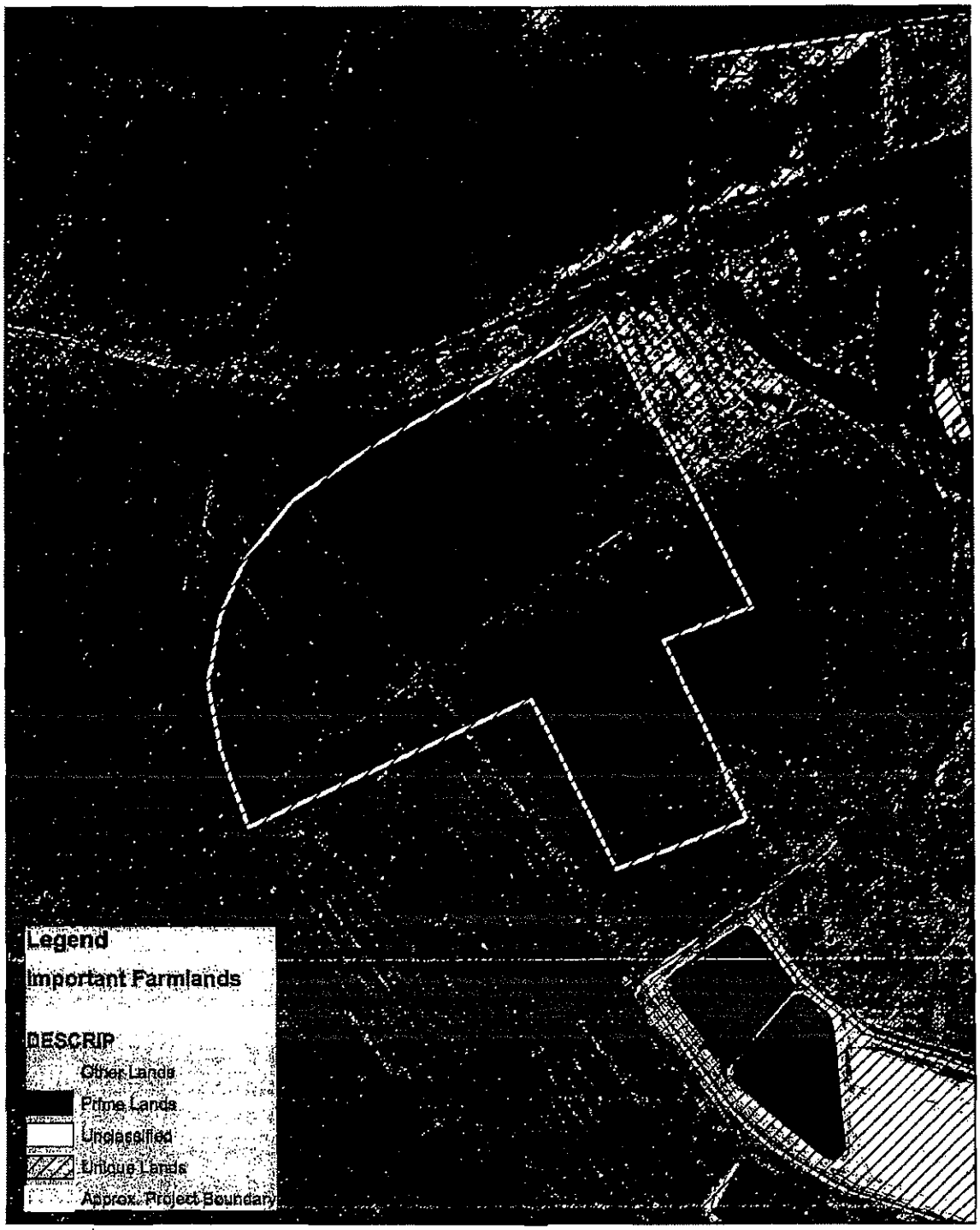
Sincerely,

LAWRENCE T. YAMAMOTO
Director
Pacific Islands Area

cc: Michael Robotham, Asst. Director for Soil Science and Natural Resource Assessments, USDA-NRCS, Honolulu, HI

Enclosures:

Important Farmland Map for Lana`i Housing Project



N

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Feet

NRCS 3/09

Map Unit Legend

Island of Lanai, Hawaii

Map symbol	Map unit name
LaA	Lahaina silty clay, 0 to 3 percent slopes
LaB	Lahaina silty clay, 3 to 7 percent slopes
WoA	Waihuna clay, 0 to 3 percent slopes

Selected Soil Interpretations

Island of Lanai, Hawaii

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

*This soil interpretation was designed as a "limitation" as opposed to a "suitability". The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation.

Map symbol and soil name	Pct. of map unit	ENG - Dwellings W/O Basements (HI) *		ENG - Local Roads and Streets *		ENG - Lawn, Landscape, Golf Fairway *	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LaA:							
Lahaina	100	Slight		Somewhat limited		Very limited	
				Low strength	0.10	Too clayey	1.00
LaB:							
Lahaina	100	Slight		Somewhat limited		Very limited	
				Low strength	0.10	Too clayey	1.00
WoA:							
Waihuna	100	Severe		Very limited		Very limited	
		Ponded (any duration)	1.00	Low strength	1.00	Too clayey	1.00
				Ponding	1.00	Ponding	1.00
				Shrink-swell	0.89	Droughty	0.01

Engineering Properties

Island of Lanai, Hawaii

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
LaA:												
Lahaina	0-15	Silty clay	ML-K (proposed)	A-7	0	0	100	100	95-100	90-100	40-50	10-20
	15-31	Silty clay	ML-K (proposed)	A-7	0	0	100	100	95-100	90-100	40-50	10-20
	31-60	Silty clay, Stony silty clay, Stony silty clay loam	ML-K (proposed)	A-7	0-10	5-10	100	95-100	95-100	85-95	40-50	10-20
LaB:												
Lahaina	0-15	Silty clay	ML-K (proposed)	A-7	0	0	100	100	95-100	90-100	40-50	10-20
	15-31	Silty clay	ML-K (proposed)	A-7	0	0	100	100	95-100	90-100	40-50	10-20
	31-60	Silty clay, Stony silty clay, Stony silty clay loam	ML-K (proposed)	A-7	0-10	5-10	100	95-100	95-100	85-95	40-50	10-20
WoA:												
Waihuna	0-1	Clay	CH	A-7	0	0	95-100	95-100	85-95	75-95	60-70	35-45
	1-6	Clay	CH	A-7	0	0	95-100	95-100	85-95	75-95	60-70	35-45
	6-12	Clay	CH	A-7	0	0	95-100	95-100	85-95	75-95	60-70	35-45
	12-18	Clay	CH	A-7	0	0	95-100	95-100	85-95	75-95	60-70	35-45
	18-25	Clay	CH	A-7	0	0	90-100	85-95	75-95	70-90	50-60	30-40
	25-41	Clay	CH	A-7	0	0	90-100	85-95	75-95	70-90	50-60	30-40
	41-53	Clay	CH	A-7	0	0	90-100	85-95	75-95	70-90	50-60	30-40
	53-65	Clay	CH	A-7	0	0	90-100	85-95	75-95	70-90	50-60	30-40

Water Features

Island of Lanai, Hawaii

Map symbol and soil name	Hydrologic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface depth	Duration	Frequency	Duration	Frequency
				Ft	*Ft*	*Ft*				
LaA:										
Lahaina	B	Low	Jan-Dec			—	—	None	—	None
LaB:										
Lahaina	B	Low	Jan-Dec			—	—	None	—	None
WoA:										
Waihuna	D	Low	January	—	—	0.0-0.1	Brief	Rare	—	None
			February	—	—	0.0-0.1	Brief	Rare	—	None
			March	—	—	0.0-0.1	Brief	Rare	—	None
			April	—	—	0.0-0.1	Brief	Rare	—	None
			October	—	—	—	—	Rare	—	None
			November	—	—	0.0-0.1	Brief	Rare	—	None
			December	—	—	0.0-0.1	Brief	Rare	—	None

Soil Map for Lana`i Housing Project

N

0 170 340 680 1,020 1,360
Feet

NRCS 3/09

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Lawrence T. Yamamoto, Director
Pacific Islands Area
U. S. Department of Agriculture
Natural Resources Conservation Service
P. O. Box 5004, Room 4-118
Honolulu, Hawai`i 96850

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Yamamoto:

In response to your letter dated March 17, 2009, please be advised that the Draft Environmental Assessment (EA) will reference the soil information provided and identification of the property as important farmlands. We acknowledge the subject property does not include any hydric soils which identify potential areas of wetlands. A detailed botanical study is being prepared for the project to address potential environmental impacts on fauna and flora, including wetlands.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
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MAR 2 3 2009

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

REPLY TO ATTENTION OF:

March 19, 2009

Regulatory Branch

POH-2009-00084

Colleen Suyama
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Suyama:

We are submitting these comments in response to your February 26, 2009 letter requesting comments on the proposed 201-H Lana'i City Housing Project in the County of Maui on the Island of Lana'i (TMK (2)4-9-002:058(por)).

A preliminary review of maps, aerial photographs and other data resources indicate the housing project and Ninth Avenue extension will both impact tributaries (drainageways) carrying water from Mauka of the project site to the ocean. Preparation for your Environmental Assessment (EA) needs to include a detailed mapping of any wetlands or other waterways on the project site. If the waterways can be traced all the way to the ocean, it is likely ground disturbing activities may need a Department of the Army (DA) permit from the Honolulu District, U.S. Army Corps of Engineers. Any discharge of dredged or fill material into Waters of the U.S. (WOUS) will require a DA permit under the Authority of Section 404 of the Clean Water Act. Available maps in our office are somewhat contradictory, thereby requiring an on-the-ground verification of these waterways.

If it is determined that a DA permit is required, you will be required to take an in-depth look at all available alternatives which would minimize impacts to WOUS. Such alternatives will include avoidance, minimization and, should impacts be unavoidable, mitigation. If a DA permit is not required, we recommend you review Best Management Practices to ensure minimal environmental impacts and/or potential runoff impacts to any WOUS.

Thank you for the opportunity to comment. If you have any questions, please contact Mr. Robert Deroche, of my Regulatory staff at 808-438-2039 (FAX: 808-438-2039) or by email at robert.d.deroche2@usace.army.mil. Please include File No. POH-2009-00084 in any future correspondence regarding this project.

Sincerely,

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

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

George P. Young, Chief
Regulatory Branch
Department of Army
Honolulu District
Fort Shafter, Hawai`i 96858-5440

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Young:

In response to your letter dated March 19, 2009, please be advised that the Draft Environmental Assessment (EA) will provide a detailed mapping of any wetlands or other waterways on the project site. Further, the Draft EA will analyze the impacts of the improvements on the environment, including areas under the jurisdiction of the U.S. Army Corps of Engineers, as applicable. We are aware that a Department of Army permit may be required for the project prior to the initiation of construction.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
F:\DATA\PA\LanaiCityHousing\DOA.ECres.doc

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

In Reply Refer To:
2009-TA-0138

MAR 1 8 2009

Ms. Colleen Suyama
Project Manager
Munekiyo and Hiraga, Inc.
305 High Street
Wailuku, Hawaii 96793

Subject: Early Comments for the 201-H Lanai Housing Project, Lanai City

Dear Ms. Suyama:

Thank you for your letter dated February 26, 2009, requesting information regarding threatened and endangered species and designated critical habitat that may occur in the vicinity of a proposed residential housing unit in Lanai City, Lanai [TMK (2)4-9-002:058]. The project will be implemented by the County of Maui, Department of Housing and Human Concerns and entails the development of an affordable housing project on 73 acres of land.

We reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program. The federally endangered Hawaiian petrel (*Pterodroma sandwichensis*), federally threatened Newell's shearwater (*Puffinus auricularis newelli*), collectively referred to as seabirds, have been observed in the project vicinity. There is no federally designated critical habitat in the project vicinity.

We offer the following comments to aide in avoiding and minimizing impacts to listed species. Outdoor lighting could result in seabird disorientation, fallout, and injury or mortality. Potential impacts to seabirds can be minimized by: 1) shielding outdoor lights associated with the project, particularly when used during each year's peak fledging period (September 15 through December 15); 2) avoiding night-time construction; and 3) providing all project staff with information regarding seabird fallout.

We hope this information assists you in determining potential impacts to listed species and avoiding and minimizing these impacts. If you have any additional questions, please contact Megan Laut, Fish and Wildlife Biologist, Consultation and Technical Assistance Program (phone: 808/792-9400; fax: 808/792-9581).

Sincerely,

for Patrick Leonard
Field Supervisor

12

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Patrick Leonard, Field Supervisor
U. S. Department of the Interior
Fish and Wildlife Service
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawai`i 96850

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Leonard:

In response to your letter dated March 18, 2009, please be advised that the Draft Environmental Assessment (EA) will reference the biological information and comments provided. A detailed botanical study is being prepared for the project to address potential environmental impacts on flora and fauna, including federally endangered species.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
F:\DATA\PA\LanaiCityHousing\USFWS.ECres.doc

MAR 2 3 2009

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

BARBARA A. ANNIS
DEPUTY COMPTROLLER

(P)1088.9

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

MAR 19 2009

Ms. Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Suyama:

Subject: Early Consultation on 201-H Lanai Housing Project in Lanai City, Hawaii TMK (2)4-9-003:058(por.)

Thank you for the opportunity to provide comments on the Early Consultation for the 201-H Lanai Housing Project in Lanai City. The project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Mr. Clarence Kubo of the Public Works Division at 586-0488.

Sincerely,

RUSS K. SAITO
State Comptroller

MAR 1 8 2009

LINDA LINGLE
GOVERNOR
THEODORE E. LIU
DIRECTOR
MARK K. ANDERSON
DEPUTY DIRECTOR
ABBEY SETH MAYER
DIRECTOR
OFFICE OF PLANNING

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-12473

March 16, 2009

Ms. Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Suyama:

Subject: Early Consultation on 201-H Lanai Housing Project in Lanai City
Environmental Assessment
TMK: 4-9-002: por. 58
Lanai City, Lanai

Thank you for sending the Office of Planning (OP) an Early Consultation for the above referenced proposal to reclassify 73 acres of land from the State Agricultural District to the State Urban District to develop an affordable housing project by the County of Maui, Department of Housing and Human Concerns (DHHC). The project will be a mix of rental and for-sale housing. The Environmental Assessment is being developed in order to prepare an application under the requirements of Chapter 201-H, Hawaii Revised Statutes. The 73 acres are part of a 115-acre parcel donated to the County of Maui by Castle & Cooke Resorts to satisfy a condition imposed by the Land Use Commission (LUC) in LUC Docket No. A90-662.

The Office of Planning will be coordinating the State's position on areas of State concern. The Environmental Assessment (EA) should consider the impacts of the proposed project on the following issues:

1. **Water Resources** – Water resource protection and water quality are critical State issues. Please discuss the water requirements of the proposed project, the proposed potable and non-potable water sources to be used for the project, and what measures are proposed to reduce water demand and promote water reuse in the project. Please identify the impact of the project on the sustainable yield of affected aquifer, and the impact of the project on projected water use and system improvements contained in the County's water use and development plan.

2. **Agricultural Lands** – Preservation of Important Agricultural Lands (IAL) is a priority for the State and Counties. Please discuss how the loss of these lands can be justified or how other lands of equal importance can be protected.

3. **Public Health** – Please quantify the volume of solid waste likely to be generated by the project, and describe the impact the project will have on the County's existing and planned capacity for managing solid waste as represented in the County's solid waste management plan. The EA should discuss any mitigation measures to be incorporated in the project to reduce solid waste generation. Please identify and discuss any potential health and environmental threats that may be present due to contamination from past or current use of the site, including findings from Phase I or Phase II environmental site assessments conducted at the site.

4. **Cultural, Archaeological, and Historic Resources** – Please include an inventory of archaeological and historic sites on the subject property. Please also identify the status of any monitoring and preservation plans being prepared for or approved by the State Historic Preservation Division. Please identify and describe any cultural resources and cultural practices, including visual landmarks, if applicable, on the subject property and within the ahupua`a in which the property is situated. Please discuss the impact of the proposed project on identified cultural resources and practices, alternatives considered, and proposed mitigation measures.

5. **Environmental, Recreational, and Scenic Resources** – Please include an inventory of flora and fauna, including invertebrates, found on or in proximity to the project site and in any lava tubes and caves on the property. Flora and fauna of concern should not be limited to listed threatened or endangered species or those under consideration for listing, and should include those species and ecosystems identified as "rare" by The Nature Conservancy of Hawai`i. The EA should discuss measures to be taken to protect rare, threatened or endangered species or ecosystems of concern. You should consider in the design of your field observations including both wet and dry season surveys to capture the fullest range of flora and fauna. Please include a description of recreational uses on or near the project site. A description of scenic resources should also be included.

6. **Coastal Zone Management (CZM)** – The State oversees protection of natural, cultural, and economic resources within the coastal zone, which is defined as all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea (§205A-1, Hawaii Revised Statutes). Please discuss how the

proposed project will balance the competing values of economic development and preservation of coastal resources, including the following CZM objective areas.

a. **Coastal and Ocean Resources** –The EA should discuss the impact of the project on existing site and offsite hydrology and how the project will manage stormwater and runoff. OP recommends the use of best management practices (BMP) that promote onsite infiltration and minimize runoff from storm events. More information on stormwater BMPs can be found at http://hawaii.gov/dbedt/czm/initiative/lid.php.

7. **Energy Use and Impacts** – The EA should quantify the projected energy requirements of the project by type of use, and discuss measures to be taken to reduce energy demand, promote energy efficiency, and to promote use of alternative, renewable energy sources. OP recommends the project's projected energy use and performance be discussed in relation to the U.S. Green Building Council's LEED rating systems for new construction and neighborhood development, the Hawaii Built Green, and Zero-Net Energy Green Homes programs for energy efficiency. Please identify any generating or transmission capacity constraints that may arise as a result of the proposed project and other projects planned for the region. The EA should also discuss the degree to which the project promotes transportation energy savings for project residents and users.

8. **Impact on State Facilities** – The EA should include a discussion on the impacts on State-funded facilities, including schools, highways, harbors, and airports. The EA should cite the mitigation measures proposed to be used in the development of the project.

9. **Conformance with County Plan Designations and Urban Growth or Rural Community Boundaries** – Act 26, Session Laws of Hawaii 2008, reaffirmed the Land Use Commission's duty to consider any proposed reclassification with respect to the Counties' adopted general, community, or development plans. Thus, the EA should discuss the proposed project's consistency with the County land use plans. If the proposed project is not consistent with the County plans, would require a County plan amendment, or lies outside a County urban growth or rural community boundary, then the EA should provide an analysis and discussion of the impact the project will have on surrounding lands.

10. **Development Timetable** –The State Land Use Commission (LUC) requires that projects seeking reclassification be substantially completed within ten years or seek incremental approvals. The EA should reference LUC rules (Section 15-15-

50, *Hawaii Administrative Rules*), and provide a schedule of development for each phase of the total project and a map showing the location and timing of each increment of development.

The Office recommends that the EA/EIS process be used as a means to identify and incorporate sustainable design and development practices, including green building practices, in the proposed project. The adoption of sustainable building and development practices has long-term environmental, social, and economic benefits to Hawaii's residents and communities. The Office of Environmental Quality Control's *Guidelines for Sustainable Building Design in Hawai`i* and the U.S. Green Building Council's (U.S. GBC) Leadership in Energy and Environmental Design (LEED) programs for new construction and its pilot program for neighborhood development (LEED-ND) offer guidelines and checklists for this purpose.

The LEED-ND rating system is especially useful in profiling how a project protects and enhances the overall health, natural environment, and quality of life of communities. The rating system provides a range of development features and strategies that promote efficient water, energy, and resource use, including waste reduction, as well as location and design elements to reduce transportation impacts. OP recommends that the EA include a preliminary overview of LEED features that could be incorporated into the project, based on the U.S. GBC LEED checklists available. This information would assist agencies, decision makers, and the public in reviewing the project application.

The Office of Planning looks forward to receiving the EA with the potential impacts and mitigation measures for the above issues addressed. If you have any questions, please call Lorene Maki in the Land Use Division at 587-2888.

Sincerely,

Abbey Seth Mayer
Director

c: Orlando Davidson, LUC
Katherine Kealoha, OEQC

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 20, 2009

Abbey Seth Mayer, Director
Department of Business,
Economic Development and Tourism
Office of Planning
P. O. Box 2359
Honolulu, Hawai`i 96804

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Mayer:

In response to your letter dated March 16, 2009, please be advised as follows:

1. The Draft Environmental Assessment (EA) will include a discussion on the water requirements for the project and its potential impacts on water resources. The Department of Housing and Human Concerns (DHHC) will coordinate its project with the Lanai Water Company who operates the water system for Lana`i island.

2. Although the preservation of Important Agricultural Lands is a priority for both the State and Counties, it should be noted that affordable housing is also a priority. Although the project will decrease the availability of vacant important agricultural land, it will provide a public benefit in the form of affordable housing.

3. The Draft EA will address solid waste for the project and its potential impacts. A Phase I Environmental Site Assessment was completed and found no contaminants. A copy of the Phase I Environmental Site Assessment will be included in the Draft EA.

4. An Archaeological Inventory Survey report has been prepared for the project and will be included in the Draft EA. The report has been sent to the State Historic Preservation Division for review and approval. A Cultural Impact Assessment has been prepared and concluded no impacts on cultural resources and practices will occur. A copy of the Cultural Impact Assessment will be included in the Draft EA.

5. A Biological Survey has been prepared for the project which will be included in the Draft EA. The survey includes discussion of listed threatened or endangered species and recommendations for mitigation.

6. Although the subject property is located outside of the Special Management Area for the island of Lana`i, the Draft EA will incorporate an evaluation of Chapter 205A, Hawai`i Revised Statutes (HRS). Further, a Preliminary Engineering Report has been prepared for the project to be included in the Draft EA which addresses drainage issues and potential mitigation measures.

7. To the extent practicable, the DHHC will consider energy efficiency measures provided it does not significantly decrease the ability of the County of Maui to provide affordable housing to the residents of Lana`i. Sustainability-related design measures will be addressed in the Draft EA.

8. The Draft EA includes discussion of the impacts of the project on public facilities.

9. The subject property is located within the State Agricultural District and the DHHC will file a petition for a State Section 201H, District Boundary Amendment to the State Urban District. The subject property is also designated for single family residential use on the Lana`i Community Plan and zoned Interim District. The DHHC will be processing the housing project in accordance with Section 201H-38, HRS, requesting exemptions from the County's General Plan and Zoning provisions. Information relating to the proposed action's relationship to plans, policies and controls will be addressed in the Draft EA.

10. We acknowledge the State Land Use Commission's requirement that projects seeking reclassification be substantially completed within ten (10) years or seek incremental approvals.

As noted above the DHHC will consider sustainable design and development measures in keeping with project affordability objectives.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
Keith Niiya, Austin, Tsutsumi & Associates, Inc.
Hallett Hammatt, Cultural Surveys Hawaii
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MAR 0 9 2009

LINDA LINGLE
GOVERNOR

ORLANDO "DAN" DAVIDSON
EXECUTIVE DIRECTOR

STATE OF HAWAII

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM
HAWAII HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
Honolulu, Hawaii 96813
FAX: (808) 587-0600

IN REPLY REFER TO:

09:PEO/17

March 5, 2009

Ms. Colleen Suyama
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Suyama:

Re: Early Consultation on 201-H Lana'i Housing Project, Lana'i City, Hawaii
TMK (2)4-9-002:058(por.)

Thank you for consulting the Hawaii Housing Finance and Development Corporation on the above-referenced project.

We look forward to reviewing the draft Environmental Assessment for the proposed project.

Sincerely,

Karen Seddon
Executive Director

22

MAR 1 6 2009

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF THE SUPERINTENDENT

March 16, 2009

Ms. Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Ms. Suyama:

Subject: Early Consultation on the Lana`i Housing Project
Lana`i City, Maui, TMK: 4-9-002: 058

The Department of Education (DOE) has been involved in some of the planning efforts for the County of Maui's affordable housing project and the expansion of Lana`i High and Elementary School.

As neighbors to the proposed project, we would like the environmental assessment (EA) to include a thorough discussion of proposed traffic patterns and street improvements that will serve the school and the housing project. We will be looking closely at what type of development is planned immediately adjacent to the DOE's 42-acre expansion area.

We would also like to see safe and direct pedestrian routes between the proposed homes and the school identified in the EA.

Thank you for the opportunity to comment. If you have any questions, please call Heidi Meeker of the Facilities Development Branch at (808) 377-8301.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

c: Randolph Moore, Assistant Superintendent, OSFSS
Lindsey Ball, CAS, Hana/Lahainaluna/Lanai/Molokai Complex Areas

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Patricia Hamamoto, Superintendent
Department of Education
P. O. Box 2360
Honolulu, Hawai`i 96804

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Ms. Hamamoto:

In response to your letter dated March 16, 2009, please be advised that a Traffic Impact Analysis Report has been prepared for the project which addresses traffic in the project area, including the nearby Lana`i High and Elementary School. Your comment regarding safe and direct pedestrian routes between the project and school will be incorporated within the project plans to encourage walkable communities.

We note that the County's Department of Housing and Human Concerns has initiated discussions with Department of Education and Department of Hawaiian Home Lands to ensure that the respective project planning efforts are properly coordinated.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft Environmental Assessment will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
Keith Niiya, Austin, Tsutsumi & Associates, Inc.
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305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhplanning.com · www.mhplanning.com

MAR 2 0 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
EMD / CWB

03073PMT.09

March 18, 2009

Ms. Colleen Suyama
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Suyama:

Subject: Early Consultation Request – Draft Environmental Assessment (DEA)
Proposed 201-H Lana`i Housing Project in Lana`i City
TMK: (2)4-9-002: 058 (por.)
Lana`i City, Island of Lanai, Hawaii

The Department of Health, Clean Water Branch (CWB), has reviewed your letter dated February 26, 2009, regarding the subject project and offers these comments. Please note that our review is based solely on the information provided in your letter for the subject project and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

   a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   b. Hydrotesting water.

   c. Construction dewatering effluent.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For other types wastewater not listed in Item 2 above or wastewater discharging into Class 1 or Class AA waters, will need to be covered under an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

4. You must also submit a copy of the NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the CWB that SHPD has or is in the process of evaluating your project. Please submit a copy of your request for review by SHPD or SHPD's determination letter for the project along with your NOI or NPDES permit application, as applicable.

5. Please call the Army Corps of Engineers at (808) 438-9258 to see if this subject project requires a Department of the Army (DA) permit. Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office.

6. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF
Clean Water Branch

MT:cu

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 20, 2009

Alec Wong, P.E., Chief
Clean Water Branch
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawai`i 96801-3379

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Wong:

Thank you for the detailed list of regulations that may be applicable to the proposed project. As the project continues to move forward through the various regulatory requirements, the County of Maui will ensure that compliance with applicable Department of Health regulations are met. We are aware that a National Pollutant Discharge Elimination System (NPDES) permit will be required for the project prior to the initiation of construction.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
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MAR 1 3 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

LORRIN W. PANG, M. D., M. P. H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

March 12, 2009

Ms. Colleen Suyama
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai`i 96793

Dear Ms. Suyama:

Subject: Early Consultation on 201-H Lana`i Housing Project
Lana`i City, Hawai`i
TMK: (2) 4-9-002:058 (por.)

Thank you for the opportunity to comment on the 201-H Lana`i Housing Project. The following comments are offered:

1. National Pollutant Discharge Elimination System (NPDES) permit coverage may be required for this project. The Clean Water Branch should be contacted at 808 586-4309.

2. The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46 "Community Noise Control". A noise permit may be required and should be obtained before the commencement of this project.

It is strongly recommended that the Standard Comments found at the Department's website: http://hawaii.gov/health/environmental/env-planning/landuse/landuse.html be reviewed, and any comments specifically applicable to this project should be adhered to.

Sincerely,

Patti Kitkowski

Patti Kitkowski
Acting District Environmental Health Program Chief

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Patti Kitkowski
Acting District Environmental Health Program Chief
Department of Health
Maui District Office
54 High Street
Wailuku, Hawai`i 96793

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Ms. Kitkowski:

In response to your letter dated March 12, 2009, we are aware of the regulatory requirements of the Department of Health and will ensure compliance prior to and during construction of the proposed housing project.

Should you require additional clarification please call me at 244-2015 or email planning@mhplanning.com. A copy of the Draft Environmental Assessment will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
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MAR 17 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 16, 2009

Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku, Hawaii 96793

Attention: Ms. Colleen Suyama, Project Manager

Ladies and Gentlemen:

Subject: Early Consultation on 201-H Lanai Housing Project in Lanai City

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

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

Sincerely,

for Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

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

RECEIVED
LAND DIVISION

2009 MAR 10 A 8:39

DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 2, 2009

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__ Div. of Boating & Ocean Recreation
x Engineering Division
__ Div. of Forestry & Wildlife
__ Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division –Gavin/Barbara

FROM: Morris M. Atta
SUBJECT: Early Consultation on 201-H Lanai Housing Project
LOCATION: Lanai City, Lanai, TMK: (2) 4-9-2:portion 58
APPLICANT: County of Maui, Department of Housing & Human Concerns

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 14, 2009.

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

Attachments

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

Signed:
Date: 3/10/09

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/MorrisAtta
Ref.: EarlyConsultation201HLanaiHousing
Maui.450

COMMENTS

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

(X) **Please take note that flood zone designation for the project site is unavailable, as the Federal Emergency Management Agency has not prepared a Flood Insurance Rate Maps for the island of Lanai.**

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

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

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

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

( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.

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

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

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

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

( ) Additional Comments:_____

_____

( ) Other: _____

_____

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

Signed: _____
ERIC T. HIRANO, CHIEF ENGINEER

Date: 3/10/09

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
09 MAR 3 P12:03

March 2, 2009

MEMORANDUM

From: ~~TO:~~ **DLNR Agencies:**

x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
x Commission on Water Resource Management
x ~~Office of Conservation & Coastal Lands~~
x Land Division –Gavin/Barbara

Darlene

To: ~~FROM:~~ Morris M. Atta
SUBJECT: Early Consultation on 201-H Lanai Housing Project
LOCATION: Lanai City, Lanai, TMK: (2) 4-9-2:portion 58
APPLICANT: County of Maui, Department of Housing & Human Concerns

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 14, 2009.

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

Attachments

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

Signed: Kyle Kawa
Date: March 10, 2009

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
MEREDITH J. CHING
JAMES A. FRAZIER
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIIKE, M.D., J.D.
KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

RECEIVED
LAND DIVISION
2009 MAR 10 P 3:11

DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

March 10, 2009

REF: Lanai Housing.Pre-EA.dr

TO: Morris Atta, Administrator
Land Division

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

SUBJECT: Early Consultation on 201-H Lanai Housing Project, Lanai City, Lanai

FILE NO.: NA
TMK NO.: (2) 4-9-2:portion 58

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

Our comments related to water resources are checked off below.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

☒ OTHER:
We recommend that the environmental assessment quantify the potable and non-potable needs of the project, the planned water supply source, and identify any alternative water sources.

If there are any questions, please contact Lenore Ohye at 587-0216.

LO:sd

MAR 2 3 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 19, 2009

Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku, Hawaii 96793

Attention: Ms. Colleen Suyama, Project Manager

Ladies and Gentlemen:

Subject: Early Consultation on 201-H Lanai Housing Project in Lanai City

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 Division of Aquatic Resources for their review and comment.

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

Sincerely,

Charlene E. Unoki
for Morris M. Atta
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

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

RECEIVED
LAND DIVISION
2009 MAR 19 A 11:19
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

AQUATIC RESOURCES: 2135

DIRECTOR	
COMM. FISH.	
AQ RES/ENV	
AQ REC	
PLANNER	
STAFF SVCS	
RCUH/UH	
STATISTICS	
AFRC/FED AID	
EDUCATION	
SECRETARY	
OFFICE SVCS	
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 2, 2009

RECEIVED
MAR 4 2009
AQUATIC RESOURCES

MEMORANDUM

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

FROM: Morris M. Atta
SUBJECT: Early Consultation on 201-H Lanai Housing Project
LOCATION: Lanai City, Lanai, TMK: (2) 4-9-2:portion 58
APPLICANT: County of Maui, Department of Housing & Human Concerns

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 14, 2009.

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

Attachments

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

Signed: Francis Oishi
Date: 3-18-09

LINDA LINGLE
GOVERNOR OF HAWAII

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

AQUATIC RESOURCES: 2/25

DIRECTOR	
COMM. FISH.	
AQ RES/ENV	
AQ REC	
PLANNER	
STAFF SVCS	
RCUH/UH	
STATISTICS	
AFRC/FED AID	
EDUCATION	
SECRETARY	
OFFICE SVCS	
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Due Date:	

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

March 2, 2009

MEMORANDUM

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

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MAR 4 2009
AQUATIC RESOURCES

FROM: Morris M. Atta
SUBJECT: Early Consultation on 201-H Lanai Housing Project
LOCATION: Lanai City, Lanai, TMK: (2) 4-9-2:portion 58
APPLICANT: County of Maui, Department of Housing & Human Concerns

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by March 14, 2009.

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

Attachments

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

Signed: Skippy Hau
Date: 3/17/09

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Morris Atta, Administrator
Department of Land and Natural Resources
Land Division
P. O. Box 621
Honolulu, Hawai`i 96809

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Atta:

Thank you for your letters dated March 16, and 19, 2009. We acknowledge that flood zone information for the project site is unavailable, as the Federal Emergency Management Agency has not prepared a Flood Insurance Rate Map for the island of Lana`i. Further, we will work with the Department of Water Supply and the Lanai Water Company to address comments of the Commission on Water Resource Management.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft Environmental Assessment will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
F:\DATA\PA\LanaiCityHousing\DLNR.ECres.doc

JUL 2 4 2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

July 20, 2009

Ms. Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793
planning@mhplanning.com

LOG NO: 2009.1076
DOC NO: 0907PC32
Archaeology

SUBJECT: **Chapter 6E-8 Historic Preservation Review –**
Early Consultation for the Proposed 201-H Lana'i Affordable Housing Project
Palawai Ahupua'a, Lahaina (Lana'i) District, Island of Lana'i
TMK: (2) 4-9-002:058 por.

Thank you for the opportunity to comment on the aforementioned project, correspondence for which we received on February 27 of 2009. Please accept our apologies for the lengthy delay in responding.

Based on the submitted information, the project involves the construction of an affordable housing project on a 73 acre portion of a 115 acre parcel of land owned by the County of Maui. The project will also involve extending the existing Fifth and Ninth Avenues in Lana'i City.

A search of our records indicates that an archaeological inventory survey of the proposed area of effect has not yet occurred. Therefore, upon review of any permit involving ground altering disturbance within the subject parcel, we will recommend that the following condition be attached:

An archaeological inventory survey shall be conducted by a qualified archaeological consultant with a report of the findings, significance assessments and recommended mitigation submitted to this office for review and acceptance prior to issuance of the permit.

A list of those meeting the requirements to perform such work can be obtained on the SHPD's website at http://hawaii.gov/dlnr/hpd/pdfs/2009-Permittee.pdf or by contacting our main office at (808) 692-8015.

If you have any questions or comments regarding this letter, please contact the SHPD's Lead Maui Archaeologist, Ms. Patty Conte (Patty.J.Conte@hawaii.gov).

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
State Historic Preservation Division

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 20, 2009

Nancy McMahon, Deputy SHPO
State Archaeologist
State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Room 555
Kapolei, Hawai`i 96707

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Ms. McMahon:

In response to your letter dated July 20, 2009, an archaeological inventory survey has been prepared by Cultural Surveys Hawaii for the project and included in the Draft Environmental Assessment (EA).

Should you require additional clarification please call me at (808) 244-2015 or email colleen@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
Hallett Hammett, Cultural Surveys Hawaii
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MAR 2 3 2009

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

IN REPLY REFER TO:

STP 8.3170

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

March 17, 2009

Ms. Colleen Suyama
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Suyama:

Subject: Lanai 201-H Housing Project
Early Consulation (EC)
TMK: 4-9-002: 058 (por.)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project.

DOT understands that the subject EC addresses a 73-acre, affordable housing project on the island of Lanai. The 73 acres are part of larger 115-acre parcel that was donated to the County of Maui by Castle and Cooke Resorts. The remaining 42 acres will be utilized by the Department of Education for the expansion of Lanai High and Elementary School. Access to the site will be from proposed extensions of both Fifth Avenue and Ninth Avenue.

The subject project's contribution to the cumulative traffic flow could potentially impact the State highway, Kaumalapau Highway. The Draft Environmental Assessment (DEA) should thus discuss and evaluate project impacts to Kaumalapau Highway in accordance with the following DOT Highways Division Planning Branch comments. Please call the Planning Branch at telephone number (808) 587-1830 to discuss these comments.

1. The DEA should address the additional traffic generated by the project.

2. The DEA should address the types of construction vehicles and heavy equipment that will be used at the job site. The project contactor will need to contact the Highways Division Maui District Office to discuss the need for an Oversize and Overweight Vehicle Permit if the transport of very large construction vehicles and equipment will occur on the State highway facility.

3. During the project construction, DOT expects that the County and its project contractor will exercise all reasonable best management practices to avoid or minimize impacts or inconveniences to the motoring public, bicyclists, pedestrians, etc.

4. The DEA should address construction activity hours.

DOT appreciates the opportunity to provide comments and requests four (4) copies of the project DEA be provided. If there are any other questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Brennon Morioka, Director
Department of Transpotation
869 Punchbowl Street
Honolulu, Hawai`i 96813-5097

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Morioka:

In response to your letter dated March 17, 2009, a Traffic Impact Analysis Report has been prepared by Austin Tsutsumi & Associates, Inc. for the project and your comments regarding traffic generation and construction impacts will be addressed in the Draft Environmental Assessment (EA). Further, we acknowledge that during construction, the County of Maui and its project contractor will exercise reasonable best management practices to avoid or minimize impacts or inconveniences to the motoring public, bicyclists, pedestrians, etc.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. As requested, four (4) copies of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
Keith Niiya, Austin, Tsutsumi & Associates, Inc.
F:\DATA\PA\LanaiCityHousing\SDOT.ECres.doc

MAR 1 7 2009

LINDA LINGLE
GOVERNOR

MAJOR GENERAL ROBERT G. F. LEE
DIRECTOR OF CIVIL DEFENSE

EDWARD T. TEIXEIRA
VICE DIRECTOR OF CIVIL DEFENSE

PHONE (808) 733-4300
FAX (808) 733-4287

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

March 16, 2009

Ms. Colleen Suyama
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Suyama:

Early Consultation Request
Lana'i Housing Project, Lana'i City, County of Maui, Hawaii

Thank you for the opportunity to comment on this project. After review of your letter and the maps sent for this project, we have no suggestions to make at this time.

We anticipate reviewing the Environmental Assessment when it is completed and will make any appropriate recommendations at that time.

If you have any questions, please call Mr. Richard Stercho, Hazard Mitigation Planner, at 733-4300, extension 583.

Sincerely,

EDWARD T. TEIXEIRA
Vice Director of Civil Defense

c: JoAnne Ridao, Deputy Director,
Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects, Inc.

PHONE (808) 594-1888

FAX (808) 594-1865

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

HRD09/4203

March 13, 2009

Colleen Suyama
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

RE: Request for early input for the 201-H Lāna'i Housing Project in Lāna'i City, Lāna'i; TMK: (2)4-9-002:058(por.)

Aloha e Colleen Suyama,

The Office of Hawaiian Affairs (OHA) is in receipt of the above-mentioned letter, dated February 26, 2009. The County of Maui, Department of Housing and Human Concerns (DHHC) is proposing an affordable housing project in Lāna'i City. The project will make use of 73 acres of land owned by Maui County, and involve extending both Fifth and Ninth Avenues to provide access to the proposed property. A community meeting will be held in the near future based upon the public comments that have been received thus far.

OHA has substantive obligations to protect the cultural and natural resources of Hawai'i for its beneficiaries, the people of this land. The Hawaii Revised Statutes mandate that OHA "[s]erve as the principal public agency in the State of Hawaii responsible for the performance, development, and coordination of programs and activities relating to native Hawaiians and Hawaiians; . . . and [t]o assess the policies and practices of other agencies impacting on native Hawaiians and Hawaiians, and conducting advocacy efforts for native Hawaiians and Hawaiians." (HRS § 10-3)

Chapter 343 of the Hawaii Revised Statues (HRS) requires that the Draft EA include a Cultural Impact Assessment (CIA). The CIA should include information relating to the traditional and customary practices and beliefs of the area's Native Hawaiians, and the community should be involved in this assessment. Consideration must also be afforded to any individuals accessing the project area for constitutionally protected traditional and customary purposes, in accordance with the Hawai'i State Constitution, Article XII, Section 7.

OHA requests clarification whether an archaeological inventory survey for the project will be submitted to the State Historic Preservation Division for review and approval. If so, OHA should be allowed the opportunity to comment on the criteria assigned to any cultural or archaeological sites identified within the archaeological inventory survey.

We request the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

In addition, OHA recommends that the applicant use native vegetation in its landscaping plan for the subject parcel. Landscaping with native plants furthers the traditional Hawaiian concept of mālama 'āina and creates a more Hawaiian sense of place.

Thank you for the opportunity to comment, and we look forward to a further, more detailed review of your forthcoming Draft EA. If you have further questions, please contact Heidi Guth by phone at (808) 594-1962 or e-mail her at heidig@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: OHA Lāna'i CRC Office

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 20, 2009

Clyde W. Nāmu`o, Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawai`i 96813

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Nāmu`o:

In response to your letter dated March 13, 2009, please be advised that Cultural Surveys Hawai`i has prepared an Archaeological Inventory Survey and Cultural Impact Assessment to be included in the Draft Environmental Assessment (EA), as well as sent to the State Historic Preservation Division (SHPD) for review and approval. Please be assured that during construction of the project, if inadvertent iwi kupuna or native Hawaiian cultural or traditional deposits be found, work will cease in the immediate area, and SHPD shall be contacted for appropriate analysis and recommended mitigation.

Your recommendation to use native vegetation in the project landscaping to create a more Hawaiian sense of place will be considered as the plans for the project progresses.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
Hallett Hammatt, Cultural Surveys Hawai`i
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MAR 0 6 2009

CHARMAINE TAVARES
Mayor

TAMARA HORCAJO
Director

ZACHARY Z. HELM
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

March 3, 2009

Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: Early Consultation on 201-H Lanai Housing Project, Lanai City, Hawaii; TMK (2) 4-9-002:058 (por.)

Dear Ms. Suyama:

This is in response to your request for comments for the above referenced project. We would like to request information on what is being proposed for the project for parks and recreational facilities as well as for bikeways and pedestrian paths.

Please feel free to contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development at 270-7387 should you have any other questions on this matter.

Sincerely,

Tamara Horcajo

TAMARA HORCAJO
Director of Parks & Recreation

xc: Patrick Matsui, Chief of Planning & Development

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 20, 2009

Patrick Matsui, Chief of Planning
Department of Parks and Recreation
County of Maui
700 Hali`a Street, Unit 2
Wailuku, Hawai`i 96793

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Matsui:

In response to your letter dated March 3, 2009, please be advised that the preliminary site plan for the project includes two (2) park sites and a 4.9-acre "public/quasi-public" site for a future community center. The two (2) park sites will be 2.83-acre and 2.06-acre. In keeping with the character of Lana`i City and the desires of the Lana`i community, generous grassed shoulders are being proposed that will accommodate pedestrian access within the project. The Department of Housing and Human Concerns will coordinate the proposed parks with the Department of Parks and Recreation.

Should you require additional clarification please call me at (808) 244-2015 or email planning@mhplanning.com. A copy of the Draft Environmental Assessment will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:lh
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
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CHARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

KATHLEEN ROSS AOKI
Deputy Director

MAR 2 4 2009

COUNTY OF MAUI
DEPARTMENT OF PLANNING

March 19, 2009

Mrs. Colleen Suyama
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mrs. Suyama:

SUBJECT: COMMENTS ON AN EARLY CONSULTATION REQUEST (EAC) FOR THE PROPOSED 201-H LANAI HOUSING PROJECT LOCATED AT IN LANAI CITY, ISLAND OF LANAI, HAWAII, TMK: (2) 4-9-002:058 (EAC 2009/0012)

The Department of Planning (Department) is in receipt of the above-referenced document for the proposed affordable housing project in Lanai City. The Department understands the proposed action includes the following:

1. The County of Maui, Department of Housing and Human Concerns is preparing an application for an affordable housing project on 73 acres of the 115 acre parcel donated to the County by Castle & Cooke Resorts;

2. The Department of Education will utilize the remaining 42 acres for expansion of the Lanai High and Elementary School (the school project is not within the scope of the environmental review); and

3. The proposed extension of Fifth Avenue will provide access to the property and separate the housing and school sites.

Based on the foregoing, the Department provides the following comments:

1. The land use designations for the 115-acre project site are as follows:

State Land Use:	Urban
Lanai Community Plan:	Single Family and Public/Quasi Public
County Zoning:	Interim; P-1 Public/Quasi Public; and PK-3 Regional Park District

(These designations have not been verified by the County's Zoning Administration & Enforcement Division)

2. The Department concurs that the use of county lands or funds is a "trigger" that requires compliance with Chapter 343, Hawaii Revised Statutes (HRS);

3. The Draft Environmental Assessment (EA) should contain a thorough discussion on how the proposed project is consistent with the objectives and polices of Chapter 205A, Coastal Zone Management, HRS;

4. The Lanai Planning Commission may want to know the timeline for development of this project as well as the expansion to the school; and

5. The Draft EA must evaluate the pertinent goals, objectives and policies listed in the Lanai Community Plan. Please note that the Community Plan is scheduled to be updated in the very near future and any revisions or updates to the plan could affect your project.

Thank you for the opportunity to comment. Should you require further clarification, please contact Staff Planner Joseph Prutch via email at joseph.prutch@mauicounty.gov or by phone at 270-7512.

Sincerely,

Clayton I. Yoshida

CLAYTON I. YOSHIDA, AICP
Planning Program Administrator

For: JEFFREY S. HUNT, AICP
Planning Director

xc: Joseph M. Prutch, Staff Planner
General File
Project File
JSH:CIY:JMP:bv
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MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Jeffrey S. Hunt, Director
Department of Planning
250 South High Street
Wailuku, Hawai`i 96793

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Hunt:

Thank you for your letter of March 19, 2009 regarding the proposed Lana`i Affordable Housing Project. The following responses are provided to address your noted comments.

1. The portion of the 115 acre parcel to be developed as the Lana`i Affordable Housing project is situated on the portion of the property identified as single family on the Lana`i Community Plan and zoned interim district. A zoning confirmation form will be obtained from the Planning Department's Zoning Administration and Enforcement Division.

2. The Draft Environmental Assessment (EA) is being prepared due to the use of county lands and funds in accordance with Chapter 343, Hawai`i Revised Statutes (HRS).

3. The Draft EA will be evaluated with respect to the objectives and policies of Chapter 205A, HRS.

4. The project was presented to the Lana`i Planning Commission at its meeting on February 18, 2009. As the project progresses through the entitlement process the project team will periodically update the Commission on the status of the project.

5. The Draft EA has evaluated the pertinent goals, objectives and policies listed in the Lana`i Community Plan.

Should you require additional clarification please call me at 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
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MAR 1 8 2009

POLICE DEPARTMENT
COUNTY OF MAUI

CHARMAINE TAVARES
MAYOR

OUR REFERENCE
YOUR REFERENCE

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

GARY A. YABUTA
DEPUTY CHIEF OF POLICE

March 12, 2009

Ms. Colleen Suyama
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Suyama:

SUBJECT: Early Consultation on 201-H Lana'i Housing Project in Lana'i City, Hawaii; TMK (20 4-9-002:058(por.)

Thank you for your letter of February 26, 2009, requesting comments on the above subject.

We have reviewed the information submitted for this project and have enclosed a copy of our comments. Thank you for giving us the opportunity to comment on this project.

Very truly yours,

AC Wayne T. Ribao

Assistant Chief Wayne T. Ribao
for: Thomas M. Phillips
Chief of Police

c: Jeffrey Hunt, Planning Department

COPY

TO : THOMAS PHILLIPS, CHIEF POLICE, MAUI POLICE DEPARTMENT

CONCUR WITH DEC. SANG'S REVIEW. AC Wayne Ibata 03/12/09

VIA : CHANNELS

FROM : JOHN K. SANG, POLICE OFFICER II, LANAI PATROL DIVISION

SUBJECT : EARLY CONSULTATION ON 201-H LANA'I PROJECT IN LANA'I CITY, HAWAI'I, TMK (2)4-9-002:058 (POR.)

Sir, this TO/FROM is written in response to the aforementioned subject. Following is a preliminary assessment of the project from a Policing point of view. It is important to note that the materials and information provided are sparse. Many of the necessary details with regards to this project and the impact on the community have not been outlined. Presented is a general concept with little or no details beyond the intent to move forward on this project.

The Department of Housing and Human Concerns is proposing an affordable housing project on the island of Lana'i. The project envisions an as yet unknown amount of residential units on a 73 acre parcel of land located west of the current Hawaiian Homelands Subdivision. The project expects access to this residential area through the extension of existing roadways which include Fifth Street and Ninth Street. The request also references a proposed expansion of the Lana'i High and Elementary School grounds westward along Fifth Street.

At present the best assessment I can provide is in line with the general request provided. Much of it still leaves questions unasked and thus unanswered.

DESIGN PHASE:

Police role during the design phase should be very limited. Questions designers could answer include the impact of increased traffic along Fifth Street fronting the school grounds. Keeping in mind the planned expansion of the school. Currently the posted speed limit on Fifth Street is 20 MPH. Fifth Street is a straight uninterrupted two-lane road. This roadway currently lends itself to excessive speed. The construction of speed mitigating devices such as speed bumps should be considered. This project would add on a stretch of roadway which from the map provided nearly doubles the current length of this roadway.

Addition of school crossing zones and signage to provide for safe travel of students to and from the school grounds.

Also to be considered is this project in relation to another proposed project on the island. The Lana'i wind project is expected to require the construction of service roads. The idea is the modification of older pineapple field roads. I suggest looking into this as it may or may not prove beneficial during the construction phase of this project.

CONSTRUCTION PHASE:

Impact on the community during construction phase depends on the intensity with which the project is undertaken. The area in question is likely to need considerable ground work thus requiring the use of heavy equipment. I suggest that those equipment not be allowed to use the surface streets of Lana'i City. However they should be relegated to the use of an unimproved roadway which leads from Kaumalapau Highway at its intersection with Manele Highway and runs northward toward the project site. This would minimize the impact of the heavy vehicles traveling through the city and thus its impact on the community. Some improvements to this roadway as well as access rights will need to be addressed however in the long run the potential negative impact of heavy equipment moving through the city streets can be avoided.

Depending on who the general contractor plans to use during construction the island can expect an increase in its population due to the construction crews. Historically this has been accompanied by an increase in Disorderly Conduct type incidents. Though these are not problems that can be definitively predicted it is something that should be expected.

Security for the equipment may also become a concern. Depending on the access roads used by the construction company police or emergency services response will be dependent on four wheel drive until such time as the roadways are completed.

LONG TERM ISSUES:

At present it is difficult to assess the long term effects of this project on the community and its draw on Police and emergency services. With the assumption that this increase in housing is followed by an increase in population the potential long term issues would be calls for police and emergency services.

CONCLUSION:

Sir, provided above is a very preliminary assessment of this proposed housing project. Only with the addition of more specific information can a better response be provided. If you have any questions regarding this matter please feel free to contact me.

Respectfully Submitted,

SANG, JOHN K. E#11799
ON 030909 AT 1132 HOURS

Officer SANG addressed some important points regarding vehicular traffic on Fifth Street and should be considered. The traffic impact will have to be re-evaluated once the design is completed.

202
031009/0830

GOOD POINTS ARE BROUGHT UP BY OFFICER JOHN SANG, WHICH SHOULD BE CONSIDERED IN THIS PROJECT.

LT. [illegible] 0321
[illegible]

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 20, 2009

Gary Yabuta, Chief
Police Department
55 Mahalani Street
Wailuku, Hawai`i 96793

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Chief Yabuta:

Thank you for your department's letter dated March 12, 2009. Your comments concerning safe pedestrian access to the Lana`i High and Elementary School and traffic impacts during construction will be addressed in the Draft Environmental Assessment (EA).

With respect to impacts to police services, we note that the project will be implemented over an anticipated 17-year time horizon. With this in mind, we believe that the incremental increase in demand for police services can be addressed through new property taxes generated by the project.

Should you require additional clarification please call me at 244-2015 or email planning@mhplanning.com. A copy of the Draft EA will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
Keith Niiya, Austin Tsutsumi & Associates, Inc.
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MAR 0 9 2009

CHARMAINE TAVARES
Mayor

MILTON M. ARAKAWA, A.I.C.P.
Director

MICHAEL M. MIYAMOTO
Deputy Director

RALPH M. NAGAMINE, L.S., P.E.
Development Services Administration

DAVID TAYLOR, P.E.
Wastewater Reclamation Division

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

TRACY TAKAMINE, P.E.
Solid Waste Division

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND ENVIRONMENTAL MANAGEMENT
DEVELOPMENT SERVICES ADMINISTRATION
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

March 5, 2009

Colleen Suyama, Project Manager
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Subject: **EARLY CONSULTATION ON 201-H LANAI HOUSING PROJECT IN LANAI CITY**
TMK (2) 4-9-002:058 (por.)

Dear Ms. Suyama:

We reviewed the subject application and have no comments at this time.

Please call Michael Miyamoto at 270-7845 if you have any questions regarding this letter.

Sincerely,

Milton M. Arakawa, A.I.C.P.
Director of Public Works

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xc: Highways Division
Engineering Division

APR 0 9 2009

CHARMAINE TAVARES
Mayor
CHERYL K. OKUMA, Esq.
Director
GREGG KRESGE
Deputy Director

TRACY TAKAMINE, P.E.
Solid Waste Division
DAVID TAYLOR, P.E.
Wastewater Reclamation
Division

COUNTY OF MAUI
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
2200 MAIN STREET, SUITE 100
WAILUKU, MAUI, HAWAII 96793

April 7, 2009

Ms. Colleen Suyama
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

SUBJECT: **201-H LANAI HOUSING PROJECT**
EARLY CONSULTATION FOR ENVIRONMENATAL ASSESSMENT
TMK (2) 4-9-002:058 (POR,), LANAI CITY, LANAI

We reviewed the subject application and have the following comments:

1. Solid Waste Division comments:

   a. Include a proposed plan for construction waste recycling or reuse to minimize disposal in the local landfill.

2. Wastewater Reclamation Division (WWRD) comments:

   a. Although wastewater system capacity is currently available as of 4/7/2009, the developer should be informed that wastewater system capacity cannot be ensured until the issuance of the building permit.
   b. Developer is not required to pay assessment fees for this area at the current time.
   c. Developer is required to fund any necessary off-site improvements to collection system and wastewater pump stations.
   d. Show or list minimum slope of new sewer laterals.
   e. Plans should show the installation of a single service lateral and advanced riser for each lot.
   f. Indicate on the plans the ownership of each easement (in favor of which party). Note: County will not accept sewer easements that traverse private property.
   g. Kitchen facilities within the proposed project shall comply with pre-treatment requirements (including grease interceptors, sample boxes, screens etc.)

h. Non-contact cooling water and condensate should not drain to the wastewater system.

If you have any questions regarding this memorandum, please contact Gregg Kresge at 270-8230.

Sincerely,

Cheryl K. Okuma

Cheryl Okuma, Director

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Cheryl Okuma, Director
Department of Environmental Management
One Main Plaza
2200 Main Street, Suite 100
Wailuku, Hawai`i 96793

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Ms. Okuma:

Thank you for your letter dated April 7, 2009. We acknowledge your comments regarding solid waste and the County's wastewater system. Our engineering consultant will work closely with your Department to ensure compliance to all county requirements.

Should you require additional clarification please call me at 244-2015 or email planning@mhplanning.com. A copy of the Draft Environmental Assessment will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
F:\DATA\PA\LanaiCityHousing\DEM.ECres.doc

MAR 2 6 2009

CHARMAINE TAVARES
Mayor

JEFFREY K. ENG
Director

ERIC H. YAMASHIGE, P.E., L.S.
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2155
www.mauiwater.org

March 20, 2009

Ms. Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 High Street
Wailuku, Hawaii 96793

Dear Ms. Suyama:

SUBJECT: Early Consultation on 201-H Lanai Housing Project in Lanai City
TMK: (2) 4-9-002:058–Development of an Affordable Housing on a 73-acre Lot

Thank you for the opportunity to provide comments on this project proposal.

The EA should address: 1) anticipated potable and non-potable water source, 2) estimated potable and non-potable water use, 3) intended density per acre and, 4) an anticipated build out schedule (2010, 2015, 2020, 2025, 2030 and beyond 2030). The 1997 Water Working Group Report (WWGR) is the existing working document used in determining water use allocations. Table A6 of this report indicates that 518 housing units can be constructed on the 115-acre county housing lot assuming a maximum density of 4.5units/acre. Using this assumption, the estimated daily demand for the 73-acre project would be around 197,000 gallons based on system standards.

In order to reduce demand on potable water systems, we encourage the applicant consider the following water conservation measures in the project design and construction:

Use Climate -adapted Plants: The project is located in the Maui County Planting Plan - Plant Zones 3 & 5. We encourage the applicant to utilize appropriate native and non invasive species and avoid the use of potentially invasive plants. Native plants adapted to the area, conserve water and protect the watershed from degradation due to invasive alien species. Attached is a list of appropriate plants for the zones as well as potentially invasive plants to avoid.

Utilize Low-Flow Fixtures and Devices: Maui County Code Subsection 16.20A.680 requires the use of low-flow water fixtures and devices in faucets, showerheads, urinals, water closets, and hose bibs. Water conserving washing machines, ice-makers and other units are also available.

Toilets that meet the EPA Water Sense criteria are recommended. These toilets use on average 1.28 gallons per flush or less. The Department of Water Supply has tried these in a county owned facility and found substantial savings.

"By Water All Things Find Life"

Maintain Fixtures to Prevent Leaks: A simple, regular program of repair and maintenance can prevent the loss of hundreds or even thousands of gallons a day. Refer to the attached handout, "The Costly Drip".

Eliminate Single-Pass Cooling: Single-pass, water-cooled systems should be eliminated per Maui County Code Subsection 14.21.20. Although prohibited by code, single-pass water cooling is still manufactured into some models of air conditioners, freezers, and commercial refrigerators.

Look for Opportunities to Conserve Water: A few examples of these are as follows: When clearing driveways, etc. of debris, use a broom instead of a hose; check for leaks in faucets and toilet tanks.

In order to protect groundwater resources, we recommend that the applicant utilize Best Management Practices designed to minimize infiltration and runoff during construction.

Should you have any questions, please contact our Water Resources and Planning Division at (808) 244-8550.

Sincerely,

Jeffrey K. Eng
Director

eam
c: Lanai Water Advisory Committee
Applicant, with attachments:
The Costly Drip
Maui County Planting Plan-Saving Water in the Yard - What and How to Plant in Your Area

ORDINANCE NO. 2108

BILL NO. 6 (1992)

Draft 1

A BILL FOR AN ORDINANCE AMENDING CHAPTER 16.20 OF THE MAUI COUNTY CODE, PERTAINING TO THE PLUMBING CODE

BE IT ORDAINED BY THE PEOPLE OF THE COUNTY OF MAUI:

SECTION 1. Title 16 of the Maui County Code is amended by adding a new section to Chapter 10 of the Uniform Plumbing Code to be designated and to read as follows:

"16.20.675 Section 1050 added. Chapter 10 of the Uniform Plumbing Code is amended by adding a new section, pertaining to low-flow water fixtures and devices, to be designated and to read as follows:

Sec. 1050 Low-flow water fixtures and devices. (a) This section establishes maximum rates of water flow or discharge for plumbing fixtures and devices in order to promote water conservation.

(b) For the plumbing fixtures and devices covered in this section, manufacturers or their local distributors shall provide proof of compliance with the performance requirements established by the American National Standards Institute (ANSI) and such other proof as may be required by the director of public works. There shall be no charge for this registration process.

(c) Effective December 31, 1992, only plumbing fixtures and devices specified in this section shall be offered for sale or installed in the County of Maui, unless otherwise indicated in this section. All plumbing fixtures and devices which were installed before December 31, 1992, shall be allowed to be used, repaired or replaced after December 31, 1992.

(1) Faucets (kitchen): All kitchen and bar sink faucets shall be designed, manufactured, installed or equipped with a flow control device or aerator which will prevent a water flow rate in excess of two and two-tenths gallons per minute at sixty pounds per square inch of water pressure.

(2) Faucets (lavatory): All lavatory faucets shall be designed, manufactured, installed or equipped with a flow control device or aerator which will prevent a water flow rate in excess of two and two tenths gallons per minute at sixty pounds per square inch of water

pressure.

(3) Faucets (public rest rooms): In addition to the lavatory requirements set forth in paragraph (2), lavatory faucets located in rest rooms intended for use by the general public shall be of the metering or self-closing types.

(4) Hose bibbs: Water supply faucets or valves shall be provided with approved flow control devices which limit flow to a maximum three gallons per minute.

EXCEPTIONS: (A) Hose bibbs or valves not used for fixtures or equipment designated by the director of public works.

(B) Hose bibbs, faucets, or valves serving fixed demand, timing, or water level control appliances, and equipment or holding structures such as water closets, pools, automatic washers, and other similar equipment.

(5) Showerheads: Showerheads, except where provided for safety or emergency reasons, shall be designed, manufactured, or installed with a flow limitation device which will prevent a water flow rate in excess of two and one-half gallons per minute at eighty pounds per square inch of water pressure. The flow limitation device must be a permanent and integral part of the showerhead and must not be removable to allow flow rates in excess of two and one-half gallons per minute or must be mechanically retained requiring force in excess of eight pounds to remove.

(6) Urinals: Urinals shall be designed, manufactured, or installed so that the maximum flush will not exceed one gallon of water. Adjustable type flushometer valves may be used provided they are adjusted so the maximum flush will not exceed one and six tenths gallons of water.

(7) Water closets (toilets): Water closets shall be designed, manufactured, or installed so that the maximum flush will not exceed one and six tenths gallons of water.

(d) Beginning December 31, 1992, it is unlawful to sell or install any plumbing fixtures or devices not specified in this section, except as permitted under this section.

(e) The director of public works may exempt the use of low-flow water fixtures and devices if there is a finding that the use of such fixtures and devices would not be consistent with accepted engineering practices and would be detrimental to the public health, safety and welfare.

(f) Any person violating this section shall be fined $250 for each violation and shall correct all instances of non-compliance for which a citation is issued. Violation of this section shall constitute a violation as defined in section 701-107 Hawaii Revised Statutes and shall be enforceable by employees of the department of public works. The foregoing fine may also be imposed in a civil, administrative proceeding pursuant to Rules and Regulations adopted by the department of public works in accordance with chapter 91 Hawaii Revised Statutes."

SECTION 2. New material is underscored. In printing this bill, the County Clerk need not include the underscoring.

SECTION 3. This ordinance shall take effect upon its approval.

APPROVED AS TO FORM
AND LEGALITY:

HOWARD M. FUKUSHIMA
Deputy Corporation Counsel
County of Maui
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WE HEREBY CERTIFY that the foregoing BILL NO. 6 (19 92), Draft 1

1. Passed FINAL READING at the meeting of the Council of the County of Maui, State of Hawaii, held on the 1st day of May , 1992 , by the following votes:

Howard S. KIHUNE Chair	Patrick S. KAWANO Vice-Chair	Vince G. BAGOYO, Jr.	Goro HOKAMA	Alice L. LEE	Ricardo MEDINA	Wayne K. NISHIKI	Joe S. TANAKA	Leinaala TERUYA DRUMMOND
Aye	Aye	Excused	Excused	Aye	Aye	Aye	Aye	Aye

2. Was transmitted to the Mayor of the County of Maui, State of Hawaii, on the 1st day of May , 1992 .

DATED AT WAILUKU, MAUI, HAWAII, this 1st day of May , 1992 .

HOWARD S. KIHUNE, CHAIR
Council of the County of Maui

DARYL T. YAMAMOTO, COUNTY CLERK
County of Maui

THE FOREGOING BILL IS HEREBY APPROVED THIS 5th DAY OF MAY , 1992 .

LINDA CROCKETT LINGLE, MAYOR
County of Maui

I HEREBY CERTIFY that upon approval of the foregoing BILL by the Mayor of the County of Maui, the said BILL was designated as ORDINANCE NO. 2108 of the County of Maui, State of Hawaii.

DARYL T. YAMAMOTO, COUNTY CLERK
County of Maui

Passed First Reading on January 17, 1992.
Effective date of Ordinance May 5, 1992.

I HEREBY CERTIFY that the foregoing is a true and correct copy of Ordinance No. 2108 , the original of which is on file in the Office of the County Clerk, County of Maui, State of Hawaii.

Dated at Wailuku, Hawaii, on

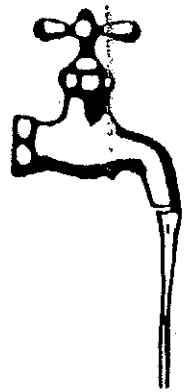
County Clerk, County of Maui

"THE COSTLY DRIP"

Slowly Dripping
Spigot Wastes
15 Gallons a day.

1/32" Leak Wastes
25 Gallons a day.

1/16" Stream Wastes
100 Gallons a Day.



1/8" Stream Wastes
400 Gallons a day.

United States Environmental Protection Agency
Office of Water
Washington, DC 20460
840-B-92-002
January 1993

EPA

Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of
Section 6217(g) of the Coastal Zone Act
Reauthorization Amendments of 1990

III. CONSTRUCTION ACTIVITIES

A. Construction Site Erosion and Sediment Control Management Measure

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

(2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

1. Applicability

This management measure is intended to be applied by States to all construction activities on sites less than 5 acres in areas that do not have an NPDES permit[3] in order to control erosion and sediment loss from those sites. This management measure does not apply to: (1) construction of a detached single family home on a site of 1/2 acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. (NOTE: All construction activities, including clearing, grading, and excavation, that result in the disturbance of areas greater than or equal to 5 acres or are a part of a larger development plan are covered by the NPDES regulations and are thus excluded from these requirements.) Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The goal of this management measure is to reduce the sediment loadings from construction sites in coastal areas that enter surface waterbodies. This measure requires that coastal States establish new or enhance existing State erosion and sediment control (ESC) programs and/or require ESC programs at the local level. It is intended to be part of a comprehensive land use or watershed management program, as previously detailed in the Watershed and Site Development Management Measures. It is expected that State and local programs will establish criteria determined by local conditions (e.g., soil types, climate, meteorology) that reduce erosion and sediment transport from construction sites.

Runoff from construction sites is by far the largest source of sediment in urban areas under development (York County Soil and Water Conservation District, 1990). Soil erosion removes over 90 percent of sediment by tonnage in urbanizing areas where most construction activities occur (Canning, 1988). Table 4-14 illustrates some of the

[3] On May 27, 1992, the United States Court of Appeals for the Ninth Circuit invalidated EPA's exemption of construction sites smaller than 5 acres from the storm water permit program in *Natural Resources Defense Council* v. *EPA*, 965 F.2d 759 (9th Cir. 1992). EPA is conducting further rulemaking proceedings on this issue and will not require permit applications for construction activities under 5 acres until further rulemaking has been completed.

measured sediment loading rates associated with construction activities found across the United States. As seen in Table 4-14, erosion rates from natural areas such as undisturbed forested lands are typically less than one ton/acre/year, while erosion from construction sites ranges from 7.2 to over 1,000 tons/acre/year.

Table 4-14. Erosion and Sediment Problems Associated With Construction

Location	Problem	Reference
United States	Sediment loading rates vary from 36.5 to 1,000 ton/ac/yr. These are 5 to 500 times greater than those from undeveloped land. Approximately 600 million tons of soil erodes from developed sites each year. Construction site sediment in runoff can be 10 to 20 times greater than that from agricultural lands.	York County Soil and Water Conservation District, 1990
Franklin County, FL	Sediment yield (ton/ac/yr): forest < 0.5 rangeland < 0.5 tilled 1.4 construction site 30 established urban < 0.5	Franklin County, FL
Wisconsin	Erosion rates range from 30 to 200 ton/ac/yr (10 to 20 times those of cropland).	Wisconsin Legislative Council, 1991
Washington, DC	Erosion rates range from 35 to 45 ton/ac/yr (10 to 100 times greater than agriculture and stabilized urban land uses).	MWCOG, 1987
Anacostia River Basin, VA, MD, DC	Sediment yields from portions of the Anacostia Basin have been estimated at 75,000 to 132,000 ton/yr.	U.S. Army Corps of Engineers, 1990
Washington	Erosion rates range from 50 to 500 ton/ac/yr. Natural erosion rates from forests or well-sodded prairies are 0.01 to 1.0 ton/ac/yr.	Washington Department of Ecology, 1989
Anacostia River Basin, VA, MD, DC	Erosion rates range from 7.2 to 100.8 ton/ac/yr.	USGS, 1978
Alabama	1.4 million tons eroded per year.	Woodward-Clyde, 1991
North Carolina	6.7 million tons eroded per year.	
Louisiana	5.1 million tons eroded per year.	
Oklahoma	4.2 million tons eroded per year.	
Georgia	3.8 million tons eroded per year.	
Texas	3.5 million tons eroded per year.	
Tennessee	3.3 million tons eroded per year.	
Pennsylvania	3.1 million tons eroded per year.	
Ohio	3.0 million tons eroded per year.	
Kentucky	3.0 million tons eroded per year.	

Eroded sediment from construction sites creates many problems in coastal areas including adverse impacts on water quality, critical habitats, submerged aquatic vegetation (SAV) beds, recreational activities, and navigation (APWA, 1991). For example, the Miami River in Florida has been severely affected by pollution associated with upland erosion. This watershed has undergone extensive urbanization, which has included the construction of many commercial and residential buildings over the past 50 years. Sediment deposited in the Miami River channel contributes to the severe water quality and navigation problems of this once-thriving waterway, as well as Biscayne Bay (SFWMD, 1988).

ESC plans are important for controlling the adverse impacts of construction and land development and have been required by many State and local governments, as shown in Table 4-13 (in the Site Development section of this chapter). An ESC plan is a document that explains and illustrates the measures to be taken to control erosion and sediment problems on construction sites (Connecticut Council on Soil and Water Conservation, 1988). It is intended that existing State and local erosion and sediment control plans may be used to fulfill the requirements of this management measure. Where existing ESC plans do not meet the management measure criteria, inadequate plans may be enhanced to meet the management measure guidelines.

Typically, an ESC plan is part of a larger site plan and includes the following elements:

- Description of predominant soil types;
- Details of site grading including existing and proposed contours;
- Design details and locations for structural controls;
- Provisions to preserve topsoil and limit disturbance;
- Details of temporary and permanent stabilization measures; and
- Description of the sequence of construction.

ESC plans ensure that provisions for control measures are incorporated into the site planning stage of development and provide for the reduction of erosion and sediment problems and accountability if a problem occurs (York County Soil and Water Conservation District, 1990). An effective plan for urban runoff management on construction sites will control erosion, retain sediments on site, to the extent practicable, and reduce the adverse effects of runoff. Climate, topography, soils, drainage patterns, and vegetation will affect how erosion and sediment should be controlled on a site (Washington State Department of Ecology, 1989). An effective ESC plan includes both structural and nonstructural controls. Nonstructural controls address erosion control by decreasing erosion potential, whereas structural controls are both preventive and mitigative because they control both erosion and sediment movement.

Typical nonstructural erosion controls include (APWA, 1991; York County Soil and Water Conservation District, 1990):

- Planning and designing the development within the natural constraints of the site;
- Minimizing the area of bare soil exposed at one time (phased grading);
- Providing for stream crossing areas for natural and man-made areas; and
- Stabilizing cut-and-fill slopes caused by construction activities.

Structural controls include:

- Perimeter controls;
- Mulching and seeding exposed areas;
- Sediment basins and traps; and
- Filter fabric, or silt fences.

Some erosion and soil loss are unavoidable during land-disturbing activities. While proper siting and design will help prevent areas prone to erosion from being developed, construction activities will invariably produce conditions where erosion may occur. To reduce the adverse impacts associated with construction, the construction management measure suggests a system of nonstructural and structural erosion and sediment controls for incorporation into an

ESC plan. Erosion controls have distinct advantages over sediment controls. Erosion controls reduce the amount of sediment transported off-site, thereby reducing the need for sediment controls. When erosion controls are used in conjunction with sediment controls, the size of the sediment control structures and associated maintenance may be reduced, decreasing the overall treatment costs (SWRPC, 1991).

3. Management Measure Selection

This management measure was selected to minimize sediment being transported outside the perimeter of a construction site through two broad performance goals: (1) **reduce** erosion and (2) **retain** sediment onsite, to the extent practicable. These performance goals were chosen to allow States and local governments flexibility in specifying practices appropriate for local conditions.

While several commentors responding to the draft (May 1991) guidance expressed the need to define "more measurable, enforceable ways" to control sediment loadings, other commentors stressed the need to draft management measures that do not conflict with existing State programs and allow States and local governments to determine appropriate practices and design standards for their communities. These management measures were selected because virtually all coastal States control construction activities to prevent erosion and sediment loss.

The measures were specifically written for the following reasons:

(1) Predevelopment loadings may vary greatly, and some sediment loss is usually inevitable;

(2) Current practice is built on the use of systems of practices selected based on site-specific conditions; and

(3) The combined effectiveness of erosion and sediment controls in systems is not easily quantified.

4. Erosion Control Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Erosion controls are used to reduce the amount of sediment that is detached during construction and to prevent sediment from entering runoff. Erosion control is based on two main concepts: (1) disturb the smallest area of land possible for the shortest period of time, and (2) stabilize disturbed soils to prevent erosion from occurring.

a. *Schedule projects so clearing and grading are done during the time of minimum erosion potential.*

Often a project can be scheduled during the time of year that the erosion potential of the site is relatively low. In many parts of the country, there is a certain period of the year when erosion potential is relatively low and construction scheduling could be very effective. For example, in the Pacific region if construction can be completed during the 6-month dry season (May 1 - October 31), temporary erosion and sediment controls may not be needed. In addition, in some parts of the country erosion potential is very high during certain parts of the year such as the spring thaw in northern areas. During this time of year, melting snowfall generates a constant runoff that can erode soil. In addition, construction vehicles can easily turn the soft, wet ground into mud, which is more easily washed offsite. Therefore, in the north, limitations should be placed on grading during the spring thaw (Goldman et al., 1986).

b. Stage construction.

oid areawide clearance of construction sites. Plan and stage land disturbance activities so that only the area ently under construction is exposed. As soon as the grading and construction in an area are complete, the area ould be stabilized.

clearing only those areas immediately essential for completing site construction, buffer zones are preserved and remains undisturbed until construction begins. Physical markers, such as tape, signs, or barriers, indicating the its of land disturbance, can ensure that equipment operators know the proposed limits of clearing. The area of watershed that is exposed to construction is important for determining the net amount of erosion. Reducing the xtent of the disturbed area will ultimately reduce sediment loads to surface waters. Existing or newly planted egetation that has been planted to stabilize disturbed areas should be protected by routing construction traffic around d protecting natural vegetation with fencing, tree armoring, retaining walls, or tree wells.

c. Clear only areas essential for construction.

Often areas of a construction site are unnecessarily cleared. Only those areas essential for completing construction ctivities should be cleared, and other areas should remain undisturbed. Additionally, the proposed limits of land isturbance should be physically marked off to ensure that only the required land area is cleared. Avoid disturbing egetation on steep slopes or other critical areas.

d. Locate potential nonpoint pollutant sources away from steep slopes, waterbodies, and critical areas.

Material stockpiles, borrow areas, access roads, and other land-disturbing activities can often be located away from critical areas such as steep slopes, highly erodible soils, and areas that drain directly into sensitive waterbodies.

e. Route construction traffic to avoid existing or newly planted vegetation.

Where possible, construction traffic should travel over areas that must be disturbed for other construction activity. his practice will reduce the area that is cleared and susceptible to erosion.

f. Protect natural vegetation with fencing, tree armoring, and retaining walls or tree wells.

Tree armoring protects tree trunks from being damaged by construction equipment. Fencing can also protect tree trunks, but should be placed at the tree's drip line so that construction equipment is kept away from the tree. The tree drip line is the minimum area around a tree in which the tree's root system should not be disturbed by cut, fill, or soil compaction caused by heavy equipment. When cutting or filling must be done near a tree, a retaining wall or tree well should be used to minimize the cutting of the tree's roots or the quantity of fill placed over the tree's roots.

g. Stockpile topsoil and reapply to revegetate site.

Because of the high organic content of topsoil, it cannot be used as fill material or under pavement. After a site is cleared, the topsoil is typically removed. Since topsoil is essential to establish new vegetation, it should be stockpiled and then reapplied to the site for revegetation, if appropriate. Although topsoil salvaged from the existing site can often be used, it must meet certain standards and topsoil may need to be imported onto the site if the existing topsoil is not adequate for establishing new vegetation.

h. Cover or stabilize topsoil stockpiles.

Unprotected stockpiles are very prone to erosion and therefore stockpiles must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles should be stabilized by erosion blankets, seeding, and/or mulching.

i. Use wind erosion controls.

Wind erosion controls limit the movement of dust from disturbed soil surfaces and include many different practices. Wind barriers block air currents and are effective in controlling soil blowing. Many different materials can be used as wind barriers, including solid board fence, snow fences, and bales of hay. Sprinkling moistens the soil surface with water and must be repeated as needed to be effective for preventing wind erosion (Delaware DNREC, 1989); however, applications must be monitored to prevent excessive runoff and erosion.

j. Intercept runoff above disturbed slopes and convey it to a permanent channel or storm drain.

Earth dikes, perimeter dikes or swales, or diversions can be used to intercept and convey runoff above disturbed areas. An earth dike is a temporary berm or ridge of compacted soil that channels water to a desired location. A perimeter dike/swale or diversion is a swale with a supporting ridge on the lower side that is constructed from the soil excavated from the adjoining swale (Delaware DNREC, 1989). These practices should be used to intercept flow from denuded areas or newly seeded areas to keep the disturbed areas from being eroded from the uphill runoff. The structures should be stabilized within 14 days of installation. A pipe slope drain, also known as a pipe drop structure, is a temporary pipe placed from the top of a slope to the bottom of the slope to convey concentrated runoff down the slope without causing erosion (Delaware DNREC, 1989).

k. On long or steep, disturbed, or man-made slopes, construct benches, terraces, or ditches at regular intervals to intercept runoff.

Benches, terraces, or ditches break up a slope by providing areas of low slope in the reverse direction. This keeps water from proceeding down the slope at increasing volume and velocity. Instead, the flow is directed to a suitable outlet, such as a sediment basin or trap. The frequency of benches, terraces, or ditches will depend on the erodibility of the soils, steepness and length of the slope, and rock outcrops. This practice should be used if there is a potential for erosion along the slope.

l. Use retaining walls.

Often retaining walls can be used to decrease the steepness of a slope. If the steepness of a slope is reduced, the runoff velocity is decreased and, therefore, the erosion potential is decreased.

m. Provide linings for urban runoff conveyance channels.

Often construction increases the velocity and volume of runoff, which causes erosion in newly constructed or existing urban runoff conveyance channels. If the runoff during or after construction will cause erosion in a channel, the channel should be lined or flow control BMPs installed. The first choice of lining should be grass or sod since this reduces runoff velocities and provides water quality benefits through filtration and infiltration. If the velocity in the channel would erode the grass or sod, then riprap, concrete, or gabions can be used.

n. Use check dams.

Check dams are small, temporary dams constructed across a swale or channel. They can be constructed using gravel or straw bales. They are used to reduce the velocity of concentrated flow and, therefore, to reduce the erosion in

swale or channel. Check dams should be used when a swale or channel will be used for a short time and therefore is not feasible or practical to line the channel or implement flow control BMPs (Delaware DNREC, 1989).

o. *Seed and fertilize.*

eding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once dense vegetative cover has been established. However, often seeding and fertilizing do not produce as thick a egetative cover as do seed and mulch or netting. Newly established vegetation does not have as extensive a root ystem as existing vegetation and therefore is more prone to erosion, especially on steep slopes. Care should be aken when fertilizing to avoid untimely or excessive application. Since the practice of seeding and fertilizing does ot provide any protection during the time of vegetative establishment, it should be used only on favorable soils in very flat areas and not in sensitive areas.

p. *Use seeding and mulch/mats.*

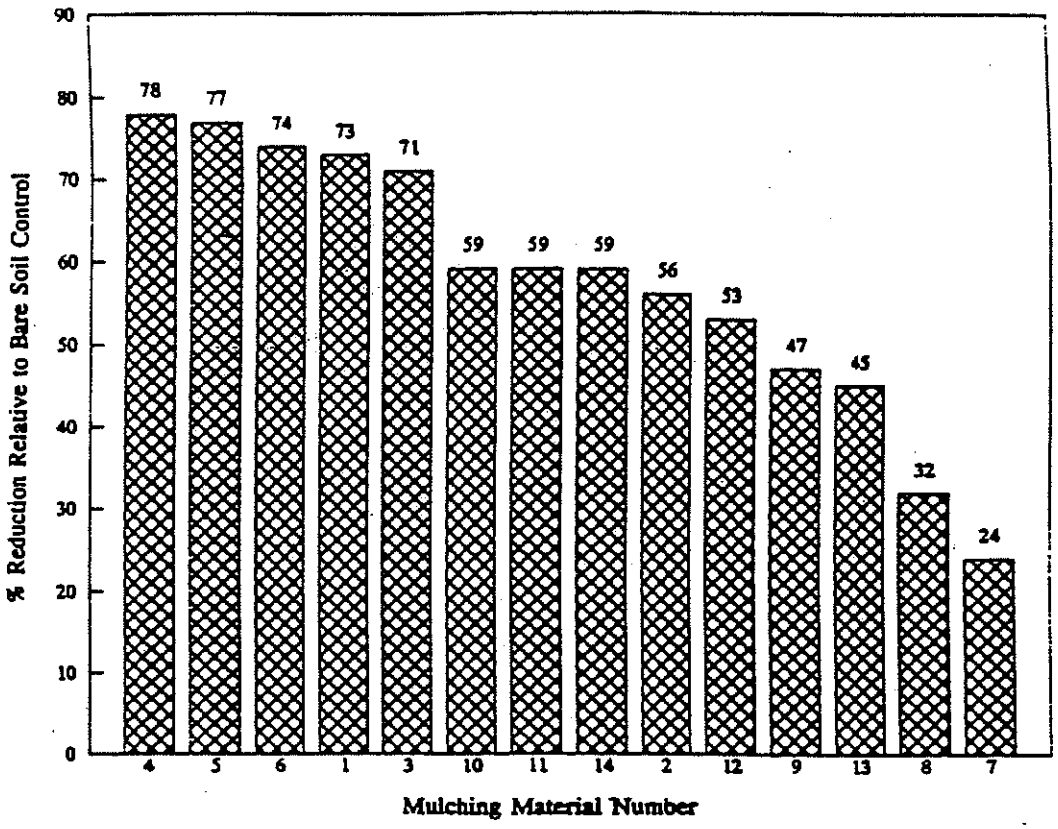
Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once the vegetative cover has been established. The mulching/mats protect the disturbed area while the vegetation becomes established.

The management of land by using ground cover reduces erosion by reducing the flow rate of runoff and the raindrop impact. Bare soils should be seeded or otherwise stabilized within 15 calendar days after final grading. Denuded areas that are inactive and will be exposed to rain for 30 days or more should also be temporarily stabilized, usually by planting seeds and establishing vegetation during favorable seasons in areas where vegetation can be established. In very flat, non-sensitive areas with favorable soils, stabilization may involve simply seeding and fertilizing. Mulching and/or sodding may be necessary as slopes become moderate to steep, as soils become more erosive, and as areas become more sensitive.

q. *Use mulch/mats.*

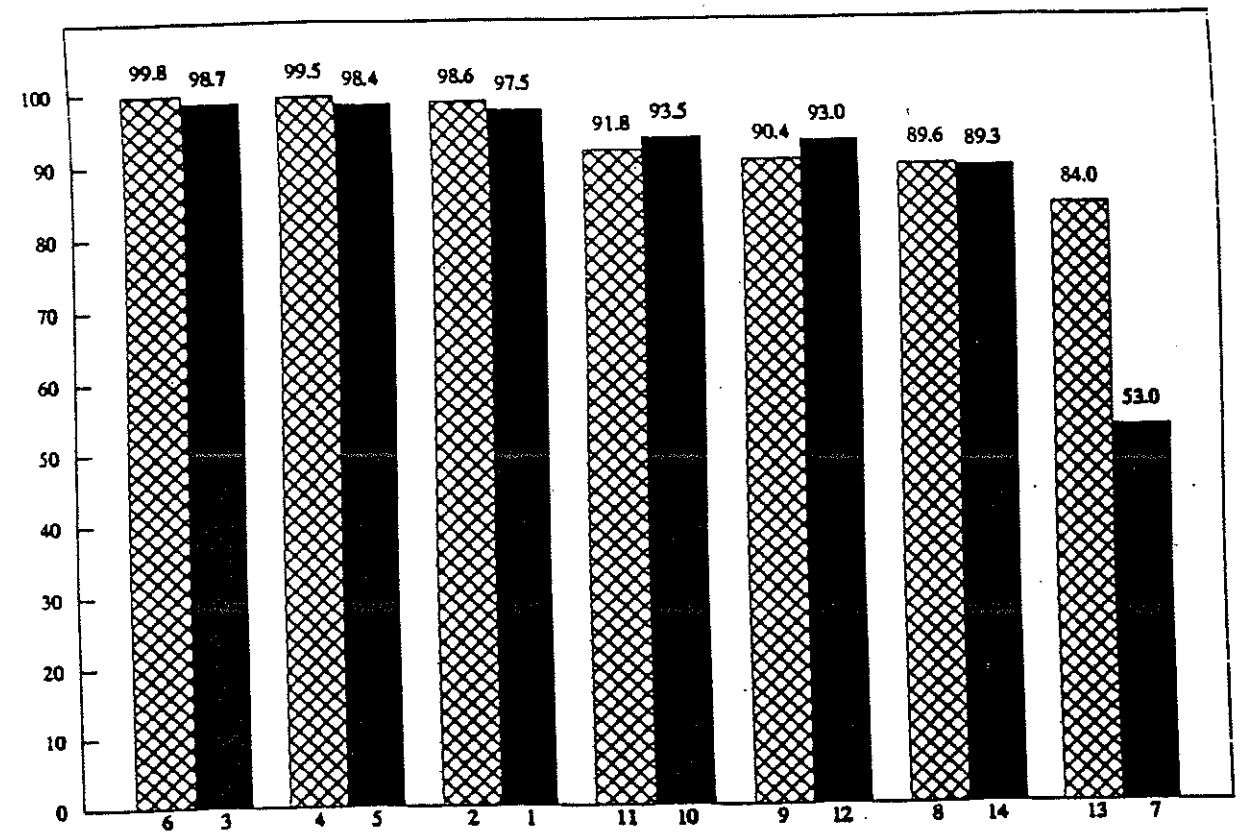
Mulching involves applying plant residues or other suitable materials on disturbed soil surfaces. Mulchs/mats used include tacked straw, wood chips, and jute netting and are often covered by blankets or netting. Mulching alone should be used only for temporary protection of the soil surface or when permanent seeding is not feasible. The useful life of mulch varies with the material used and the amount of precipitation, but is approximately 2 to 6 months. Figure 4-5 shows water velocity reductions that could be expected using various mulching techniques. Similarly, Figure 4-6 shows reductions in soil loss achievable using various mulching techniques. During times of year when vegetation cannot be established, soil mulching should be applied to moderate slopes and soils that are not highly erodible. On steep slopes or highly erodible soils, multiple mulching treatments should be used. On a high-elevation or desert site where grasses cannot survive the harsh environment, native shrubs may be planted. Interlocking ceramic materials, filter fabric, and netting are available for this purpose. Before stabilizing an area, it is important to have installed all sediment controls and diverted runoff away from the area to be planted. Runoff may be diverted away from denuded areas or newly planted areas using dikes, swales, or pipe slope drains to intercept runoff and convey it to a permanent channel or storm drain. Reserved topsoil may be used to revegetate a site if the stockpile has been covered and stabilized.

Consideration should be given to maintenance when designing mulching and matting schemes. Plastic nets are often used to cover the mulch or mats; however, they can foul lawn mower blades if the area requires mowing.



Mulch Material	Characteristics
1	100% wheat straw/top net
2	100% wheat straw/two nets
3	70% wheat straw/30% coconut fiber
4	70% wheat straw/30% coconut fiber
5	100% coconut fiber
6	Nylon monofilament/two nets
7	Nylon monofilament/rigid/bonded
8	Vinyl monofilament/flexible/bonded
9	Curled wood fibers/top net
10	Curled wood fibers/two nets
11	Antiwash netting (jute)
12	Interwoven paper and thread
13	Uncrimped wheat straw – 2,242 kg/ha
14	Uncrimped wheat straw – 4,484 kg/ha

Figure 4-5. Water velocity reductions for different mulch treatments (adapted from Harding, 1990).



Mulch Material	Characteristics
1	100% wheat straw/top net
2	100% wheat straw/two nets
3	70% wheat straw/30% coconut fiber
4	70% wheat straw/30% coconut fiber
5	100% coconut fiber
6	Nylon monofilament/two nets
7	Nylon monofilament/rigid/bonded
8	Vinyl monofilament/flexible/bonded
9	Curled wood fibers/top net
10	Curled wood fibers/two nets
11	Antiwash netting (jute)
12	Interwoven paper and thread
13	Uncrimped wheat straw – 2,242 kg/ha
14	Uncrimped wheat straw – 4,484 kg/ha

Figure 4-6. Actual soil loss reductions for different mulch treatments (adapted from Harding, 1990).

r. Use sodding.

Sodding permanently stabilizes an area. Sodding provides immediate stabilization of an area and should be used in critical areas or where establishment of permanent vegetation by seeding and mulching would be difficult. Sodding is also a preferred option when there is a high erosion potential during the period of vegetative establishment from seeding.

s. Use wildflower cover.

Because of the hardy drought-resistant nature of wildflowers, they may be more beneficial as an erosion control practice than turf grass. While not as dense as turfgrass, wildflower thatches and associated grasses are expected to be as effective in erosion control and contaminant absorption. Because thatches of wildflowers do not need fertilizers, pesticides, or herbicides, and watering is minimal, implementation of this practice may result in a cost savings (Brash et al., undated). In 1987, Howard County, Maryland, spent $690.00 per acre to maintain turfgrass areas, compared to only $31.00 per acre for wildflower meadows (Wilson, 1990).

A wildflower stand requires several years to become established; maintenance requirements are minimal once the area is established (Brash et al., undated).

5. Sediment Control Practices[4]

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Sediment controls capture sediment that is transported in runoff. Filtration and detention (gravitational settling) are the main processes used to remove sediment from urban runoff.

a. Sediment Basins

Sediment basins, also known as silt basins, are engineered impoundment structures that allow sediment to settle out of the urban runoff. They are installed prior to full-scale grading and remain in place until the disturbed portions of the drainage area are fully stabilized. They are generally located at the low point of sites, away from construction traffic, where they will be able to trap sediment-laden runoff.

Sediment basins are typically used for drainage areas between 5 and 100 acres. They can be classified as either temporary or permanent structures, depending on the length of service of the structure. If they are designed to function for less than 36 months, they are classified as "temporary"; otherwise, they are considered permanent structures. Temporary sediment basins can also be converted into permanent urban runoff management ponds. When sediment basins are designed as permanent structures, they must meet all standards for wet ponds.

b. Sediment Trap

Sediment traps are small impoundments that allow sediment to settle out of runoff water. Sediment traps are typically installed in a drainageway or other point of discharge from a disturbed area. Temporary diversions can be

[4]Adapted from Goldman (1986).

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used to direct runoff to the sediment trap. Sediment traps should not be used for drainage areas greater than 5 acres and typically have a useful life of approximately 18 to 24 months.

c. Filter Fabric Fence

Filter fabric fence is available from many manufacturers and in several mesh sizes. Sediment is filtered out as urban runoff flows through the fabric. Such fences should be used only where there is sheet flow (i.e., no concentrated flow), and the maximum drainage area to the fence should be 0.5 acre or less per 100 feet of fence. Filter fabric fences have a useful life of approximately 6 to 12 months.

d. Straw Bale Barrier

A straw bale barrier is a row of anchored straw bales that detain and filter urban runoff. Straw bales are less effective than filter fabric, which can usually be used in place of straw bales. However, straw bales have been effectively used as temporary check dams in channels. As with filter fabric fences, straw bale barriers should be used only where there is sheet flow. The maximum drainage area to the barrier should be 0.25 acre or less per 100 feet of barrier. The useful life of straw bales is approximately 3 months.

e. Inlet Protection

Inlet protection consists of a barrier placed around a storm drain drop inlet, which traps sediment before it enters the storm sewer system. Filter fabric, straw bales, gravel, or sand bags are often used for inlet protection.

f. Construction Entrance

A construction entrance is a pad of gravel over filter cloth located where traffic leaves a construction site. As vehicles drive over the gravel, mud, and sediment are collected from the vehicles' wheels and offsite transport of sediment is reduced.

g. Vegetated Filter Strips

Vegetated filter strips are low-gradient vegetated areas that filter overland sheet flow. Runoff must be evenly distributed across the filter strip. Channelized flows decrease the effectiveness of filter strips. Level spreading devices are often used to distribute the runoff evenly across the strip (Dillaha et al., 1989).

Vegetated filter strips should have relatively low slopes and adequate length and should be planted with erosion-resistant plant species. The main factors that influence the removal efficiency are the vegetation type, soil infiltration rate, and flow depth and travel time. These factors are dependent on the contributing drainage area, slope of strip, degree and type of vegetative cover, and strip length. Maintenance requirements for vegetated filter strips include sediment removal and inspections to ensure that dense, vigorous vegetation is established and concentrated flows do not occur. Maintenance of these structures is discussed in Section II.A of this chapter.

6. Effectiveness and Cost Information

a. Erosion Control Practices

The effectiveness of erosion control practices can vary based on land slope, the size of the disturbed area, rainfall frequency and intensity, wind conditions, soil type, use of heavy machinery, length of time soils are exposed and unprotected, and other factors. In general, a system of erosion and sediment control practices can more effectively reduce offsite sediment transport than can a single system. Numerous nonstructural measures such as protecting natural or newly planted vegetation, minimizing the disturbance of vegetation on steep slopes and other highly

erodible areas, maximizing the distance eroded material must travel before reaching the drainage system, and locating roads away from sensitive areas may be used to reduce erosion.

Table 4-15 contains the available cost and effectiveness data for some of the erosion controls listed above. Information on the effectiveness of individual nonstructural controls was not available. All reported effectiveness data assume that controls are properly designed, constructed, and maintained. Costs have been broken down into annual capital costs, annual maintenance costs, and total annual costs (including annualization of the capital costs).

b. Sediment Control Practices

Regular inspection and maintenance are needed for most erosion control practices to remain effective. The effectiveness of sediment controls will depend on the size of the construction site and the nature of the runoff flows. Sediment basins are most appropriate for drainage areas of 5 acres or greater. In smaller areas with concentrated flows, silt traps may suffice. Where concentrated flow leaves the site and the drainage area is less than 0.5 ac/100 ft of flow, filter fabric fences may be effective. In areas where sheet flow leaves the site and the drainage area is greater than 0.5 acre/100 ft of flow, perimeter dikes may be used to divert the flow to a sediment trap or sediment basin. Urban runoff inlets may be protected using straw bales or diversions to filter or route runoff away from the inlets.

Table 4-16 describes the general cost and effectiveness of some common sediment control practices.

c. Comparisons

Figure 4-7 illustrates the estimated TSS loading reductions from Maryland construction sites possible using a combination of erosion and sediment controls in contrast to using only sediment controls. Figure 4-8 shows a comparison of the cost and effectiveness of various erosion control practices. As can be seen in Figure 4-8, seeding or seeding and mulching provide the highest levels of control at the lowest cost.

Table 4-15. ESC Quantitative Effectiveness and Cost Summary

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Sod	Immediate erosion protection where there is high erosion potential during vegetative establishment.	Average: 99% Observed range: 98% - 99% References: Minnesota Pollution Control Agency, 1989; Pennsylvania, 1983 cited in USEPA, 1991	2	Average: $0.2 per ft^2 [$11,300 per acre] Range: $0.1 - $1.1 References: SWRPC, 1991; Schueler, 1987; Virginia, 1980	Average: 5% Range: 5% Reference: SWRPC, 1991	$0.20 per ft^2 $7,500 per acre
Seed	Establish vegetation on disturbed area.	After vegetation established- Average: 90% Observed range: 50% - 100% References: SCS, 1985 cited in EPA, 1991; Minnesota Pollution Control Agency, 1989; Oberts, 1984 cited in City of Austin, 1988; Delaware Department of Natural Resources, 1989	2	Average: $400 per acre Range: $200 - $1000 per acre References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986; Virginia, 1980	Average: 20% Range: 15% - 25% References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991	$300 per acre
Seed and Mulch	Establish vegetation on disturbed area.	After vegetation established- Average: 90% Observed range: 50% - 100% References: SCS, 1985 cited in EPA, 1991; Minnesota Pollution Control Agency, 1989; Oberts, 1984 cited in City of Austin, 1988; Delaware Department of Natural Resources, 1989	2	Average: $1,500 per acre Range: $800 - $3,500 per acre References: Goldman, 1986; Washington DOT, 1990; NC State, 1990; Schueler, 1987; Virginia, 1980; SWRPC, 1991	Average: NA[b] Range: NA References: None	$1,100 per acre

Table 4-15. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Mulch	Temporary stabilization of disturbed area.	Observed range: sand: 20% slope / 50% slope wood fiber @ 1500 lb/ac 50-60% / 0-20% wood fiber @ 3000 lb/ac 50-85% / 50-70% straw @ 3000 lb/ac 90-100% / 95% Silt-loam: 20% slope / 50% slope wood fiber @ 1500 lb/ac 20-60% / 40-60% wood fiber @ 3000 lb/ac 60-90% / 60-70% straw @ 3000 lb/ac 80-95% / 70-90% Silt-clay-loam: 10-30% slope / 30-50% slope wood fiber @ 1500 lb/ac 5% / -- wood fiber @ 3000 lb/ac 40% / -- jute netting 30-60% / 30% straw @ 3000 lb/ac 40-70% / 20-40% wood chips @ 10,000 lb/ac 60-80% / 50-60% mulch blanket 60-80% / 50-60% excelsior blanket 60-80% / 50-60% multiple treatment (straw and jute) 90% / 90% References: Minnesota Pollution Control Agency, 1989; Kay, 1983 cited in Goldman, 1986	Straw mulch: 0.25 Wood fiber mulch: 0.33 Jute netting: 0.33 Straw and jute: 0.33	Straw mulch: Average: $1,700 per acre Range: $500 - $5,000 per acre References: Wisconsin DOT cited in SWRPC, 1991; Washington DOT, 1990; Virginia, 1980 Wood fiber mulch: Average: $1,000 per acre Range: $100 - $2,300 per acre References: Washington DOT, 1990; Virginia, 1980 Jute netting: Average: $3,700 per acre Range: $3,500-$4,100 per acre References: Washington DOT, 1990; Virginia, 1980 Straw and jute: Average: $5,400 per acre Range: $4,000-$9,100 per acre References: Washington DOT, 1990; Virginia, 1980	Average: NA[b] Range: NA References: None	Straw mulch: $7,500 per acre Wood fiber mulch: $3,500 per acre Jute netting: $12,500 per acre Straw and jute: $18,000 per acre

Table 4-15. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Terraces	Break up long or steep slopes.	Observed range: Land Slope / Reduction in Erosion 1-12% / 70% 12-18% / 60% 18-24% / 55% Additionally, if the slope steepness is halved, while other factors are held constant, the soil loss potential decreases 2-1/2 times. If both the slope and length are halved, the soil loss potential is decreased 4 times. References: Goldman, 1986; Beasley, 1972	2	Average: $5 per lin ft Range: $1 - $12 References: SWRPC, 1991; Goldman, 1986; Virginia, 1991	Average: 20% Range: 20% Reference: SWRPC, 1991	$4 per lin ft
All Erosion Controls	Reduce amount of sediment entering runoff.	Average: 85% Observed range: 85% Reference: Schueler, 1990	--	Varies but typically low	Varies but typically low	Varies but typically low

NA - Not available.
[a] Useful life estimated as length of construction project (assumed to be 2 years).
[b] For Total Annual Cost, assume Annual Maintenance Cost = 2% of construction cost.

Table 4-16. ESC Quantitative Effectiveness and Cost Summary for Sediment Control Practices

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Sediment basin	Minimum drainage area = 5 acres, maximum drainage area = 100 acres	Average: 70% Observed range: 55% - 100% References: Schueler, 1990; Engle, BW and Jarrett, AR, 1990; Baumann, 1990	2	Less than 50,000 ft^3 storage Average: \$0.60 per ft^3 storage (\$1,100 per drainage acre[c]) Range: \$0.20 - \$1.30 per ft^3	Average: 25% Range: 25% References: Denver COG cited in SWRPC, 1991; SWRPC, 1991	Less than 50,000 ft^3 storage \$0.40 per ft^3 storage \$700 per drainage acre[b]
				Greater than 50,000 ft^3 storage Average: \$0.3 per ft^3 storage (\$550 per drainage acre[c]) Range: \$0.10 - \$0.40 per ft^3 References: SWRPC, 1991		Greater than 50,000 ft^3 storage \$0.20 per ft^3 storage \$900 per drainage acre[c]
Sediment trap	Maximum drainage area = 5 acres	Average: 60% Observed range: (-7%) - 100% References: Schueler, et al., 1990; Tahoe Regional Planning Agency, 1989; Baumann, 1990	1.5	Average: \$0.60 per ft^3 storage (\$1,100 per drainage acre[c]) Range: \$0.20 - \$2.00 per ft^3 References: Denver COG cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986	Average: 20% Range: 20% References: Denver COG cited in SWRPC, 1991; SWRPC, 1991	\$0.70 per ft^3 storage \$1,300 per drainage acre[c]
Filter Fabric Fence	Maximum drainage area = 0.5 acre per 100 feet of fence. Not to be used in concentrated flow areas.	Average: 70% Observed range: 0% - 100% sand: 80% - 99% silt-loam: 50% - 80% silt-clay-loam: 0% - 20% References: Munson, 1991; Fisher et al., 1984; Minnesota Pollution Control Agency, 1989	0.5	Average: \$3 per lin ft (\$700 per drainage acre[c] Range: \$1 - \$8 per lin ft References: Wisconsin DOT cited in SWRPC, 1991; SWRPC, 1991; Goldman, 1986; Virginia, 1991; NC State, 1990	Average: 100% Range: 100% References: SWRPC, 1991	\$7 per lin ft \$850 per drainage acre[c]

Table 4-16. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Straw Bale Barrier	Maximum drainage area = 0.25 acre per 100 feet of barrier. Not to be used in concentrated flow areas.	Average: 70% Observed Range: 70% References: Virginia, 1980 cited in EPA, 1991	0.25	Average: $4 per lin ft ($1,600 per drainage acre[d] Range: $2 - $6 per lin ft References: Goldman, 1986; Virginia, 1991	Average: 100% Range: 100% References: SWRPC, 1991	$17 per lin ft $6,800 per drainage acre[d]
Inlet Protection	Protect storm drain inlet.	Average: NA Observed Range: NA References: None	1	Average: $100 per inlet Range: $50 - $150 References: SWRPC, 1991; Denver COG cited in SWRPC, 1991; Virginia, 1991; EPA cited in SWRPC, 1991	Average: 60% Range: 20% - 100% References: SWRPC, 1991; Denver COG cited in SWRPC, 1991	$150 per inlet
Construction Entrance	Removes sediment from vehicles wheels.	Average: NA Observed Range: NA References: None	2	Average: $2,000 each Range: $1,000 - $4,000 References: Goldman, 1986; NC State, 1990	Average: NA[e] Range: NA References: None	$1,500 each
				With washrack: Average: $3,000 each Range: $1,000 - $5,000 References: Virginia, 1991		$2,200 each

Table 4-16. (Continued)

Practice	Design Constraints or Purpose	Percent Removal of TSS	Useful Life (years)[a]	Construction Cost	Annual Maintenance Cost (as % construction cost)	Total Annual Cost
Vegetative Filter Strip	Must have sheet flow.	Average: 70% Observed Range: 20% - 80% References: Hayes and Hairston, 1983 cited in Casman, 1990; Dillaha et al., 1989, cited in Glick et al., 1991; Virginia Department of Conservation, 1987; Nonpoint Source Control Task Force, 1983 cited in Minnesota PCA, 1989; Schueler, 1987	2	Established from existing vegetation- Average: $0 Range: $0 References: Schueler, 1987 Established from sod- Average: $11,300 per acre Range: $4,500 - $48,000 per acre References: Schueler, 1987; SWRPC, 1991	Average: NA Range: NA References: None	NA

NA - Not available.
[a] Useful life estimated as length of construction project (assumed to be 2 years)
[a] For Total Annual Cost, assume Annual Maintenance Cost=20% of construction cost.
[b] Assumes trap volume = 1800 cf/ac (0.5 inches runoff per acre).
[c] Assumes drainage area of 0.5 acre per 100 feet of fence (maximum allowed).
[d] Assumes drainage area of 0.25 acre per 100 feet of barrier (maximum allowed).

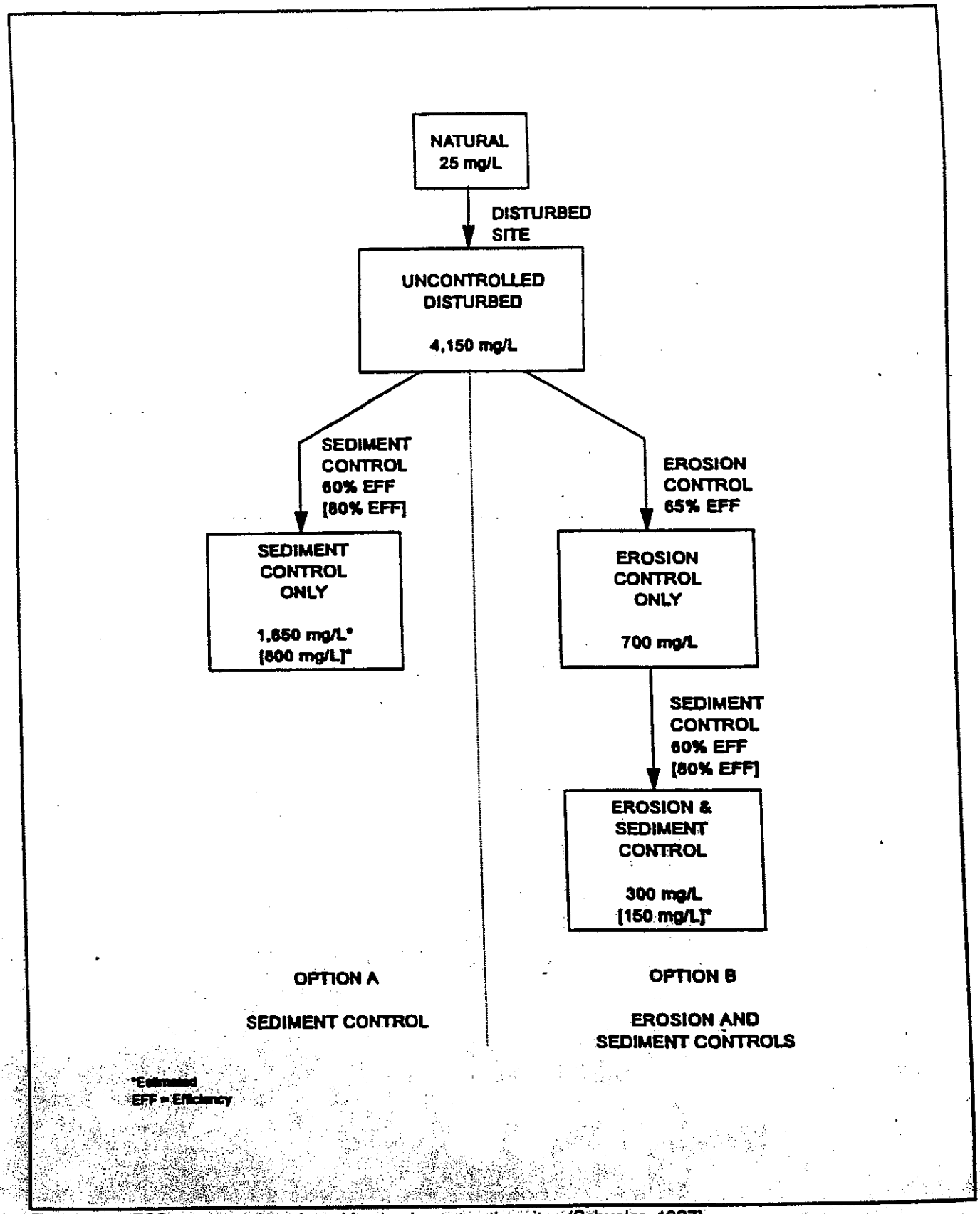

Figure 4-7. TSS concentrations from Maryland construction sites (Schueler, 1987).

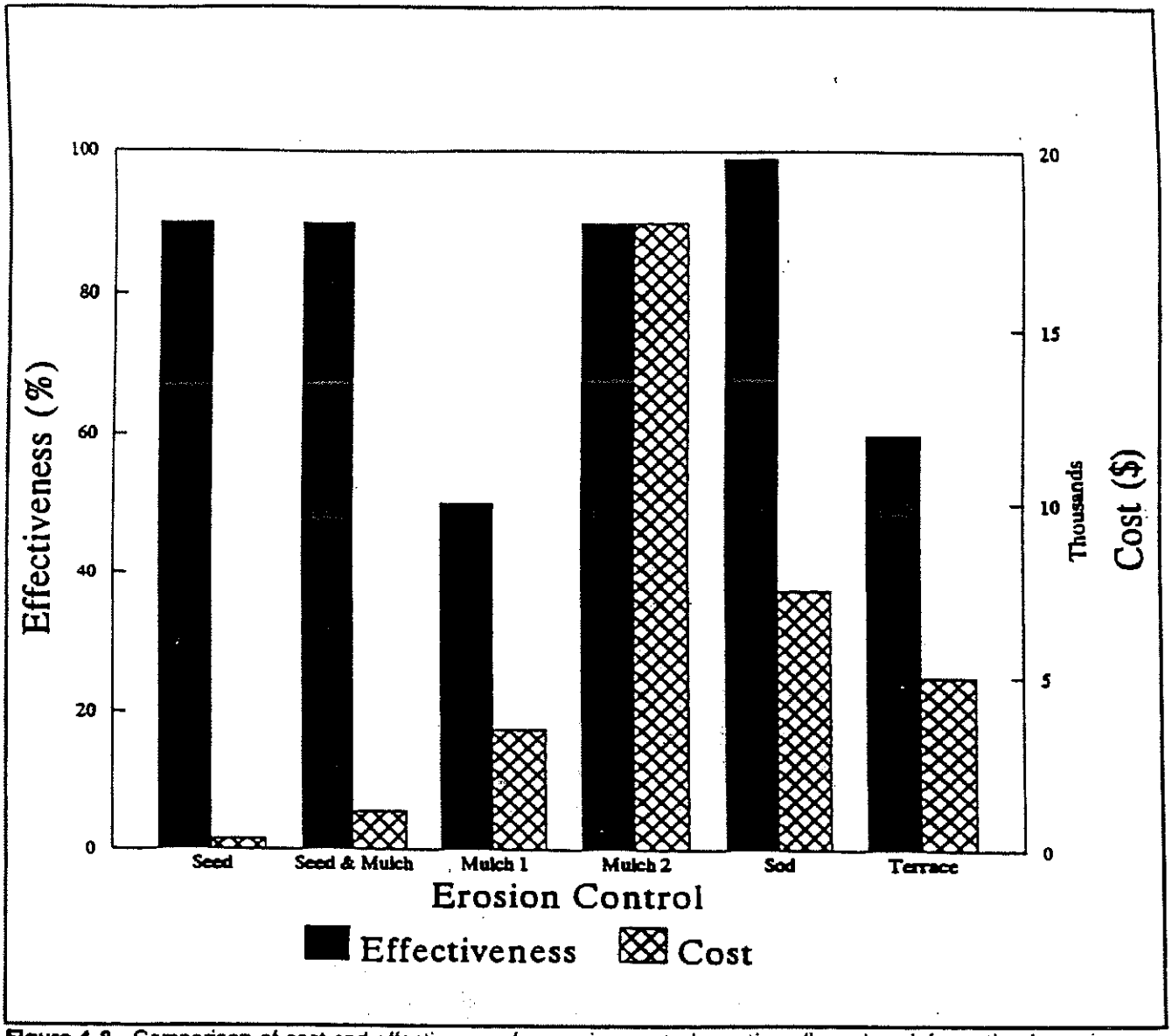

Figure 4-8. Comparison of cost and effectiveness for erosion control practices (based on information in Tables 4-15 and 4-16).

B. Construction Site Chemical Control Management Measure

(1) Limit application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

1. Applicability

This management measure is intended to be applied by States to all construction sites less than 5 acres in area and to new, resurfaced, restored, and reconstructed road, highway, and bridge construction projects. This management measure does not apply to: (1) construction of a detached single family home on a site of 1/2 acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. (NOTE: All construction activities, including clearing, grading, and excavation, that result in the disturbance of areas greater than or equal to 5 acres or are a part of a larger development plan are covered by the NPDES regulations and are thus excluded from these requirements.) Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformance with this management measure and will bave flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The purpose of this management measure is to prevent the generation of nonpoint source pollution from construction sites due to improper handling and usage of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site.

Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides (insecticides, fungicides, herbicides, and rodenticides); fertilizers used for vegetative stabilization; petrochemicals (oils, gasoline, and asphalt degreasers); construction chemicals such as concrete products, sealers, and paints; wash water associated with these products; paper; wood; garbage; and sanitary wastes (Washington State Department of Ecology, 1991).

The variety of pollutants present and the severity of their effects are dependent on a number of factors:

(1) **The nature of the construction activity.** For example, potential pollution associated with fertilizer usage may be greater along a highway or at a housing development than it would be at a shopping center development because highways and housing developments usually have greater landscaping requirements.

(2) **The physical characteristics of the construction site.** The majority of all pollutants generated at construction sites are carried to surface waters via runoff. Therefore, the factors affecting runoff volume,

such as the amount, intensity, and frequency of rainfall; soil infiltration rates; surface roughness; slope length and steepness; and area denuded, all contribute to pollutant loadings.

(3) **The proximity of surface waters to the nonpoint pollutant source.** As the distance separating pollutant-generating activities from surface waters decreases, the likelihood of water quality impacts increases.

a. Pesticides

Insecticides, rodenticides, and herbicides are used on construction sites to provide safe and healthy conditions, reduce maintenance and fire hazards, and curb weeds and woody plants. Rodenticides are also used to control rodents attracted to construction sites. Common insecticides employed include synthetic, relatively water-insoluble chlorinated hydrocarbons, organophosphates, carbamates, and pyrethrins.

b. Petroleum Products

Petroleum products used during construction include fuels and lubricants for vehicles, for power tools, and for general equipment maintenance. Specific petroleum pollutants include gasoline, diesel oil, kerosene, lubricating oils, and grease. Asphalt paving also can be particularly harmful since it releases various oils for a considerable time period after application. Asphalt overloads might be dumped and covered without inspection. However, many of these pollutants adhere to soil particles and other surfaces and can therefore be more easily controlled.

c. Nutrients

Fertilizers are used on construction sites when revegetating graded or disturbed areas. Fertilizers contain nitrogen and phosphorus, which in large doses can adversely affect surface waters, causing eutrophication.

d. Solid Wastes

Solid wastes on construction sites are generated from trees and shrubs removed during land clearing and structure installation. Other wastes include wood and paper from packaging and building materials, scrap metals, sanitary wastes, rubber, plastic and glass, and masonry and asphalt products. Food containers, cigarette packages, leftover food, and aluminum foil also contribute solid wastes to the construction site.

e. Construction Chemicals

Chemical pollutants, such as paints, acids for cleaning masonry surfaces, cleaning solvents, asphalt products, soil additives used for stabilization, and concrete-curing compounds, may also be used on construction sites and carried in runoff.

f. Other Pollutants

Other pollutants, such as wash water from concrete mixers, acid and alkaline solutions from exposed soil or rock, and alkaline-forming natural elements, may also be present and contribute to nonpoint source pollution.

Revegetation of disturbed areas may require the use of fertilizers and pesticides, which, if not applied properly, may become nonpoint source pollutants. Many pesticides are restricted by Federal and/or State regulations.

Hydroseeding operations, in which seed, fertilizers, and lime are applied to the ground surface in a one-step operation, are more conducive to nutrient pollution than are the conventional seedbed-preparation operations, in which fertilizers and lime are tilled into the soil. Use of fertilizers containing little or no phosphorus may be required by

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local authorities if the development is near sensitive waterbodies. The addition of lime can also affect the pH of sensitive waters, making them more alkaline.

Improper fueling and servicing of vehicles can lead to significant quantities of petroleum products being dumped onto the ground. These pollutants can then be washed off site in urban runoff, even when proper erosion and sediment controls are in place. Pollutants carried in solution in runoff water, or fixed with sediment crystalline structures, may not be adequately controlled by erosion and sediment control practices (Washington Department of Ecology, 1991). Oils, waxes, and water-insoluble pesticides can form surface films on water and solid particles. Oil films can also concentrate water-soluble insecticides. These pollutants can be nearly impossible to control once present in runoff other than by the use of very costly water-treatment facilities (Washington Department of Ecology, 1991).

After spill prevention, one of the best methods to control petroleum pollutants is to retain sediments containing oil on the construction site through use of erosion and sediment control practices. Improved maintenance and safe storage facilities will reduce the chance of contaminating a construction site. One of the greatest concerns related to use of petroleum products is the method for waste disposal. The dumping of petroleum product wastes into sewers and other drainage channels is illegal and could result in fines or job shutdown.

The primary control method for solid wastes is to provide adequate disposal facilities. Erosion and sediment control structures usually capture much of the solid waste from construction sites. Periodic removal of litter from these structures will reduce solid waste accumulations. Collected solid waste should be removed and disposed of at authorized disposal areas.

Improperly stored construction materials, such as pressure-treated lumber or solvents, may lead to leaching of toxics to surface water and ground water. Disposal of construction chemicals should follow all applicable State and local laws that may require disposal by a licensed waste management firm.

3. Management Measure Selection

This management measure was selected based on the potential for many construction activities to contribute to nutrient and toxic NPS pollution.

This management measure was selected because (1) construction activities have the potential to contribute to increased loadings of toxic substances and nutrients to waterbodies; (2) various States and local governments regulate the control of chemicals on construction sites through spill prevention plans, erosion and sediment control plans, or other administrative devices; (3) the practices described are commonly used and presented in a number of best management practice handbooks and guidance manuals for construction sites; and (4) the practices selected are the most economical and effective.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

a. Properly store, handle, apply, and dispose of pesticides.

Pesticide storage areas on construction sites should be protected from the elements. Warning signs should be placed in areas recently sprayed or treated. Persons mixing and applying these chemicals should wear suitable protective clothing, in accordance with the law.

Application rates should conform to registered label directions. Disposal of excess pesticides and pesticide-related wastes should conform to registered label directions for the disposal and storage of pesticides and pesticide containers set forth in applicable Federal, State, and local regulations that govern their usage, handling, storage, and disposal. Pesticides and herbicides should be used only in conjunction with Integrated Pest Management (IPM) (see Chapter 2). Pesticides should be the tool of last resort; methods that are the least disruptive to the environment and human health should be used first.

Pesticides should be disposed of through either a licensed waste management firm or a treatment, storage, and disposal (TSD) facility. Containers should be triple-rinsed before disposal, and rinse waters should be reused as product.

Other practices include setting aside a locked storage area, tightly closing lids, storing in a cool, dry place, checking containers periodically for leaks or deterioration, maintaining a list of products in storage, using plastic sheeting to line the storage area, and notifying neighboring property owners prior to spraying.

b. Properly store, handle, use, and dispose of petroleum products.

When storing petroleum products, follow these guidelines:

- Create a shelter around the area with cover and wind protection;
- Line the storage area with a double layer of plastic sheeting or similar material;
- Create an impervious berm around the perimeter with a capacity 110 percent greater than that of the largest container;
- Clearly label all products;
- Keep tanks off the ground; and
- Keep lids securely fastened.

Oil and oily wastes such as crankcase oil, cans, rags, and paper dropped into oils and lubricants should be disposed of in proper receptacles or recycled. Waste oil for recycling should not be mixed with degreasers, solvents, antifreeze, or brake fluid.

c. Establish fuel and vehicle maintenance staging areas located away from all drainage courses, and design these areas to control runoff.

Proper maintenance of equipment and installation of proper stream crossings will further reduce pollution of water by these sources. Stream crossings should be minimized through proper planning of access roads. Refer to Chapter 3 for additional information on stream crossings.

d. Provide sanitary facilities for constructions workers.

e. Store, cover, and isolate construction materials, including topsoil and chemicals, to prevent runoff of pollutants and contamination of ground water.

f. Develop and implement a spill prevention and control plan. Agencies, contractors, and other commercial entities that store, handle, or transport fuel, oil, or hazardous materials should develop a spill response plan.

Post spill procedure information and have persons trained in spill handling on site or on call at all times. Materials for cleaning up spills should be kept on site and easily available. Spills should be cleaned up immediately and the contaminated material properly disposed of. Spill control plan components should include:

- Stop the source of the spill.
- Contain any liquid.
- Cover the spill with absorbent material such as kitty litter or sawdust, but do not use straw. Dispose of the used absorbent properly.

g. *Maintain and wash equipment and machinery in confined areas specifically designed to control runoff.*

Thinners or solvents should not be discharged into sanitary or storm sewer systems when cleaning machinery. Use alternative methods for cleaning larger equipment parts, such as high-pressure, high-temperature water washes, or steam cleaning. Equipment-washing detergents can be used, and wash water may be discharged into sanitary sewers if solids are removed from the solution first. (This practice should be verified with the local sewer authority.) Small parts can be cleaned with degreasing solvents, which can then be reused or recycled. Do not discharge any solvents into sewers.

Washout from concrete trucks should be disposed of into:

- A designated area that will later be backfilled;
- An area where the concrete wash can harden, can be broken up, and then can be placed in a dumpster; or
- A location not subject to urban runoff and more than 50 feet away from a storm drain, open ditch, or surface water.

Never dump washout into a sanitary sewer or storm drain, or onto soil or pavement that carries urban runoff.

h. *Develop and implement nutrient management plans.*

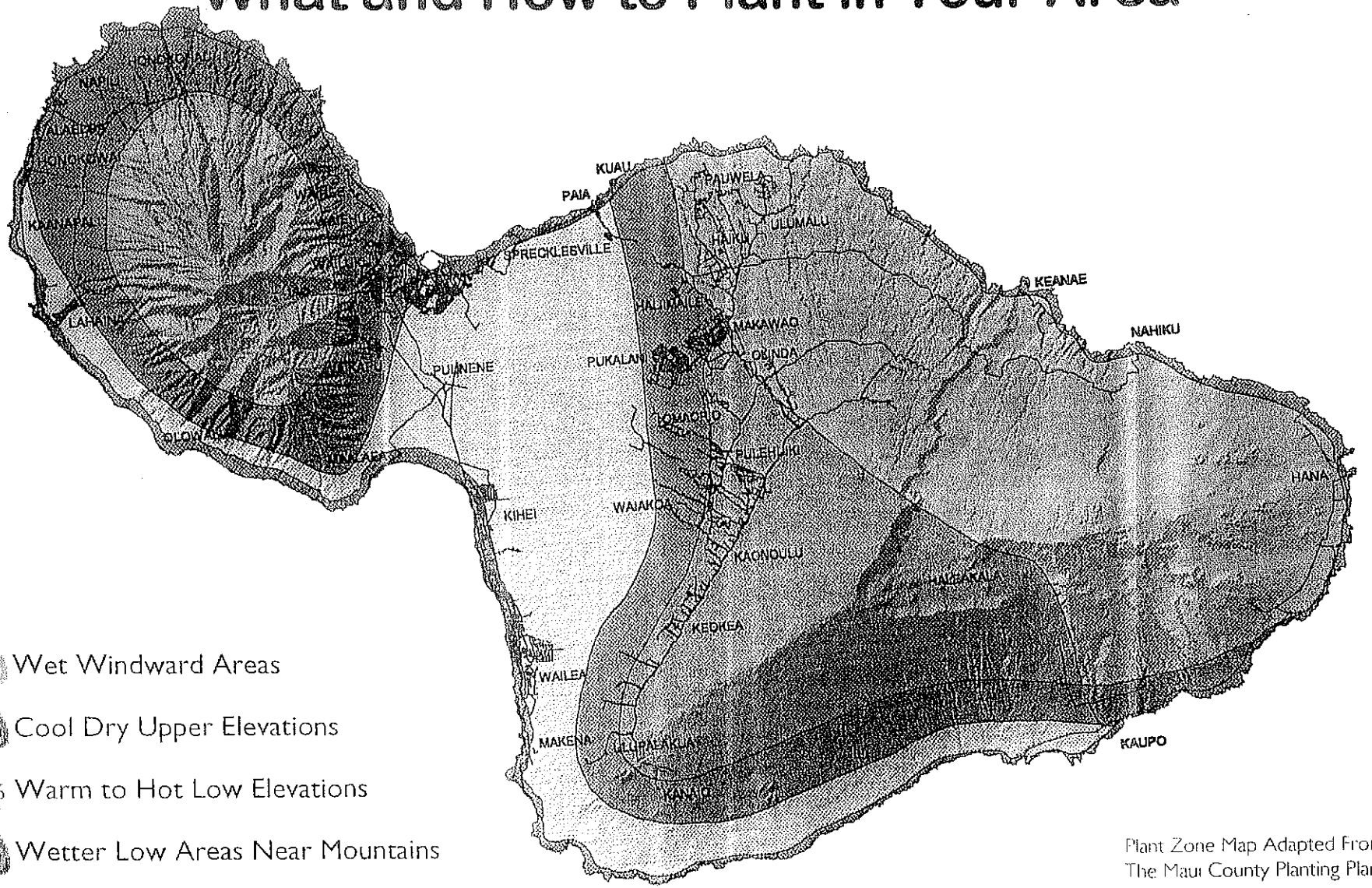
Properly time applications, and work fertilizers and liming materials into the soil to depths of 4 to 6 inches. Using soil tests to determine specific nutrient needs at the site can greatly decrease the amount of nutrients applied.

i. *Provide adequate disposal facilities for solid waste, including excess asphalt, produced during construction.*

j. *Educate construction workers about proper materials handling and spill response procedures. Distribute or post informational material regarding chemical control.*

Saving Water in The Yard

What and How to Plant in Your Area



1. Wet Windward Areas
2. Cool Dry Upper Elevations
3. Warm to Hot Low Elevations
4. Wetter Low Areas Near Mountains
5. Windward Coastal Salt Spray Zones

Plant Zone Map Adapted From
The Maui County Planting Plan

Tips From The Maui County Department of Water Supply

By Water All Things Find Life

Zone-specific Native and Polynesian plants for Maui County

Zone 1

TYPE: **F** Fern **G** Grass **Gr** Ground Cover **Sh** Shrub **P** Palm **S** Sedge **Tr** Tree **V** Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia arecina	lo'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	Pritchardia forbesiana	lo'ulu	15'			
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Cordyline fruticosa	ti, ki	6			
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Charpentiera obovata		15'			
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'akiohala, hau-hele	8'			
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

TYPE: **F** Fern **G** Grass **Gr** Ground Cover **Sh** Shrub **P** Palm **S** Sedge **Tr** Tree **V** Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia mauiensis var. diffusa	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Charpentiera obovata		15'			
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

TYPE: **F** Fern **G** Grass **Gr** Ground Cover **Sh** Shrub **P** Palm **S** Sedge **Tr** Tree **V** Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Bidens menziesii ssp. menziesii	ko'oko'olau	1'	3'		
Sh	Bidens micrantha ssp. micrantha	ko'oko'olau	1'	3'		
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai osmanthus				
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Canthium odoratum	Alahe'e, 'ohe'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Diospyros sandwicensis	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Nesoluma polynesicum	keahi	15'	15'	sea to 3,00'	Dry
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Reynoldsia sandwicensis	'ohe makai	20'	20'	1,000' to 3,000'	Dry
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, 'ama'uma'u				
Gr	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u 'aki'aki, fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. lorifolia	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pā'ū o Hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala wai nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr, Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr, Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr, Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia arecina	lo'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	Pritchardia forbesiana	lo'ulu	15'			
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 4

[illegible]	[illegible]	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh		Artemisia mauiensis var. diffusa	Maui wormwood, ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh		Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh		Bidens menziesii ssp. menziesii	ko'oko'olau	1'	3'		
Sh		Bidens micrantha ssp. micrantha	ko'oko'olau	1'	3'		
Sh		Cordyline fruticosa	ki, ti	6'			
Sh		Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh		Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh		Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh		Scaevola sericea	naupaka, naupaka kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh		Solanum nelsonii	[illegible], beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh		Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh		Vitex rotundifolia	pohinahina	3'	2'	sea to 1,000'	Dry to Medium
Sh		Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai [illegible]				
Sh	Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	8'	sea to 1,000'	Dry to Medium
Sh	Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh	Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh		Dodonaea viscosa	'a'ali'i	6'	5'	sea to higher	Dry to Medium
Tr		Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr		Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr		Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr		Canthium odoratum	Alahe'e, 'ohe'a, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr		Charpentiera obovata		15'			
Tr		Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr		Diospyros sandwicensis	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr		Hibiscus furcellatus	'akiohala, hau hele	8'			
Tr		Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr		Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
[illegible]	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
[illegible]	Pandanus tectorius	hala, puhala (HALF LIST)	35'	25'	sea to 1,000'	Dry to Wet
T	[illegible]	[illegible]	20'			
T	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
T	Santalum ellipticum	'iliahi/sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
T	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
T	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Alyxia oliviformis	maile	Vine		sea to 8,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 5

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Watering
G	Colubrina asiatica	anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis variabilis	emoloa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. kaenana	akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,000'	Dry to Medium
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lycium sandwicense	ohelo kai, 'ae'ae	2'	3'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	loulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	ma'o, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 5

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	6'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	8'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomona	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	[illegible], beach solanum	3'	3'	sea to 1,00	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	1'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis, kauaiensis	'akia, [illegible]				
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	8'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'akiohala, hau hele	6'			
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Thespesia populnea	milo	30'	30'	sea to 1,000'	Dry to Wet
V	Ipomoea pes-caprae	beach morning glory, pohuehue	1'			

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
black wattle	Acacia mearnsii	Mimosaceae
blackberry	Rubus argutus	Rosaceae
blue gum	Eucalyptus globulus	Myrtaceae
bocconia	Bocconia frutescens	Papaveraceae
broad-leaved cordia	Cordia glabra	Boraginaceae
broomsedge, yellow bluestem	Andropogon virginicus	Poaceae
buffelgrass	Cenchrus ciliaris	Poaceae
butterfly bush, smoke bush	Buddleja madagascariensis	Buddlejaceae
cats claw, Mysore thorn, wait-a-bit	Caesalpinia decapetala	Caesalpiniaceae
common ironwood	Casuarina equisetifolia	Casuarinaceae
common velvet grass, Yorkshire fog	Holcus lanatus	Poaceae
fiddlewood	Citharexylum spinosum	Verbenaceae
fire tree, faya tree	Myrica faya	Myricaceae
glorybower	Clerodendrum laponicum	Verbenaceae
hairy cat's ear, gosmore	Hypochoeris radicata	Asteraceae
haole koa	Leucaena leucocephala	Fabaceae
ivy gourd, scarlet-fruited gourd	Coccinia grandis	Cucurbitaceae
juniper berry	Citharexylum caudatum	Verbenaceae
kahili flower	Grevillea banksii	Proteaceae
klu, popinac	Acacia farnesiana	Mimosaceae
logwood, bloodwood tree	Haematoxylon campechianum	Caesalpiniaceae
loquat	Eriobotrya japonica	Rosaceae
meadow ricegrass	Ehrharta stipoides	Poaceae
melaleuca	Melaleuca quinquenervia	Myrtaceae
miconia, velvet leaf	Miconia calvescens	Melastomataceae
narrow-leaved carpetgrass	Axonopus fissifolius	Poaceae
oleaster	Elaeagnus umbellata	Elaeagnaceae
oriental mangrove	Bruguiera gymnorrhiza	Rhizophoraceae
padang cassia	Cinnamomum burmanii	Lauraceae
palmgrass	Setaria palmifolia	Poaceae
pearl flower	Heterocentron subtriplinervium	Melastomataceae
quinine tree	Cinchona pubesens	Rubiaceae
satin leaf, caimitillo	Chrysophyllum oliviforme	Sapotaceae
silkwood, Queensland maple	Flindersia brayleyana	Rutaceae
silky oak, silver oak	Grevillea robusta	Proteaceae
strawberry guava	Psidium cattleianum	Myrtaceae
swamp oak, saltmarsh, longleaf ironwood	Casuarina glauca	Casuarinaceae
sweet vernalgrass	Anthoxanthum odoratum	Poaceae
tree of heaven	Ailanthus altissima	Simaroubaceae
trumpet tree, guarumo	Cecropia obtusifolia	Cecropiaceae
white ginger	Hedychium coronarium	Zingiberaceae
white moho	Heliocarpus popayanensis	Tiliaceae
yellow ginger	Hedychium flavescens	Zingiberaceae

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
	Jasminum fluminense	Oleaceae
	Arthrostema ciliatum	Melastomataceae
	Dissotis rotundifolia	Melastomataceae
	Erigeron karvinskianus	Asteraceae
	Eucalyptus robusta	Myrtaceae
	Hedychium gardnerianum	Zingiberaceae
	Juncus planifolius	Juncaceae
	Lophostemon confertus	Myrtaceae
	Medinilla cumingii	Melastomataceae
	Medinilla magnifica	Melastomataceae
	Medinilla venosa	Melastomataceae
	Melastoma candidum	Melastomataceae
	Melinis minutiflora	Poaceae
	Olea europaea	
	Oxyspora paniculata	Melastomataceae
	Panicum maximum	Poaceae
	Paspalum urvillei	Poaceae
	Passiflora edulis	Passifloraceae
	Phormium tenax	Agavaceae
	Pinus taeda	Pinaceae
	Prosopis pallida	Fabaceae
	Pterolepis glomerata	Melastomataceae
	Rhodomyrtus tomentosa	Myrtaceae
	Schefflera actinophylla	Araliaceae
	Syzygium jambos	Myrtaceae
Australian blackwood	Acacia melanoxylon	Mimosaceae
Australian tree fern	Cyathea cooperi	Cyatheaceae
Australian tree fern	Sphaeropteris cooperi	Cyatheaceae
Beggar's tick, Spanish needle	Bidens pilosa	Asteraceae
California grass	Brachiaria mutica	Poaceae
Chinese banyon, Maylayan banyon	Ficus mirocarpa	Moraceae
Chinese violet	Asystasia gangetica	Acanthaceae
Christmasberry, Brazilian pepper	Schinus terebinthifolius	Anacardiaceae
Formosan koa	Acacia confusa	Mimosaceae
German ivy	Senecio mikanioides	Asteraceae
Japanese honeysuckle	Lonicera japonica	Caprifoliaceae
Koster's curse	Clidemia hirta	Melastomataceae
Lantana	Lantana camara	Verbenaceae
Mauritius hemp	Furcraea foetida	Agavaceae
Mexican ash, tropical ash	Fraxinus uhdei	Oleaceae
Mexican tulip poppy	Hunnemannia fumariifolia	Papaveraceae
Mules foot, Madagascar tree fern	Angiopteris evecta	Marattiaceae
New Zealand laurel, karakaranut	Corynocarpus laevigatus	Corynocarpaceae
New Zealand tea	Leptospermum scoparium	Myrtaceae
Pampas grass	Cortaderia jubata	Poaceae
Panama rubber tree, Mexican rubber tree	Castilloa elastica	Moraceae
Shoebutton ardisia	Ardisia elliptica	Myrsinaceae
banana poka	Passiflora mollissima	Passifloraceae

Selection

As a general rule, it is best to select the largest and healthiest specimens. However, be sure to note that they are not pot-bound. Smaller, younger plants may result in a low rate of plant survival.[1] When selecting native species, consider the site they are to be planted in, and the space that you have to plant. For example: Mountain species such as koa and maile will not grow well in hot coastal areas exposed to strong ocean breezes. Lowland and coastal species such as wiliwili and Kou require abundant sunshine and porus soil. They will not grow well with frequent cloud cover, high rainfall and heavy soil.

Consider too, the size that the species will grow to be. It is not wise to plant trees that will grow too large.[2] Overplanting tends to be a big problem in the landscape due to the underestimation of a species' height, width or spread.

A large, dense canopied tree such as the kukui is a good shade tree for a lawn. However, it's canopy size and density of shade will limit what can be planted in the surrounding area. Shade cast by a koa and ohia lehua is relatively light and will not inhibit growth beneath it.

Keep seasons in mind when you are selecting your plants. Not all plants look good year round, some plants such as ilima will look scraggly after they have flowered and formed seeds. Avoid planting large areas with only one native plant. Mixing plants which naturally grow together will ensure the garden will look good all year round.[3] Looking at natural habitats helps to show how plants grow naturally in the landscape.

When planting an area with a mixed-ecosystem, keep in mind the size and ecological requirements of each plant. Start with the hardiest and most easily grown species, but allow space for fragile ones in subsequent plantings.

Acquiring natives

Plants in their wild habitat must be protected and maintained. It is best and easiest to get your plants from nurseries (see list), or friend's gardens. Obtain proper permits from landowners and make sure you follow a few common sense rules:

- **collect sparingly from each plant or area.**
- some plants are on the state or Federal Endangered Species list. Make sure you get permits (see app. A,B)

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[1] K. Nagata, P.6

[2] K. Nagata, P.9

[3] Nagata, P.9

Soil

Once you have selected your site and the plants you wish to establish there, you must look at the soil conditions on the site. Proper soil is necessary for the successful growth of most native plants, which preform poorly in hard pan, clay or adobe soils. If natives are to be planted in these types of soil, it would be wise to dig planting holes several times the size of the rootball and backfill with 50-75% compost.[4] A large planting hole ensures the development of a strong root system. The plant will have a headstart before the roots penetrate the surrounding poor soil.[5]

It is recommended that native plants not be planted in ground that is more dense than potting soil. If there is no alternative, dig a hole in a mound of soil mixed with volcanic cinder which encourages maximum root development. Fill the hole with water, if the water tends to puddle or drain too slowly, dig a deeper hole until the water does not puddle longer than 1 or 2 minutes.[6] Well-drained soil is one of the most important things when planting natives as you will see in the next section.

Irrigation

Most natives do very poorly in waterlogged conditions. Do not water if the soil is damp. Water when the soil is dry and the plants are wilting. Once established, a good soaking twice a week should suffice. Deep soaking encourages the development of stronger, and deeper root systems. This is better than frequent and shallow watering which encourage weaker, more shallow root systems.

The following is a watering schedule from Kenneth Nagata's Booklet, *How To Plant A Native Hawaiian Garden*:

WATER REQUIREMENT	WATERING FREQUENCY
Heavy	3x / week
Moderate	2x / week
Light	1x / week

Red clay soils hold more water for a longer period of time than sandy soils do. If your area is very sunny or near a beach, things will dry out faster. Even in the area of one garden, there are parts that will need more or less water. Soils can vary and amount of shade and wind differ. After plants are established (a month or two for most plants, up to a year for some trees), you can back off watering.

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[4] Nagata, p. 6

[5] Nagata, p. 8

[6] Nagata, p. 8

Automatic sprinkler systems are expensive to install and must be checked and adjusted regularly. Above-ground systems allow you to monitor how much water is being put out, but you lose a lot due to malfunctioning of sprinkler heads and wind. The most efficient way to save water and make sure your plants get enough water, is to hand-water. This way you are getting our precious water to the right places in the right amounts.[7]

Fertilizer

An all-purpose fertilizer 10-10-10 is adequate for most species. They should be applied at planting time, 3 months later, and 6 months thereafter. Use half the dosage recommended for ornamentals and pay special attention to native ferns which are sensitive to strong fertilizers. Use of organic composts and aged animal manures is suggested instead of chemical fertilizers. In addition, use of cinders for providing trace minerals is strongly recommended.[8]

Natives are plants which were here hundreds of years before the polynesians inhabited the Hawaiian Islands. They were brought here by birds, or survived the harsh ocean conditions to float here. They are well-adapted to Hawaii's varying soil and environmental conditions. This is why they make prime specimens for a xeriscape garden. However, natives will not thrive on their own, especially under harsh conditions. On the other hand, like any other plant, if you over-water and over-fertilize them, they will die. Follow the instructions given to you by the nursery you buy the plant from, or from this booklet. Better yet, buy a book (suggested readings can be found in the bibliography in the back of this pamphlet), read it, and learn more about native plants. I guarantee that you will be pleased with the results.

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[7] Bornhorst, p. 19-20

[8] Nagata, p. 6

Propagation

There are many ways to propagate and plant-out native Hawaiian species. One of the most thourough and helpful book is Heidi Bornhorst's book, *Growing Native Hawaiian Plants.* The easiest, and best way to obtain natives for the novice gardener is to get them from a reputable nursery (see appendix c). That way all you will have to do is know how to transplant (if necessary) and plant-out when you are ready. These are the two methods I have listed here.

Transplanting

1. Use pots that are one size bigger than the potted plant is in
2. Get your potting medium ready

Good potting medium is a ½, ½ mixture of peat moss and perlite. If the plant is from a dry or coastal area, add chunks of cinder or extra perlite. If it is a wet forest species, add more peat moss or compost. Be aware that peat moss is very acidic and certain plants react severely to acidity.

If the plant is to eventually be planted into the ground, make a mix of equal parts peat moss, perlite, and soil from the area in which the plant is to be planted. Slow-release fertilizer can be mixed into the potting medium.

3. Once pots, potting medium, fertilizer and water are ready, you can begin re-potting. Keep the plant stem at the same depth it was in the original pot. Avoid putting the plant in too large a pot, as the plant may not be able to soak up all the water in the soil and the roots may drown and rot.

Mix potting medium and add slow-release fertilizer at this time. Pre-wet the medium to keep dust down and lessen shock to the plant. Put medium in bottom of pot. Measure for the correct depth in the new pot. Make sure there is from ½ to 2 inches from the top of the pot so the plant can get adequate water. Try to stand the plant upright and center the stem in the middle of the pot.

Water the plant thoroughly after transplanting. A vitamin B-1 transplanting solution can help to lessen the transplant shock. Keep the plant in the same type of environment as it was before, sun or shade. If roots were broken, trimm off some of the leaves to compensate for the loss.[9]

Planting out

1. Plant most native Hawaiian plants in a sunny location in soil that is well-drained.
2. Make the planting hole twice as wide as the root ball or present pot, and just as deep.

If the soil is clay-like, and drains slowly, mix in some coarse red or bland cinder, coarse perlite or

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[9] Bornhorst, p.20-21

coarse compost. Place some slow-release fertilizer at the bottom of the hole.

3. Carefully remove the plant from the container and place it in the hole.

The top of the soil should be at the same level as the top of the hole, if it is too high or too low, adjust the soil level so that the plant is at the right depth.

4. Water thoroughly after you transplant.

Mulch

Most natives cannot compete with weeds, and therefore must be weeded around constantly in order to thrive. Mulch is a practical alternative, which discourages and prevents weeds from growing.

Hawaii's hot, humid climate leads to the breaking down of organic mulches. Thick organic mulches such as wood chips and leaves, may also be hiding places for pests.

Stone mulches are attractive, permanent and can help to improve soil quality. Red or black cinder, blue rock chips, smooth river rocks and coral chips are some natural choices.[10] Macadamia nut hulls are also easy to find and can make a nice mulch.[11]

Never pile up mulch right next to the stem or trunk of a plant, keep it a few inches away.

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[10] Bornhorst, p. 24

[11] Nagata, p. 7

ZONES

The Maui County Planting Plan has compiled a system of 5 zones of plant growth for Maui County. The descriptions of zones and maps for these zones are as follows:

Zone 1:

Wet areas on the windward side of the island. More than 40 inches of rain per year. Higher than 3,000 feet.

Zone 2:

Cool, dry areas in higher elevations (above 1,000 feet). 20 to 40 inches of rain per year.

Zone 3:

Low, drier areas, warm to hot. Less than 20 inches of rain per year. Sea level to 1,000 feet.

Zone 4:

Lower elevations which are wetter due to proximity of mountains. 1,000 to 3,000 feet.

Zone 5:

Salt spray zones in coastal areas on the windward side.

These zones are to be used as a general guide to planting for Maui County. In addition to looking at the maps, read the descriptions of the zones and decide which zone best fits your area. Plants can be listed in more than one zone and can be planted in a variety of conditions. For best results, take notes on the rainfall, wind, sun and salt conditions of your site. Use the zones as a general guide for selection and read about the plants to decide which best fits your needs as far as care and or function.

PLACES TO SEE NATIVES ON MAUI:

The following places propagate native Hawaiian plants from seeds and/or cuttings. Their purpose is to protect and preserve these native plants. Please contact them before going to view the sites, they can provide valuable information and referral to other sources.

1.	Hoolawa Farms P O Box 731 Haiku HI 96708	575-5099
2.	The Hawaiian Collection 1127 Manu Street Kula HI 96790	878-1701
3.	Kula Botanical Gardens RR4, Box 228 Kula HI 96790	878-1715
4.	Maui Botanical Gardens Kanaloa Avenue, Kahului across from stadium	249-2798
5.	Kula Forest Reserve access road at the end of Waipoli Rd Call the Maui District Office	984-8100
6.	Wailea Point, Private Condominium residence 4000 Wailea Alanui, Kihei public access points at Four Seasons Resort or Polo Beach	875-9557
7.	Kahanu Gardens, National Tropical Botanical Garden Alau Place, Hana HI 96713	248-8912
8.	Kahului Library Courtyard 20 School Street Kahului HI 96732	873-3097

PLACES TO BUY NATIVE PLANTS ON MAUI

1. Ho'olawa Farms
   Anna Palomino
   P O Box 731
   Haiku HI 96708
   575-5099

   * The largest and best collection of natives in the state. They will deliver, but worth the drive to go and see! Will propagate upon request

2. Kahanu Gardens
   National Tropical Botanical Garden
   Alau Place, Hana
   248-8912

3. Kihana Nursery
   1708 South Kihei Road
   Kihei HI 96753
   879-1165

4. Kihei Garden and Landscape
   Waiko Road, Wailuku
   P O Box 1058
   Puunene HI 96784
   244-3804

5. Kula Ace Hardware and Nursery
   3600 Lower Kula Road
   Kula HI 96790
   876-0734
   * many natives in stock
   * get most of their plants from Ho'olawa Farms
   * they take special requests

6. Kulamanu Farms - Ann Carter
   Kula HI 96790
   878-1801

7. Maui Nui Botanical Gardens
   Kanaloa Avenue
   (Across from stadium)
   Kahului HI 96732
   249-2798

8. Native Gardenscapes
   Robin McMillan
   1330 Lower Kimo Drive
   Kula HI 96790
   870-1421

   * grows native plants and installs landscapes including irrigation.

9. Native Hawaiian Tree Source
   1630 Piiholo Road
   Makawao HI 96768
   572-6180

10. Native Nursery, LLC
    Jonathan Keyser
    250-3341

11. New Moon Enterprises - Pat Bily
    47 Kahoea Place
    Kula HI 96790
    878-2441

12. Waiakoa Tree Farm - Kua Rogoff
    Pukalani HI 96768
    Cell - 264-4166

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 20, 2009

Jeffrey K. Eng, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawai`i 96793

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Eng:

Thank you for your letter dated March 20, 2009. Since the 1997 Water Working Group Report (WWGR) the Lana`i Affordable Housing project has been scaled down to encompass 73 acres of the 115 acre parcel. The remaining 42 acres will be transferred to the Department of Education for the expansion of the Lanai High and Elementary School. The 518 units proposed in 1997 has correspondingly been reduced. The project will include a total of 412 units consisting of 239 single family units and 173 multi-family units at a density of 12 units/acre.

The Preliminary Engineering Report for the project will address the estimated water use for the project. Water for the project will be from the private Lanai Water Company. As a limited resource, the water conservation measures recommended by your Department will be incorporated into the project to the extent practicable.

Should you require additional clarification please call me at 244-2015 or email planning@mhplanning.com. A copy of the Draft Environmental Assessment will be forwarded to your agency.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
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Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

MAR 0 4 2009

March 2, 2009

Ms. Colleen Suyama, Project Manager
Munekiyo & Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Maui, Hawaii, 96793

Dear Ms. Suyama,

Subject: Early Consultation Request for 201-H Housing Project in Lana'i City
TMK: (2) 4-9-002:058 (por.)
Fifth Avenue and Nineth Avenue
Lana'i City, Lana'i, Hawaii

Thank you for allowing us to comment on the Early Consultation Request for the subject project.

In reviewing our records and the information received, Maui Electric Company (MECO) may be requiring access and electrical easements for our facilities to serve the subject project site. County of Maui permits for work within right-of-ways may be required prior to MECO's installation. The project's anticipated electrical demand may have a substantial impact to our system, and we highly encourage the customer's electrical consultant to submit the electrical demand requirements, project time schedule, and schedule a meeting with us as soon as practical so that service can be provided on a timely basis.

Should you have any questions or concerns, please call me at 871-2340.

Sincerely,

Ray Okazaki
Staff Engineer

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO
KARLYNN FUKUDA

MARK ALEXANDER ROY

August 18, 2009

Ray Okazaki, Staff Engineer
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawai`i 96733-6898

SUBJECT: Early Consultation on the Draft Environmental Assessment (EA) for the Lana`i Affordable Housing Project at TMK (2) 4-9-002:058 (por.), Lana`i City, Lanai

Dear Mr. Okazaki:

Thank you for your letter dated March 2, 2009. We acknowledge receipt of your comments. Our engineering consultant will work closely with your company to ensure our electrical demands are met in a timely manner.

Should you require additional clarification please call me at 244-2015 or email planning@mhplanning.com. A copy of the Draft Environmental Assessment will be forwarded to your company.

Very truly yours,

Colleen Suyama
Project Manager

CS:yp
cc: JoAnn Ridao, Deputy Director, Department of Housing and Human Concerns
Dwight Mitsunaga, Pacific Architects
Donald Okuhara, Okuhara & Associates
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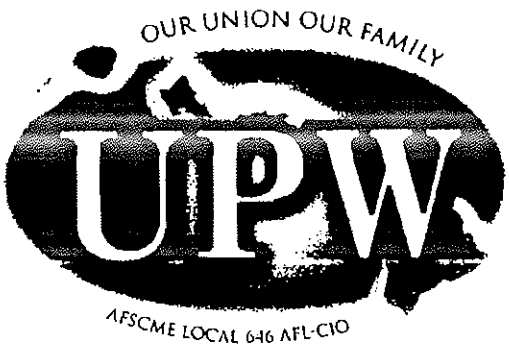

March 12, 2009

Ms. Colleen Suyama
Project Manager
Munekiyo Hiraga, Inc.
305 High Street, Suite 105
Wailuku, Hawaii 96793

RE: Early Consultation on 201-H Lanai Housing Project in Lanai City, Hawaii; TMK (2)4-9-002:058(por.), letter dated March 5, 2009

Dear Ms. Suyama:

Thank you for your letter inviting the UPW to be a part of the environmental assessment (EA) early consultation process. At this time we do not have written comments to offer regarding the proposed action.

The UPW is designating Matthew Mano as the contact person on Lanai to participate in planning for housing, looking at site plans and offering comments on the mixture of housing (i.e., single family homes, multi-housing for rentals, etc.). Matt can be contacted on his cellular telephone at 563-0506.

We look forward to receiving a copy of the Draft EA, and may, at that time, submit written comments.

Sincerely,

Dayton M. Nakanelua
State Director

c: Lahela Aiwohi
Matthew Mano

HEADQUARTERS - 1426 North School Street ◆ Honolulu, Hawaii 96817-1914 ◆ Phone: (808) 847-2631
HAWAII - 362 East Lanikaula Street ◆ Hilo, Hawaii 96720-4336 ◆ Phone: (808) 961-3424
KAUAI - 4211 Rice Street ◆ Lihue, Hawaii 96766-1325 ◆ Phone: (808) 245-2412
MAUI - 841 Kolu Street ◆ Wailuku, Hawaii 96793-1436 ◆ Phone: (808) 244-0815
1-866-454-4166 (Toll Free, Molokai/Lanai only)

X. REFERENCES

X. REFERENCES

County of Maui, The General Plan of the County of Maui 1990 Update.

County of Maui, Department of Planning, Lanai Community Plan, December 1998.

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State Department of Labor and Industrial Relations, Hawaii Workforce Informer, June 2009.

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APPENDIX A.

Proposed Section 201H-38, HRS Exemptions

PROPOSED EXEMPTIONS FOR AFFORDABLE HOUSING
PROPOSED SECTION 201H-38, HRS, EXEMPTIONS
FROM THE MAUI COUNTY CODE ("MCC")

A. EXEMPTION FROM TITLE 2, MCC, ADMINISTRATION AND PERSONNEL

1. An exemption from Chapter 2.80B, MCC, General Plan and Community Plans, shall be granted to permit the project without obtaining a community plan amendment for a portion of the project.

B. EXEMPTION FROM TITLE 12, STREETS, SIDEWALKS AND PUBLIC PLACES

1. Exemption from Section 12.24A.070D MCC, Planting of street trees, shall be granted to delete the requirement for street trees.

C. EXEMPTIONS FROM TITLE 16, MCC, PUBLIC SERVICES

1. Exemption from MCC Chapters 16.04A, Fire Code, 16.18A, Electrical Code, 16.20A, Plumbing Code, and 16.26, Building Code, shall be granted to exempt the project from fire, electrical, plumbing, and building permit fees, as well as inspection fees.

D. EXEMPTIONS FROM TITLE 18, MCC, SUBDIVISIONS

1. Exemptions from Section 18.04.030, MCC, Administration, and related land use consistency and conformity requirements of Title 18, shall be granted to exempt the project from obtaining a change in zoning and community plan amendment to enable subdivision approval.

2. An exemption from Section 18.16.320, MCC, Parks and Playgrounds, shall be granted to allow the 4.91 acres of land within the project to satisfy the park dedication and assessment requirements.

3. An exemption from Section 18.16.050 MCC, Minimum Right of way and Pavement Widths, shall be granted to allow the following roadway standards within the Lana`I Affordable Housing project: 64 ft. Right of way with 24 feet of pavement; 50 ft. right of way with 22 ft. of pavement and 44 ft. right of way with 22 feet of pavement. Further, the extension of Fifth Street will be a 50 ft. right of way with 40 ft. of pavement and 6 ft. wide shoulders along the school frontage.

4. An exemption from Section 18.20.070 MCC, Sidewalks, shall be granted to allow 5 ft. wide sidewalks on one side of the street within the Lana`i Affordable Housing Project and 4 ft. wide sidewalks on one side of Fifth Street.

5. An exemption from Section 18.20.080 MCC, Curbs and Gutters, shall be granted to allow grass swales within the Lanai Affordable Housing Project.

6. An exemption from Section 18.20.105 MCC, Traffic calming elements, shall be granted.

7. An exemption from Section 18.20.140 MCC, Utility lines and facilities, shall be granted to allow for above ground utility lines.

E. EXEMPTIONS FROM TITLE 19,MCC, ZONING

1. An exemption from Chapter 19, MCC, shall be granted to permit the development and use of the parcel for single-family, multi-family, public/quasi-public, and park purposes, including supporting infrastructure requirements. Further, this exemption shall allow the subdivision of the property in the conceptual plat configuration shown in Attachment "A", which may be amended by the Director of Public Works. The following zoning standards shall apply to the proposed development:

Residential Use:

Minimum lot area	5,000 square feet
Height:	No building shall exceed two-stories or 30 feet in height, measured from finished grade
Setback:	Ten (10) feet front yard Six (6) feet side and rear yard; except one zero lot line may be permitted on an adjacent property boundary.

Multi Family Use:

Minimum lot area	10,000 square feet
Height:	No building shall exceed two-stories or 30 feet in height, measured from finished grade
Setback:	Fifteen (15) feet front yard Ten (10) feet side and rear yard

Public Quasi-Public Use:

Minimum lot area:	15,000 square feet
Height:	No building shall exceed two-stories or forty-five (45) feet in height, measured from finished grade
Setback:	Fifteen (15) feet front yard Ten (10) feet side and rear yard

Park Use:

Minimum lot area:	One (1) acre
Height:	No building shall exceed two-stories or forty-five (45) feet in height, measured from finished grade
Setback:	Fifteen (15) feet front yard Ten (10) feet side and rear yard

2. Uses permitted in Chapter 19.08 Residential District, 19.09 R-0 Zero Lot Line Residential District, 19.12 Apartment District, 19.31 Public/Quasi-Public District and 19.615 Park Districts, except Pk-4 Golf Course Park District, shall be permitted; including the following additional uses:

   1) Home Occupation

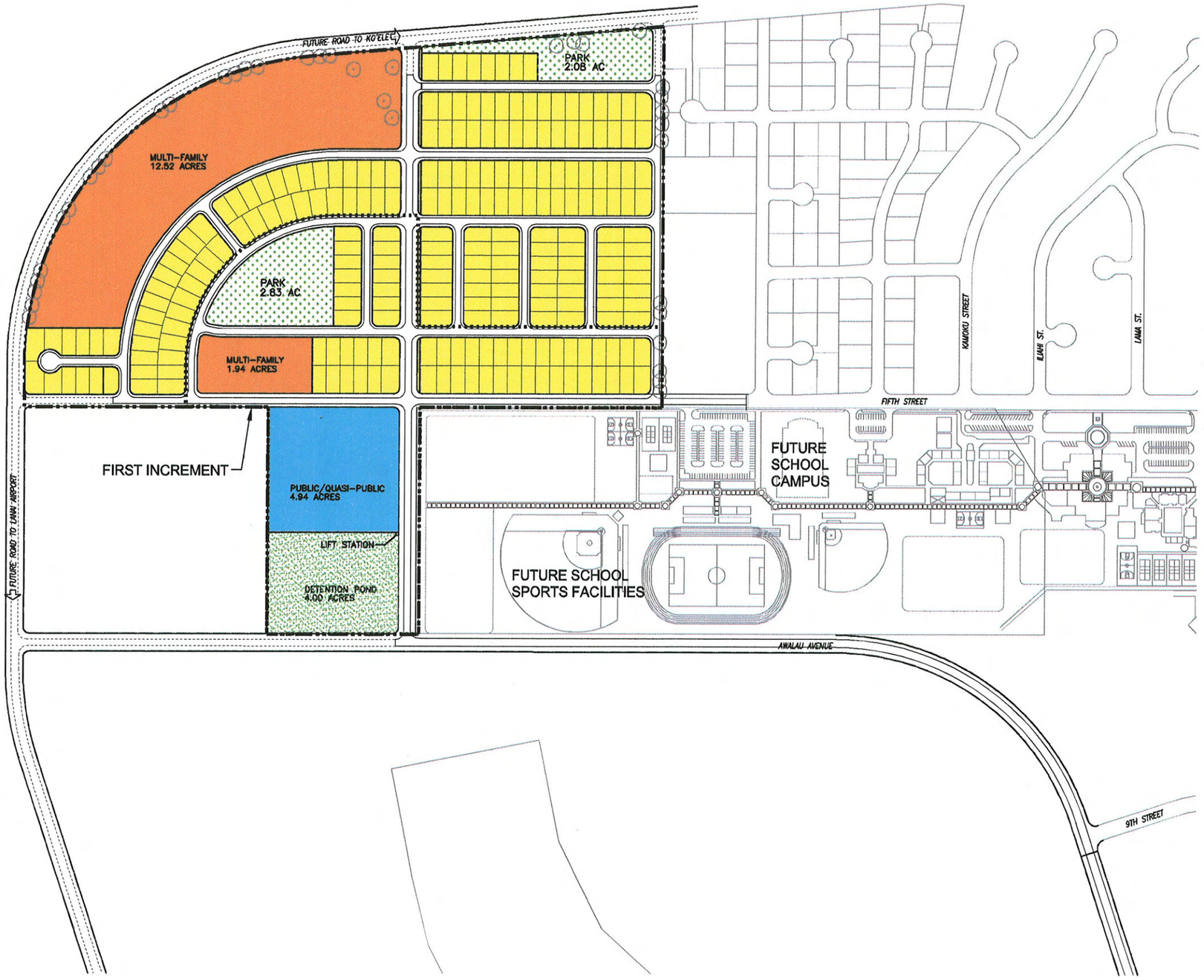
   2) Residential Care Facilities pursuant to § 46-4(d), Hawaii Revised Statutes (HRS)

   3) Utility facilities, minor; and

   4) Utility services

F. EXEMPTIONS FROM TITLE 20, MCC, ENVIRONMENTAL PROTECTION

1. An exemption from Section 20.08.090, MCC, Grubbing and Grading Permit Fees shall be granted to exempt the project from payment of grading, grubbing, and excavation permit fees, as well as inspection fees.



MULTI-FAMILY

SINGLE FAMILY

PUBLIC/QUASI-PUBLIC

PARK

OPEN SPACE

INDIVIDUAL PLOTS (5000sf)	239 UNITS
MULTI-FAMILY	14.46 ACRES
QUASI-PUBLIC	4.94 ACRES
PARK REQUIRED	3.23 ACRES
PARK PROVIDED	4.91 ACRES
OPEN SPACE	4.00 ACRES

200' 100' 0' 200' 400' 600' 800' 1000'

Pacific Architects, Inc.
2020 South King Street
Honolulu, Hawaii 96826
808-949-1607
fax 808-942-0054

LANA'I AFFORDABLE HOUSING PROJECT

ZONING SITE PLAN

DATE 04-15-09

ATTACHMENT "A"

APPENDIX B.

Flora and Fauna Survey and Assessment

FLORA AND FAUNA SURVEY AND ASSESSMENT

for the

LANA'I CITY AFFORDABLE HOUSING PROJECT

LANA'I CITY, HAWAII

by

ROBERT W. HOBDY
ENVIRONMENTAL CONSULTANT
Kokomo, Maui
August 2008

Prepared for: Pacific Architects

BIOLOGICAL RESOURCES SURVEY
LANA'I CITY AFFORDABLE HOUSING PROJECT

INTRODUCTION

The Lana'i City Affordable Housing Project lies on 65 acres of undeveloped Land, TMK (2) 4-9-02:058 (por.), on the northwest edge of town. The land is bounded on the east side by single family homes of the Hawaiian Homes Ha'u öwī Project, and on the north, west and south sides by undeveloped land. This study was initiated to fulfill environmental requirements of the planning process.

SITE DESCRIPTION

The project area is situated on nearly level land. Vegetation consists of a tall and dense grass cover interspersed with shrubs and small trees. Soils are entirely of the Waihuna clay, 0 – 3 % slopes series (WoA) which is a deep, well drained alluvial soil with moderately slow permeability and a slight erosion hazard (Foote et al, 1972). Elevations range from 470 to 480 meters above sea level. Rainfall averages 30 to 35 inches per year with the bulk falling during 1 to 3 storms during the winter months (Armstrong, 1983).

BIOLOGICAL HISTORY

During pre-contact times this area would have been a grassy plain with an assortment of native dryland trees and shrubs such as olopua (*Nestegis sandwicensis*), lama (*Diospyros sandwicensis*), naio (*Myoporum sanwicense*), alahe'e (*Psydrax odorata*) and akoko (*Chamaesyce celastroides var. lorifolia*). This would have been complemented by a number of native forest birds and snails. The Hawaiians would have practiced seasonal sweet potato farming in small areas during the winter months.

In the mid 1920's this area was put into pineapple cultivation and was periodically plowed, planted and harvested for about 75 years until pineapple farming was discontinued in the 1990's. Since this time the areas has lain idle and has gradually grown in with non-native plants. All vestiges of the native flora and fauna have long since disappeared from this vicinity.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed Lana'i City Affordable Housing project area that was conducted in August, 2008. The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the native flora and fauna in this part of the island.
5. Note which aspects of the proposed development pose significant concerns for plants or for wildlife and recommend measures that would mitigate or avoid these problems.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used to cover this 65 acre property. All representative habitats were examined including grasslands, brush lands and patches of forest. Close attention was given to ascertaining whether any native Hawaiian plant species were present.

DESCRIPTION OF THE VEGETATION

Dense vegetation covers all parts of the project area. Most abundant was Guinea grass (*Panicum maximum*) which covered the entire property. Also common were sourgrass (*Digitaria insularis*), Christmas berry (*Schinus terebinthifolius*) and lantana (*Lantana camara*).

A total of 59 plant species were recorded during the survey. Two of these were native species: 'ilima (*Sida fallax*) and 'uhaloa (*Waltheria indica*). The remaining 57 species were non-native trees, shrubs, grasses and herbs.

DISCUSSION AND RECOMMENDATIONS

The vegetation in this project area is totally dominated by non-native species. Only two plant species were native to Hawai'i: 'ilima and 'uhaloa. Both of these are widespread and common indigenous species in Hawai'i as well as other Pacific islands. No Endangered or Threatened plant species were found, nor were any seen that are candidates for such protected Federal status. No special native plant habitats were found either.

Because the vegetation on this site is dominated by common non-native plants and because there are no rare or protected native species within the project area, there is little of botanical concern with regard to this property, and the proposed project is not expected to have a significant negative impact on the botanical resources in this part of Lana'i.

No special recommendations with reference to plants are deemed appropriate or necessary.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups: Monocots and Dicots. Taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographic status. The following symbols are used:
   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   non-native = all those plants brought to the islands intentionally or accidentally after western contact.
   polynesian = brought by the Hawaiians during Polynesian migrations.

4. Abundance of each species within the project area:
   abundant = forming a major part of the vegetation within the project area.
   common = widely scattered throughout the area or locally abundant within a portion of it.
   uncommon = scattered sparsely throughout the area or occurring in a few small patches.
   rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
POACEAE (Grass Family)			
Andropogon virginicus L.	broomsedge	non-native	rare
Cenchrus echinatus L.	common sandbur	non-native	rare
Chloris divaricata R. Br.	stargrass	non-native	rare
Chloris gayana Kunth	Rhodes grass	non-native	rare
Cynodon dactylon (L.) Pers.	Bermuda grass	non-native	uncommon
Dichanthium sericeum (R.Br.) A. Camus	Australian bluestem	non-native	rare
Digitaria ciliaris (Retz.) Koeler	Henry's crabgrass	non-native	rare
Digitaria insularis (L.) Mez ex Ekman	sourgrass	non-native	common
Eleusine indica (L.) Gaertn.	wiregrass	non-native	rare
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	non-native	rare
Panicum maximum Jacq.	Guinea grass	non-native	abundant
Paspalum dilatatum Poir.	Dallis grass	non-native	uncommon
Pennisetum purpureum Schumach.	Napier grass	non-native	rare
Sporobolus africanus (Poir.) Robins & Tournay	African dropseed	non-native	rare
DICOTS			
AMARANTHACEAE (AmaranthFamily)			
Chenopodium ambrosioides L.	Mexican tea	non-native	rare
Chenopodium carinatum R. Br.	keeled goosefoot	non-native	rare
ANACARDIACEAE (Mango Family)			
Schinus terebinthifolius Raddi	Christmas berry	non-native	common
APIACEAE (Parsley Family)			
Ciclospermum leptophyllum (Pers.) Sprague	fir-leaved celery	non-native	rare
APOCYNACEAE (Dogbane Family)			

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Asclepias physocarpus (E.Mey.) Schlecter	baloon plant	non-native	uncommon
ASTERACEAE (Sunflower Family)			
Acanthospermum australe (Loefl.) Kuntze	spiny bur	non-native	uncommon
Ageratum conyzoides L.	maile hohono	non-native	rare
Calyptocarpus vialis Less.	straggler daisy	non-native	rare
Cirsium vulgare (Savi) Ten.	bull thistle	non-native	uncommon
Conyza bonariensis (L.) Cronq.	hairy horseweed	non-native	uncommon
Emilia fosbergii Nicolson	red pualele	non-native	rare
Heterotheca grandiflora Nutt.	telegraph weed	non-native	uncommon
Pluchea carolinensis (Jacq.) G. Don	sourbush	non-native	rare
Tridax procumbens L.	coat buttons	non-native	rare
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	non-native	rare
CASUARINACEAE (She-oak Family)			
Casuarina equisetifolia L.	common ironwood	non-native	rare
EUPHORBIACEAE (Spurge Family)			
Chamaesyce hirta (L.) Millsp..	hairy spurge	non-native	rare
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	non-native	rare
Ricinus communis L.	Castor bean	non-native	rare
FABACEAE (Pea Family)			
Acacia confusa Merr.	Formosa koa	non-native	uncommon
Acacia mearnsii De Wild.	black wattle	non-native	rare
Chamaecrista nictitans (L.) Moench	partridge pea	non-native	uncommon
Crotalaria pallida Aiton	smooth rattlepod	non-native	rare
Desmanthus pernambucanus (L.) Thellung	slender mimosa	non-native	uncommon
Desmodium incanum DC.	kaimi clover	non-native	uncommon
Desmodium sandwicense E. Mey.	Spanish clover	non-native	rare

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Desmodium triflorum (L.) DC.	three-flowered beggarweed	non-native	rare
Indigofera hendecaphylla Jacq.	creeping indigo	non-native	rare
Indigofera suffruticosa Mill.	inikö	non-native	uncommon
Leucaena leucocephala (Lam.) de Wit	koa haole	non-native	rare
Macroptilium atropurpureum (DC.) Urb.	siratro	non-native	rare
Macroptilium lathyroides (L.) Urb.	wild bean	non-native	rare
Mimosa pudica L.	sensitive plant	non-native	rare
Stylosanthes fruticosa (Retz.) Alston	shrubby pencilflower	non-native	rare
MALVACEAE (Mallow Family)			
Malvastrum coromandelianum (L.) Garcke	false mallow	non-native	rare
Sida fallax Walp.	'ilima	indigenous	rare
Sida rhombifolia L.	Cuban jute	non-native	uncommon
Sida spinosa L.	prickly sida	non-native	rare
Waltheria indica L.	'uhaloa	indigenous	uncommon
MELIACEAE (Mahogany Family)			
Melia azedarach L.	pride of India	non-native	rare
PLANTAGINACEAE (Plantain Family)			
Plantago lanceolata L.	English plantain	non-native	common
SOLANACEAE (Nightshade Family)			
Solanum linnaeanum Hepper & P. Jaeger	apple of Sodom	non-native	rare
VERBENACEAE (Verbena Family)			
Lantana camara L.	lantana	non-native	common
Stachytarpheta jamaicensis (L.) Vahl	Jamaica vervain	non-native	rare
Verbena litoralis Kunth	ha'u öwī	non-native	rare

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through fauna survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species, abundance, activities and location as well as observations of trails, tracks, scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Four species of mammals were detected in the project area during two site visits. Taxonomy and nomenclature follow Tomich (1986).

Axis deer (*Axis axis*) - Axis deer seen and heard and their trails, tracks, antler rubbing, scat and feeding signs were everywhere.

Mouse (*Mus domesticus*) – One mouse was seen scurrying through the grass. Their numbers should be large in this type of habitat.

Cat (*Felis catus*) - One cat was seen hunting for rodents during the evening survey.

Horse (*Equus caballus*) – Horse tracks were seen along a dirt road. Local horse owners no doubt occasionally ride through this area.

Other mammals one might expect to see here include rats (*Rattus rattus*) and the occasional domestic dog (*Canis familiaris*). Rats would feed on seeds and herbaceous vegetation and domestic dogs would wander here from the adjacent residential area. Mongoose are not presently found on the island of Lana'i.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the area. When present in an area these bats can be easily identified as they forage for insects, their distinctive flight patterns clearly visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent and plenty of flying insects were seen.

In addition, an electronic bat detecting device was employed set to the frequency range of 27,000 to 28,000 hertz which these bats are known to utilize. No bats were detected using this device.

BIRDS

Birdlife was moderate both in number of species and in total number of individuals. Eleven species of non-native birds were identified within the project area. Taxonomy and nomenclature follow American Ornithologists' Union (2005).

Zebra dove (*Geopelia striata*) – These small doves were found throughout the property in openings along roads and in small clearings in the grass.

Common myna (*Acridotheres tristis*) – Pairs of mynas were seen in small trees and in flight over the property.

Spotted dove (*Streptopelia chinensis*) – Several of these large doves were seen perched in trees and in flight. They usually do not congregate unless there is abundant feed available.

Cattle egret (*Bubulcus ibis*) – Scattered individuals were seen feeding in openings. Larger groups were seen during the evening flying toward roosting trees near the settling ponds below town.

Turkey (*Meleagris gallopavo*) – Two flocks of these large birds were seen along roads and in forest understory.

House sparrow (*Passer domesticus*) – Small groups of sparrows were seen feeding in small trees on the property.

House finch (*Carpodacus mexicanus*) – Small groups of finches were seen perched in trees and flying through the property.

Gray francolin (*Francolinus pondicerianus*) – A few francolins were seen along dirt roads and heard calling across the property.

Japanese white-eye (*Zosterops japonicus*) – A few of these small green birds were seen feeding on insects in trees and making their high-pitched chattering calls.

African silverbill (*Lonchura cantans*) –One flock of these tiny beige birds were seen in a tree making their gentle high-pitched calls.

Nutmeg mannikin (*Lonchura punctulata*) – One flock of these tiny brown birds was seen resting in a tree snag.

While not seen, this habitat might be periodically utilized by the pueo or Hawaiian owl (*Asio flammeus sanwichensis*) which is still fairly common on Lana'i. These native owls usually prefer open habitat a little more distant from human habitations. A few other non-native birds may also occasionally use this property. The habitat is not suitable for Lana'is native forest birds which have now almost completely disappeared from the island, nor is the habitat suitable for native seabirds such as the 'ua'u (*Pterodroma sandwichensis*) or the 'a'o (*Puffinus newelli*) which are known to nest in dense, wet, fern shrubland on the summit of the island. The nene or Hawaiian goose (*Branta sandvicensis*) is not known from Lana'i.

INSECTS

While insects in general were not tallied, a diversity of them were seen throughout the area, helping to fuel the bird activity observed. One native insect, Blackburn's sphinx moth (*Manduca blackburni*) has been put on the Endangered Species list (USFWS 2000) and this designation requires special focus to ascertain if it is present. None were found. This insects' native host plants are species of 'aiea (*Nothocestrum spp.*) and some non-native host plants are tobacco (*Nicotiana tabacum*) and tree tobacco (*Nicotiana glauca*). None of the host plant species were found on the property and no Blackburn's sphinx moths or their larvae were observed.

DISCUSSION AND RECOMMENDATIONS

The fauna survey documented a variety of mammals and birds, all of which were non-native. None of these are of any particular environmental concern. No special habitats were found on the property either. It is determined that the proposed project will not have a significant negative impact on the fauna resources on Lana'i.

Seabirds including the Endangered ua'u and the Threatened 'a'o were not found on this property and are highly unlikely to utilize such an area. Yet these birds are known to fly over these lowlands in the evenings to get to their burrows high in the mountains. Young birds which are fledgling during the fall months are particularly vulnerable to being confused by bright lights upon which they are prone to crash and be injured or killed. It is recommended that any outdoor lights in the proposed project be hooded to direct the light downward so the light is not visible from above.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within two groups: Mammals and Birds. For each species the following information is provided:

1. Common name

2. Scientific name

3. Bio-geographical status. The following symbols are used:
   endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

4. Abundance of each species within the project area:
   abundant = many flocks or individuals seen throughout the area at all times of day.
   common = a few flocks or well scattered individuals throughout the area.
   uncommon = only one flock or several individuals seen within the project area.
   rare = only one or two seen within the project area.

COMMON NAME	SCIENTIFIC NAME	STATUS	ABUNDANCE
MAMMALS			
Axis deer	*Axis axis*	non-native	common
Horse	*Equus caballus*	non-native	rare
Mouse	*Mus domesticus*	non-native	rare
Cat	*Felis catus*	non-native	rare
BIRDS			
Zebra dove	*Geopelia striata*	non-native	uncommon
Common myna	*Acridotheres tristis*	non-native	uncommon
Spotted dove	*Streptopelia chinensis*	non-native	uncommon
Cattle egret	*Bublcus ibis*	non-native	uncommon
Turkey	*Meleagris gallopavo*	non-native	uncommon
House sparrow	*Passer domesticus*	non-native	uncommon
House finch	*Carpodacus mexicanus*	non-native	uncommon
Gray francolin	*Francolinus pondicerianus*	non-native	uncommon
Japanese white-eye	*Zosterops japonicus*	non-native	uncommon
African silverbill	*Lonchura cantans*	non-native	rare
Nutmeg mannikin	*Lonchura punctulata*	non-native	rare

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APPENDIX C.

Phase I Environmental Site Assessment

EQI
EnviroQuest INC.

Phase 1 Environmental Site Assessment

County of Maui
65 Acre Site in Lanai City
Lanai City, Lanai, Hawai'i 96763

Identified as
First Division Tax Map Key
4-9-002, parcel 058
Honolulu, Hawaii
Latitude (North) 20° 49' 31.4"
Longitude (West) 156° 55' 40.1"

Prepared For:

Pacific Architects, Inc
2020 South King Street
Honolulu, HI 96826

Prepared By:

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95-029 Hekaha Street, Suite 21
Aiea, HI 96701
808-486-5881

Project Number: 4006
Project Manager: Miles T. Nirei

October 2008

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ABBREVIATIONS AND ACRONYMS

ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
EDR	Environmental Data Resources Inc.
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
HEER	Hazard Evaluation and Emergency Response Office
HDOH	State of Hawai`i Department of Health
HWS	Hazardous Waste Site
LUST	Leaking Underground Storage Tank
MSL	Mean sea level
NFRAP	No Further Remedial Action Planned
NFA	No Further Action
NPL	National Priority List
PCB	Polychlorinated biphenyl
Ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conversation and Recovery Information System
SHWB	Solid and Hazardous Waste Branch
SQG	Small Quantity Generator
TMK	Tax Map Key
TSD	Treatment, Storage and Disposal
UIC	Underground injection control
UST	Underground storage tank

EXECUTIVE SUMMARY

EnviroQuest, Inc. was retained by Pacific Architects, Inc. to perform a Phase I Environmental Site Assessment of the Tax Map Key 4-9-002, parcel 58, located near the corner of 5th Street and Kamoku Street (real assessment office registered as Awalua Ave), Lanai City, island of Lanai, County of Maui, Hawai'i.

This Phase I Environmental Site Assessment was performed in conformance with the scope and limitations of ASTM Standard E 1527-05, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" of the parcel located on the island of Lanai as stated as TMK 4-9-002, parcel 58. This assessment revealed no evidence of recognized environmental conditions in connection with the property.

1. INTRODUCTION

1.1 PURPOSE

EnviroQuest, Inc. was retained by Pacific Architects, Inc. to perform a Phase I Environmental Site Assessment of the Tax Map Key (TMK) 4-9-002, parcel 58 (65 acres) located approximately 200 feet east from the corner of 5th Street and Kamoku Street (real assessment office registered as Awalua Ave), Lanai City, island of Lanai, County of Maui, Hawai'i. The site location is shown in Figure 1 and a topographic map is shown in Figure 2.

This environmental site assessment was performed to establish recognized environmental conditions at the property and propose recommendations for additional investigation, if warranted. "Recognized environmental conditions" means the presence, or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water on the property (American Society for Testing and Materials [ASTM] 2005). This term is not intended to include *de minimus* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies.

Hazardous substances are those substances defined under Section 101 of the Federal Comprehensive Environmental Response, Compensation, and Liability Act. They are listed under Title 40 of the Code of Federal Regulations (CFR) Part 302. They include hazardous substances and toxic pollutants regulated under the Clean Water Act, hazardous wastes regulated under the Resource Conservation and Recovery Act (RCRA), and hazardous air pollutants regulated under the Clean Air Act. Petroleum products include crude oil, gasoline, kerosene, diesel oil, jet fuel, fuel oil, lubricating oil, natural gas, liquefied natural gas, and synthetic gas usable for fuel.

This assessment was conducted in accordance with ASTM Standard E 1527-05, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (2005). The scope of work consisted of four major components:

1. Site Description
    - Location and Legal Description
    - Site and Vicinity Characteristics
    - Site Description
    - Physiography
    - Site Geology
2. Records Review
    - Federal and State Records
    - Local Records
    - Site History

3. Site Reconnaissance and Interviews
    - Site Reconnaissance
    - Interviews
4. Conclusions and Recommendations

1.2 LIMITATIONS AND EXCLUSIONS

We have performed our services for this project in accordance with our Agreement and in accordance with ASTM Standard E1527-05 for environmental site assessments; no guarantees are either expressed or implied.

The record search was limited to information available from public sources and, to a limited extent, records provided for review by the current property lessee or owner. This information changes continually and is frequently incomplete. Unless we have actual knowledge to the contrary, information obtained from interviews, or provided to us by third parties has been assumed to be correct and complete. We do not assume any liability for the misrepresentation of the information, or for items not visible, accessible, or present on the site at the time of the site visit.

Because of the uncertainty in identifying and characterizing conditions beneath the surface of the ground, no environmental investigation can show or prove the absence of hazardous substances at the site. Likewise, because environmental regulatory programs are constantly evolving and changing, statements about the acceptability of the site for human health and the environment are relative only to the regulatory program in place today. Future programs could change the way these conditions are viewed and could require additional action to address hazardous conditions at the site.

Work for this project was performed and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. Opinions and judgments expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions. It is intended for the exclusive use of Pacific Architects, Inc. for specific application to the site. This report is not meant to represent a legal opinion. No other warranty, expressed or implied, is made. Any reliance on this report by third parties shall be at such party's sole risk.

EnviroQuest, Inc. relied on verbal information provided by the individuals indicated in this report, and EnviroQuest, Inc. can only relay this information and cannot be responsible for its accuracy or completeness. Any questions regarding our work and this report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the project manager.

2. SITE DESCRIPTION

This section describes the physical characteristics of the site, including land use, topography, geology, and hydrogeology.

2.1 LOCATION AND ZONING

The subject property consists of a total of 115 acres, 65 acres of which EnviroQuest, Inc. was contracted to investigate. This parcel is located on the outskirts of the southwest corner of Lanai City on the island of Lanai (Figure 1). The parcel is identified as TMK 4-9-002, parcel 058 (Figure 2). Lanai City is located in the center of the island. The parcel is approximately 7 miles east of Kaumalapau Harbor (Pacific Ocean), which is the nearest body of water. The subject property is zoned for Agricultural use. The property is owned by the County of Maui per the Maui County Real Property Assessment Division (www.mauipropertytax.com)

Single family homes are located northeast and east of the property. Lanai Elementary, Middle, and High School and a scrap metal recycling plant are located south of the property.

2.2 SITE AND VICINITY CHARACTERISTICS AND TOPOGRAPHY

The topography of the surrounding area is relatively flat with low vegetation and bushes (Figure 2). The elevation of the parcel is approximately 1,562 feet above mean sea level (msl).

The surface area of the subject property is relatively flat with low level brush and ground vegetation. The natural vegetation is made up of kiawe, bristly foxtail, lantana, and Bermuda grass (see photograph log).

Nearly the entire population lives in Lanai City, the only town on the island. An airport is located within 5 miles of the town. Kaumalapau Harbor, a shallow-water harbor, is on the southwestern coast.

2.3 PHYSIOGRAPHY

The Hawaiian Islands lie at the northern margin of the tropics (21 degrees north latitude), but have a subtropical climate due to cool trade winds. These northeasterly trades prevail for much of the year, usually blowing from 10 to 15 knots. The average daily temperature varies between 64° F and 85° F in winter and between 75° F and 90° F in summer. The average annual rainfall for the Island of Lanai ranges between 20 and 60 inches. The leeward coast averages an annual rainfall is less than 20 inches and at Lana'ihale (elevation 3,370 ft) the average is as high as 60 inches per year.

The property encompasses an area of approximately 115 acres. This project contract was to assess 65 of the 115 acres. An additional 8 acres were requested to be added on during a preliminary meeting with all parties. There are no structures on this property.

2.4 SITE GEOLOGY AND HYDROGEOLOGY

The island of Lanai is the sixth largest island in the State of Hawaii. It is 18 miles long and 13 miles wide. The land area is 90,000 acres or 141 square miles. The island rises to 3,370 feet at the summit of Lana'ihale. The Central Plateau of Lanai is southwest of the summit at an elevation of 1,000 to 2,000 feet. The plateau was once the largest pineapple plantation in the world. Below the 1,200 foot elevation the soils are eroded and stony. At the north end of the island, at approximately 1,500 to 1,800 feet, there are broad areas of severely windblown soils. The north and east sides of Lanai are dissected by many deep gulches and are inaccessible in many places.

Lanai is formed by the eroded remnants of a single volcano. The geological structure of the island is dominated by the collapsed caldera in the Palawai Basin, which is 6 miles long by 1.5 to 3 miles wide; the southwest rift is about 3 miles long and 1.5 to 2 miles wide. The rest of the island is layered thin lava flows; occasionally a small volcanic cone is present.

Lanai was a simple shield volcano with a typical history of caldera collapse, cessation of eruptions, erosion, and subsidence. Extensive faulting was associated with the collapse of the caldera and the adjustment of the rift zones. Investigations have suggested that enormous landslides broke away from the south and southwest portion of the island.

Lanai is composed of a single parent rock consisting of primitive basalt and olivine basalt. Differentiation into more alkalic rock types did not follow initial volcanic activity, as was the case of other major islands of the Hawaiian Archipelago; nor did post-erosional volcanism occur, as it did on Kauai, Oahu, and Maui.

The surface and subsurface rocks of the island are permeable to infiltration from rainfall to the extent that surface runoff infrequently reaches the sea. No perennial streams exist on Lanai. Weak springs caused by local perching strata exist in gulches leeward of the crest but were never reliable as a water source.

The simple geology of Lanai is reflected in the occurrence of its water resources. Potential surface water supplies do not exist because of the preciousness of the rocks, whereas fresh to saline groundwater underlies the entire island. On the flanks of the volcanic dome, brackish basal groundwater with a water table no more than a few feet above sea level occurs.

The Leeward Aquifer System, which is part of the Central Aquifer Sector (System Identifier 5010102), underlies the property. The area aquifer is classified as a high level, unconfined dike aquifer that is currently used. The groundwater, used for drinking, is categorized as having fresh salinity and is considered irreplaceable. Groundwater has a high vulnerability for contamination.

The site is situated above the Underground Injection Control (UIC) line. The UIC line is used by the State to delineate groundwater into areas that are fully protected from areas that are managed. The groundwater beneath the property is fully protected.

2.5 Regulatory Agency Records and Report Review

EnviroQuest, Inc. reviewed publicly available federal, state, and local records to assess the potential presence of hazardous substances and petroleum at the site. Federal and state environmental databases were searched to identify operations on the subject property and vicinity properties regulated by the U.S. Environmental Protection Agency (EPA) and/or Hawaii Department of Health (HDOH). Section 5 contains a detailed discussion on environmental issues identified during record reviews.

Federal and State Records

A standardized database report was commissioned from Environmental Data Resources (contained in Appendix 1) which compiles information from the following federal and state databases:

- National Priorities List (NPL) and proposed NPL sites
- Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS/NFRAP) sites
- Corrective Action Report for hazardous waste facilities (CORRACTS)

- Hazardous waste treatment, storage, and disposal facilities (TSD)
- Emergency response notification system for spills (ERNS)
- Large quantity and small quantity generators of hazardous waste (LG GEN/SM GEN)
- State landfills and other solid waste sites (SWLF)

This information was supplemented by a review of databases specific to Hawai`i, including:

- Underground Storage Tank (UST) sites registered with the State of Hawai`i
- Leaking Underground Storage Tank (LUST) sites listed by the State of Hawai`i
- Groundwater contamination maps for the State of Hawai`i (HDOH 1998)
- Release reports under the State Contingency Plan
- State Contingency Plan list of sites being addressed by the HDOH Hazard Evaluation and Emergency Response (HEER) office

In addition to identifying potential hazardous substance and petroleum release sites, the report included in Appendix 1 contains information about the physical characteristics of the site, including soil geology and floodplain information.

Based on information compiled from these sources, EnviroQuest, Inc. identified registered, permitted, or regulated sites within one-half mile of the site that involve management of hazardous substances or petroleum. There were no NPL or proposed NPL sites within one-half mile of the property. No solid or hazardous waste landfills, or facilities regulated under the Clean Air Act were identified.

2.5.1 Federal CERCLIS

CERCLIS is a Federal database maintaining national information on over 15,000 sites identified as hazardous or potentially hazardous, which may require action. These sites are currently being investigated or an investigation has been completed regarding the release of hazardous substances. The most serious of this list, as ranked by the hazardous ranking system, are eligible for listing onto the NPL. No CERCLA sites were identified within a one-mile radius of the property. CERCLA sites reclassified by the EPA as No Further Remedial Action Planned (NFRAP) were identified within one-mile of the parcel.

2.5.2 Federal RCRA

The Resource Conservation and Recovery (RCRA) Information System (RCRIS) is a national system used to track events and activities that fall under the jurisdiction of RCRA. There are three significant subsets to RCRIS:

- x RCRA treatment, storage, and disposal facilities (TSDs). Includes facilities that treat, store, dispose, or incinerate hazardous waste.
- x RCRA generators. Includes hazardous waste generators, which create more than 100 kilograms of hazardous waste per month or meet other RCRA requirements.
- x RCRA Corrective Action Sites (CORRACTS). Includes sites with reported corrective actions.

The database search identified no RCRA TSDs and no CORRACTS within one-mile of the properties. A CORRACTS facility is beyond the one-mile search distance under ASTM E1527-05 and is not expected to impact the properties.

There is no registered RCRA Small Quantity hazardous waste generators (SQG) located within one-half mile of the site. There are no registered waste generators within the search distance under ASTM E1527-05 of the property.

2.5.3 State Equivalent NPL and CERCLIS

Spills and releases of hazardous substances that occur in Hawaii are reported to the HDOH under the notification requirement in the Hawaii Environmental Response Law. Spills and releases that are not cleaned up or remediated under the oversight of HDOH emergency response personnel are evaluated for potential inclusion onto the SITELIST database. The sites on the SITELIST are considered to pose an environmental or health threat and are prioritized for further investigations and potential remediation. The sites on SITELIST are the State's equivalent of the EPA CERCLIS. There are no sites on SITELIST within a one-mile radius of the property.

2.5.4 State Leaking Underground Storage Tanks

The HDOH maintains a report on leaking underground storage tanks. The report is a comprehensive listing of reported LUSTs in Hawaii. The database search identified one LUST within one-half mile radius of the property. The LUST facility had releases that were confirmed with release responses initiated. The LUST facility on file is:

Oshiro Enterprises, Inc.
850 Fraser Ave.
Lanai City, Hawaii 96763

The leak reported to the Department of Health was from a UST in early 2000. Release response actions were taken and HDOH issued a "no further action" letter in January 2001.

2.5.5 State Underground Storage Tanks (UST)

Certain underground storage tanks (USTs) are required to be registered by federal or state regulations. For regulated USTs, notifications must be filed for existing USTs, USTs closed in place, and new USTs. The database search indicates fifteen (15) UST facilities within a quarter mile radius of the property. The UST facilities are mapped out in the colorized EDR report in Appendix 1. There are two (2) tanks that are permanently out of use today. The UST's were taken out of service June 24, 1993. Both USTs were 2,000 gallon steel units storing gasoline. The tanks were owned by:

Castle & Cooke
P.O. Box L
Lanai City, Hawaii 96763

None of the surrounding tank facilities pose a threat to the subject property.

2.5.6 State of Hawaii Department of Health Record Review

EnviroQuest requested HDOH HEER and Solid and Hazardous Waste Branch public files on September 20, 2008 for the subject site. Per personal communication with HDOH, there are no records on file regarding the subject property.

2.6 LOCAL RECORDS

Maui County Real Property Assessment Division records were reviewed to compile an ownership and lease history. Historic topographic maps, Historical Topographic and Sanborn Fire Insurance Company maps obtained from EDR were also examined.

A review of the Maui Real Property Assessment Division online records revealed the owner of the property is the County of Maui. The date of recording of the property was November 11, 1998.

As part of this investigation, a review of other resources, including personal communication, revealed that the previous owner was Castle & Cooke. The island has produced pineapple on 91% of island from 1922 to the last harvest in 1992.

3. SITE RECONNAISSANCE AND INTERVIEWS

3.1 SITE RECONNAISSANCE

Mr. Miles Nirei and Mr. David Leigh of EnviroQuest Inc. visited the site on September 10, 2008. A visual inspection was conducted of the property and surrounding area. Interviews were also conducted during the inspection. According to the meeting held on May 3 with all interested parties, it was stated that there was a survey conducted to determine the boundaries of the property. During the field investigation old survey tape was observed tied to brush however there were no marking on the tape. Mr. Nirei and Mr. Leigh surveyed the property by walking and riding across the property. Identifiable trails and off-trail locations were surveyed for evidence of debris or potential staining on the ground. Due to the landscape and the lack of boundary markings it's estimated that the area surveyed exceed 80 acres.

Lanai City resident, Ms. Kayla Eligado, was observed riding across the property on a quad trac recreational vehicle. Mr. Nirei requested the assistance of Ms. Eligado to survey the property utilizing her quad trac. With the assistance of Ms. Elgado, Mr. Nirei was able to ride across the property looking for any anomalies that could be an environmental concern. Observed was black plastic debris and Axis deer. According to personal interviews, the plastic was utilized throughout the plantation to mark plant location, retain fumigant, control weeds and raise soil temperature (Sipes 2000).

The visual investigation revealed nothing unusual that would indicate to this inspector that there are any major environmental concerns. There was no visible staining indicating a release of hazardous materials occurred nor were there any observed illegal dump sites on the property.

A scrap metal recycling facility, Maui Tri Isle, Inc., was observed approximately one-quarter of a mile southeast of the subject property. The facility segregates recyclable items for removal from the island. The facility does not pose an environmental concern to the subject property.

3.1.1 Current Activities

Currently the County of Maui owns the subject property. Axis deer roam the dormant property which is overgrown with vegetation.

3.1.2 Building Materials

There are no building structures on the property or evidence that any structures were ever on the property.

3.1.3 Hazardous Materials

No hazardous materials or abandoned storage containers are stored on property or is there visible evidence that any hazardous materials were stored on the property.

3.1.4 Transformers and Oil-Filled Electrical Equipment

There is no transformer type equipment on the property.

3.1.5 Solid Waste Disposal

No solid waste disposal was observed on the property.

3.2 INTERVIEWS

Personal interviews were conducted to gain a further understanding of the area and potential past practices of the area. Interviewed were Ms. Kayla Eligado, employed by the U.S.

Department of Homeland Security TSA Lanai Airport; Mr. Kepa Moly, Executive Director of the Lanai Culture & Heritage Center; and Mr. Andres Velasco, employee of Maui Tri Isle, Inc., all residents of Lanai City. Observations and opinions are incorporated into the site reconnaissance descriptions above and are attributed as appropriate.

This investigation was limited to a visual inspection, review of historical records and interviews of current pertinent personnel. There were no subsurface investigations or sampling conducted.

4. ENVIRONMENTAL CONCERNS AND RECOMMENDATIONS

This section identifies environmental concerns observed at the property along with recommendations for addressing those concerns.

After document review, personal interview and physical visual review of the subject property, there are no recognized environmental conditions.

5. CONCLUSIONS

The conclusions presented below are based on the site reconnaissance, interviews with site personnel, historical review, and records review conducted during this Phase 1 Environmental Assessment. The site consists of land that has relatively flat geography with various vegetations and no structure of any type.

- We have performed this Phase 1 Environmental Site Assessment in conformance with the scope and limitations of ASTM Standard E 1527-05, of 65 acres in Lanai City. This assessment has revealed no evidence of recognized environmental conditions in connection with the property

6. REFERENCES

American Society for Testing and Materials. 2000. Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process. ASTM Standard E 1527-00.

Juvik, Sonia P. and James O. Juvik, editors. 1998. Atlas of Hawai`i, Third Edition. Department of Geography, University of Hawai`i at Hilo. Honolulu, University of Hawai`i Press.

Mink, John F and L. Stephen Lau 1993. Aquifer Identification and Classification for Lanai, Groundwater Protection Strategy for Hawai'i. Technical Report No. 190. Water Resources Research Center, University of Hawaii at Manoa

Sipes, Brent S. 2000. Crop Profile for Pineapples in Hawaii. Department of Plant Pathology, University of Hawaii at Manoa.

Personal Communication:

Kayla Eligado, resident of Lanai City, TSA employee

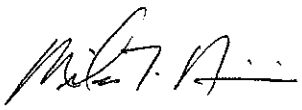
Andres Velasco, resident of Lanai City, Tri Isle Inc. employee

Kepa Moly, resident of Lanai City, Executive Director, Lanai Culture & Heritage Center

Grace Simmons, Department of Health, Solid and Hazardous Waste Branch

7. SIGNATURE OF ENVIRONMENTAL PROFESSIONAL

This Phase 1 Environmental Site Assessment was completed by EnviroQuest, Inc. Questions and comments on this report may be directed to the undersigned:



Miles T. Nirei, M.S.
Senior Environmental Scientist

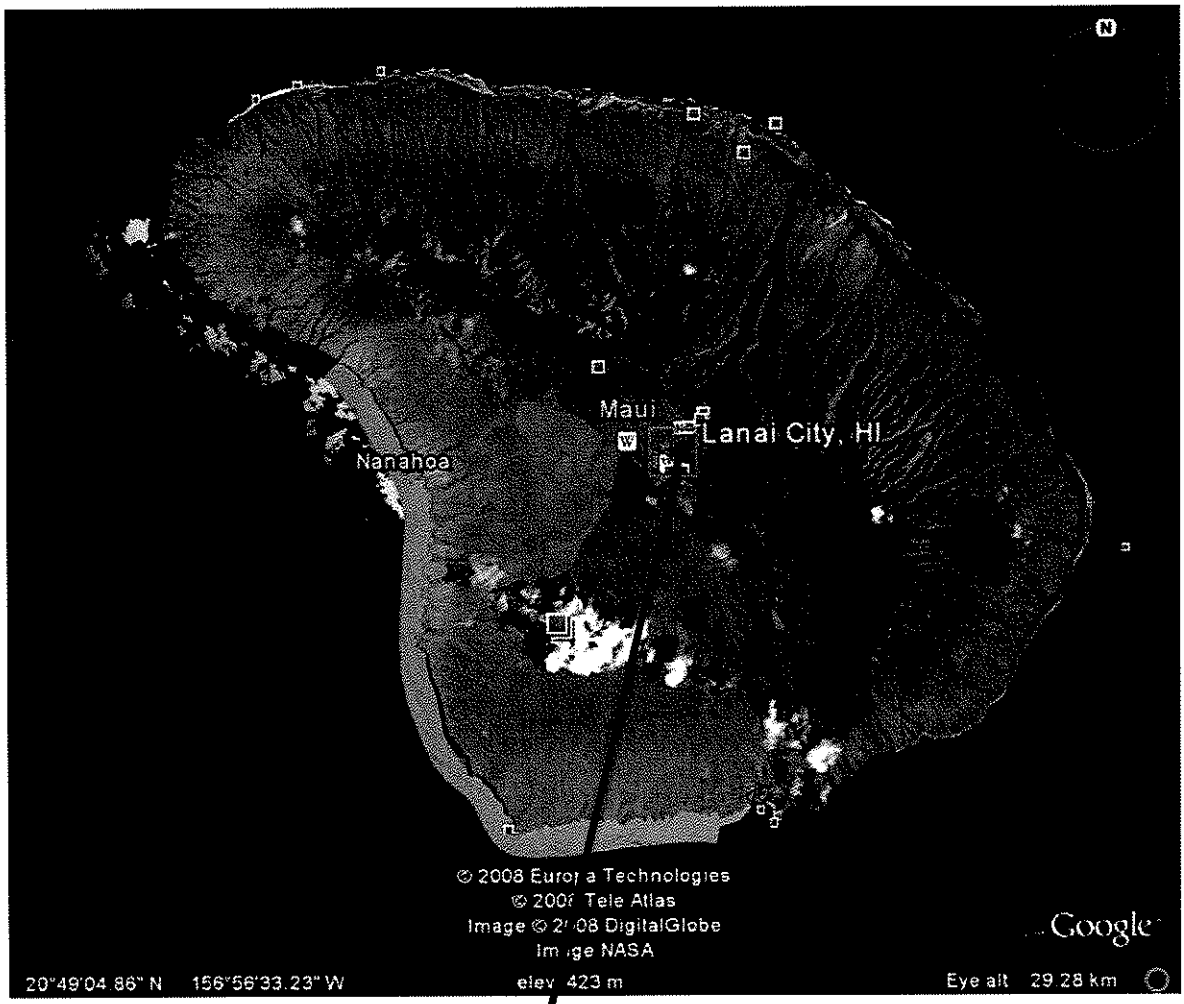
EnviroQuest, Inc.
95-029 Hekaha Street, Suite 21
Aiea, HI 96701

Telephone: (808) 486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

FIGURES

EQI
EnviroQuest

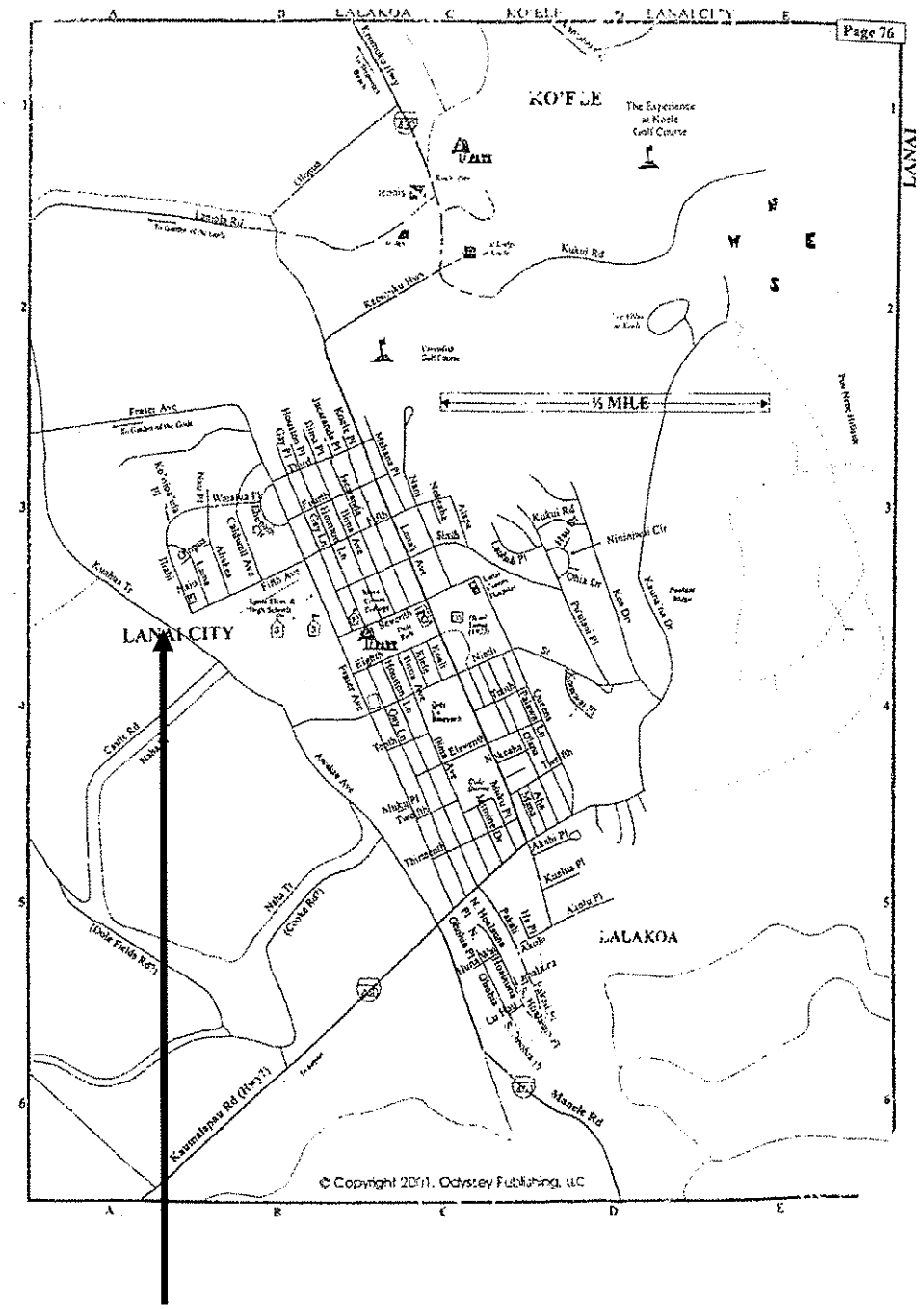
FIGURE 1
SITE LOCATION MAP



Project Site

EQI
EnviroQuest INC

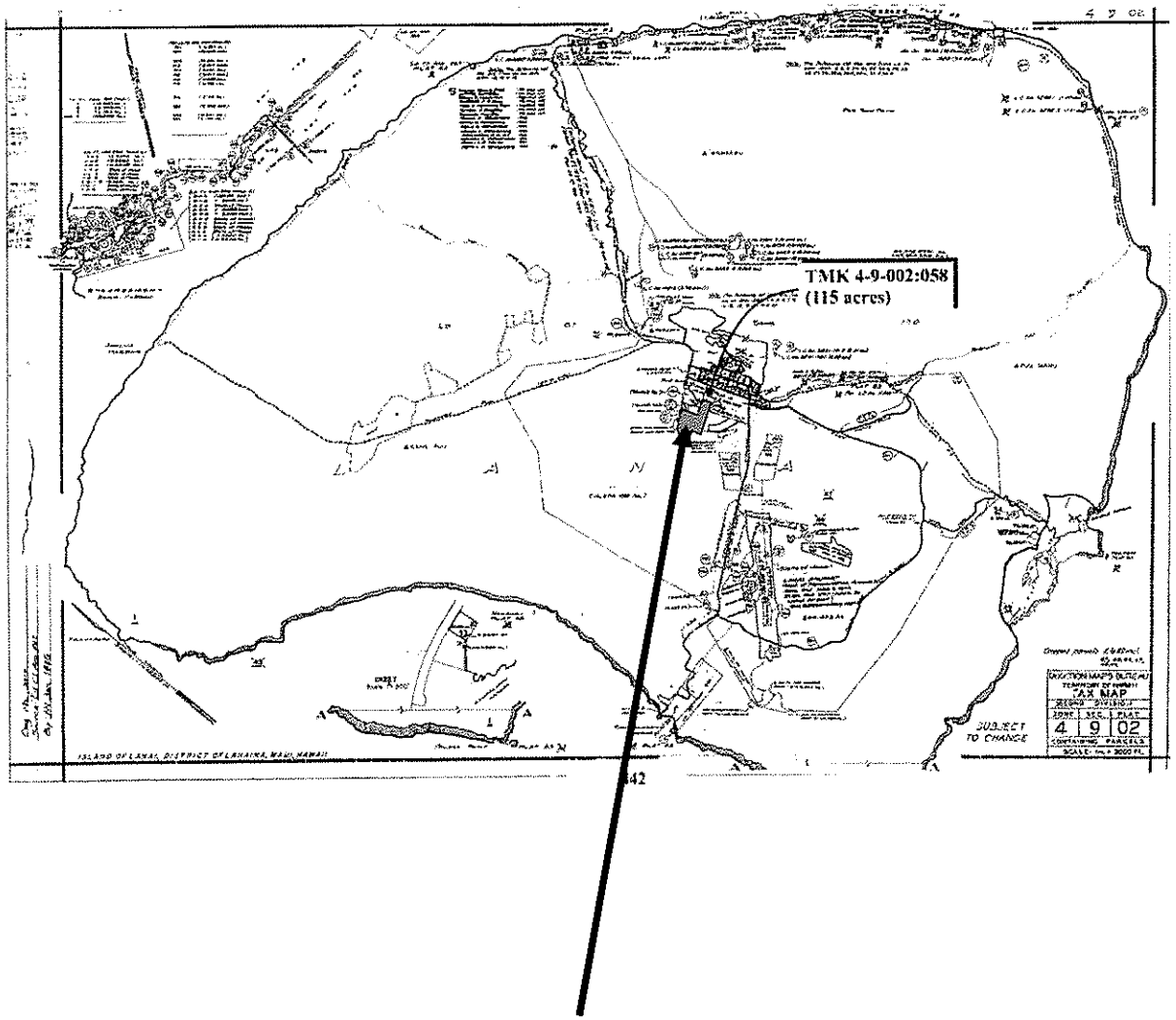
FIGURE 2
TOPOGRAPHIC MAP



Project Site

FIGURE 3

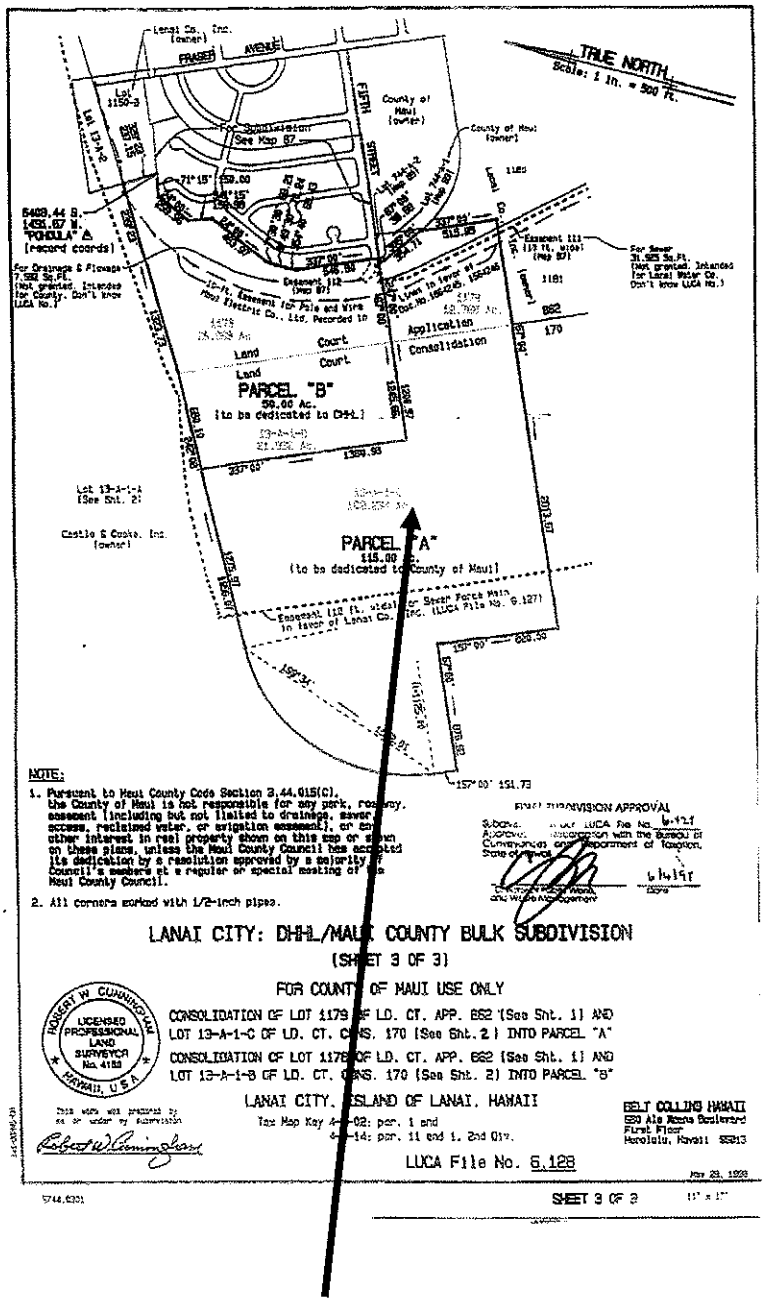
Site Layout



Project Site

FIGURE 4

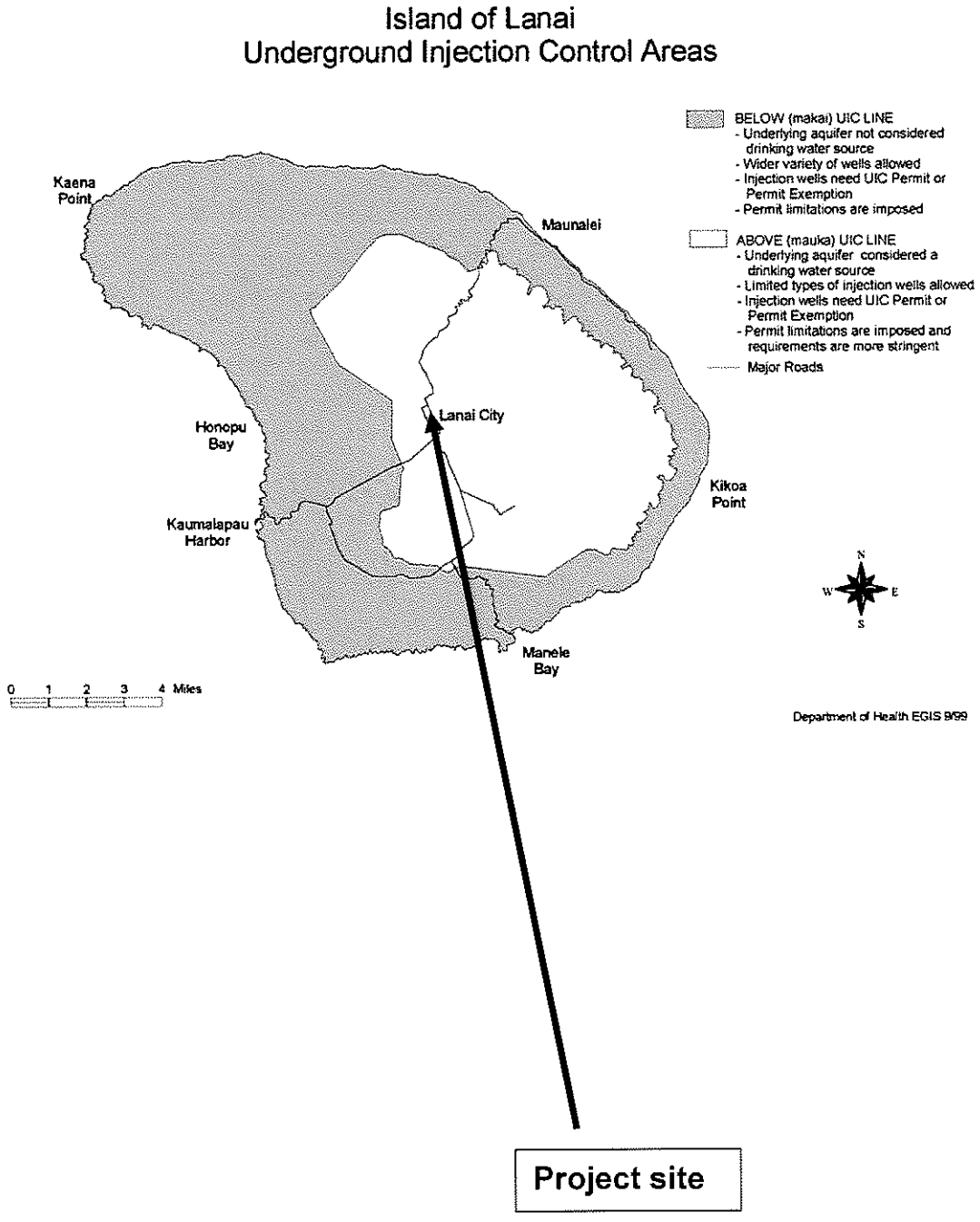
Parcel Map



Project Site

EQI
EnviroQuest

FIGURE 5
UNDERGROUND INJECTION CONTROL AREAS MAP



EQI
EnviroQuest

FIGURE 6
REQUEST TO REVIEW GOVERNMENT DOCUMENTS

FAX: (808) 586-7509

Request to Access a Government Record

DATE: 9/21/08 Email Address: niveim001@hawaii.rr.com
TO: DOH/EMD/Solid and Hazardous Waste Branch, 919 Ala Moana Blvd., Rm. 212
FROM: ENVIROQUEST
Name or Alias (Print)

Contact Information/Company Name (Print)
MILES NIVEI 631-9250
Phone# Fax #

Although you are not required to provide any personal information, you should provide enough information to allow the agency to contact you about this request. The processing of this request may be stopped if the agency is unable to contact you. Therefore, please provide any information that will allow the agency to contact you (name or alias, telephone or fax number, mailing address, e-mail, etc.).

I WOULD LIKE THE FOLLOWING GOVERNMENT RECORD:
Describe the government record as specifically as possible so that it can be located. Try to provide a record name, subject matter, date, location, purpose, or names of persons to whom the record refers, or other information that could help the agency identify the record.

CASTLE & COOKE
LANAI CITY
ANALUA AVE @ CORNER OF KAMOKU / 5TH ST

I WOULD LIKE: (please check one or more of the options below)
✓ To inspect the government record.
___ A copy of the government record: (Please check one of the options below). See the back of this page for information about fees that you may be required to pay for agency services to process your record request. Note: Copying and transmission charges may also apply to certain options.
___ Pick up at agency (date and time):_____
___ Mail
___ Fax (toll free and only if available)
___ Other, if available (please specify);

___ If the agency maintains the records in a form other than paper, please advise in which format you would prefer to have the record.
___ Electronic ___ Audio ___ Other (please specify):_____

___ Check here if you are attaching a request for waiver of fees in the public interest (see waiver information on back).

SEE BACK FOR IMPORTANT INFORMATION

OIP 1 (rev. 7/29/99)

EQI
EnviroQuest INC

FIGURE 6a
REQUEST TO REVIEW GOVERNMENT DOCUMENTS

REQUEST TO ACCESS A GOVERNMENT RECORD

DATE: 9/20/02

TO: Hazard Evaluation & Emergency Response Office (Fax: 586-7537)

FROM: ENVIROQUEST
Name or Alias

Contact Information
MILES NIKEI 631-9650

Although you are not required to provide any personal information, you should provide enough information to allow the agency to contact you about this request. The processing of this request may be stopped if the agency is unable to contact you. Therefore, please provide any information that will allow the agency to contact you (name or alias, telephone or fax number, mailing address, e-mail address, etc.).

I WOULD LIKE THE FOLLOWING GOVERNMENT RECORD:

Describe the government record as specifically as possible so that it can be located. Try to provide a record name, subject matter, date, location, purpose, or name of persons to whom the record refers, or other information that could help the agency identify the record. A complete and accurate description of the government record you request will prevent delays in locating the record. Attach a second page if needed.

CASTLE ; COOKE
LANAI CITY
ALUALUA AVE @ CORNER OF KAMOKA / 5TH ST

I WOULD LIKE: (please check one or more of the options below)

☒ To inspect the government record.

☐ A copy of the government record: (Please check one of the options below.) See the back of this page for information about fees that you may be required to pay for agency services to process your record request. Note: Copying and transmission charges may also apply to certain options.

- ☐ Pick up at agency (date and time):_____
- ☐ Mail
- ☐ Fax (toll free and only if available)
- ☐ Other, if available (please specify):_____

☐ If the agency maintains the records in a form other than paper, please advise in which format you would prefer to have the record.

☐ Electronic ☐ Audio ☐ Other (please specify):_____

☐ Check this box if you are attaching a request for waiver of fees in the public interest (see waiver information on back).

SEE BACK FOR IMPORTANT INFORMATION

OFFICIAL USE ONLY:

_____ _____
Office Manager Date

OIP 1 (rev. 7/29/99)

APPENDIX 1

EDR Radius Map Report

Project Number: NA
Lanai City
Awalua Ave
Lanai City, HI 96763

Inquiry Number: 2327818.2s
October 08, 2008

The EDR Radius Map™ Report with GeoCheck®

Prepared Using The EDR FieldCheck® System

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of the environmental records was conducted by Environmental Data Resources, Inc. (EDR). ENVIROQUEST used the EDR FieldCheck System to review and/or revise the results of this search, based on independent data verification by ENVIROQUEST. The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

AWALUA AVE
LANAI CITY, HI 96763

COORDINATES

Latitude (North):	20.825380 - 20° 49' 31.4"
Longitude (West):	156.927810 - 156° 55' 40.1"
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	715648.4
UTM Y (Meters):	2304072.8
Elevation:	1562 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	20156-G8 ISLAND OF LANAI OE NW, HI
Most Recent Revision:	Not reported

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No sites were identified in following databases.

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Transporters, Storage and Disposal
RCRA-LQG	RCRA - Large Quantity Generators
RCRA-SQG	RCRA - Small Quantity Generators

EXECUTIVE SUMMARY

RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator
RCRA-NonGen	RCRA - Non Generators
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
SCRD DRYCLEANERS	State Coalition for Redediation of Drycleaners Listing

STATE AND LOCAL RECORDS

SHWS	Sites List
SWF/LF	Permitted Landfills in the State of Hawaii
UST	Underground Storage Tank Database
SPILLS	Release Notifications
INST CONTROL	Sites with Institutional Controls
VCP	Voluntary Response Program Sites
DRYCLEANERS	Permitted Drycleaner Facility Listing
BROWNFIELDS	Brownfields Sites
AIRS	List of Permitted Facilities

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
INDIAN VCP	Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants

EXECUTIVE SUMMARY

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STATE AND LOCAL RECORDS

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.

An online review and analysis by ENVIROQUEST of the LUST list,
as provided by EDR, and dated 06/30/2008 has revealed that there is 1 LUST site
within approximately 0.5 miles of the target property.

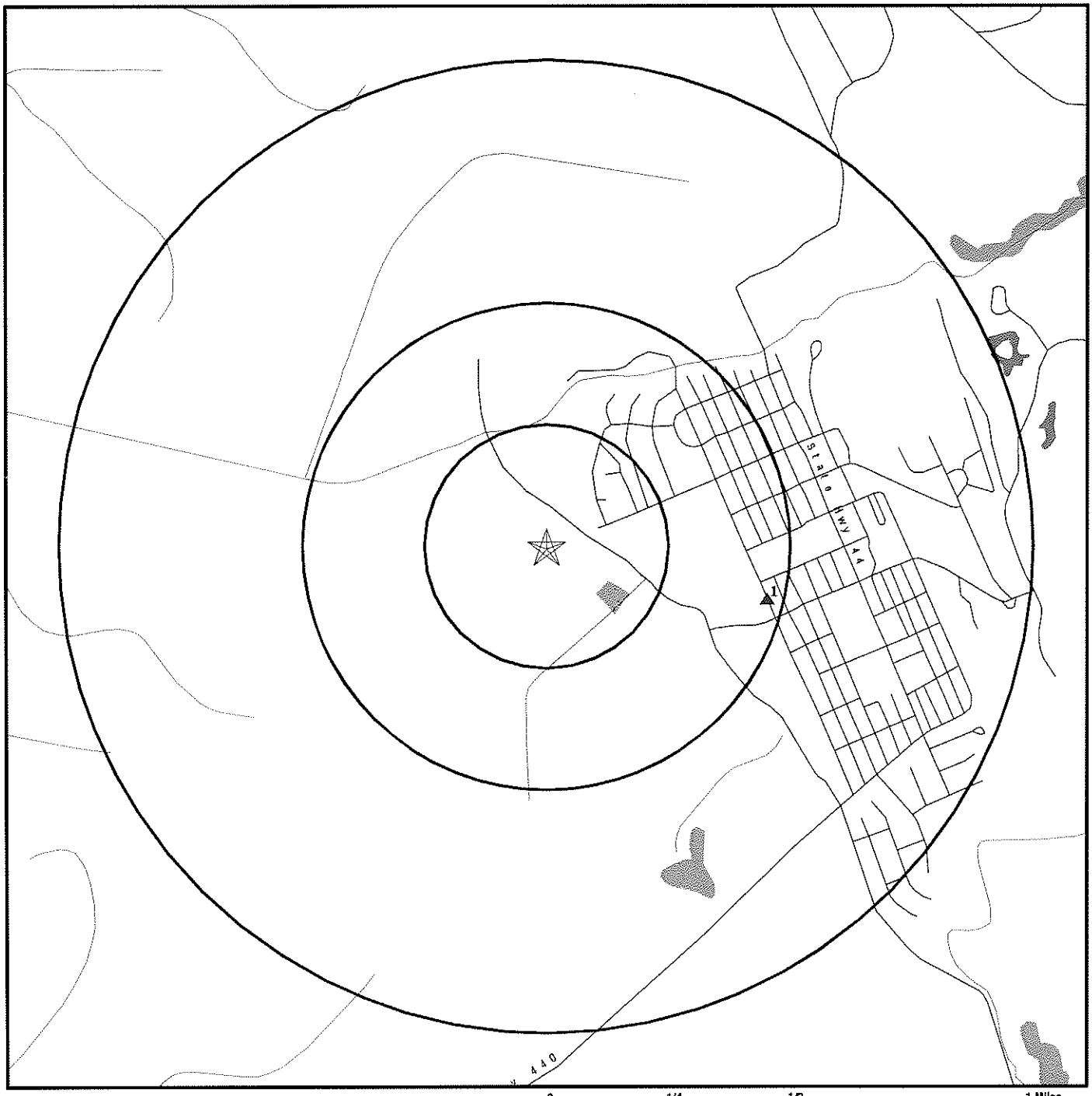
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
OSHIRO ENTREPRISES, INC.	***850 FRASER AVE***	***ESE 1/4 - 1/2 (0.465 mi.)***	***1***	***6***
Facility Status: Site Cleanup Completed (NFA)				

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
LANAI ELEMENTARY AND HIGH	FTTS, HIST FTTS
CASTLE & COOKE FOODS-LANAI PLANTATION	FINDS, CERC-NFRAP, RCRA-TSDF, RCRA-NonGen
LANAI LANDFILL	SHWS
DOLE PLANTATION (PALAWAI & 5319 BASINS)	FINDS, INST CONTROL, SHWS
LANAI LDFL	CERC-NFRAP
LANAI DUMP SITE PALAWI BASIN	CERC-NFRAP
LANAI DDT STORAGE TANK AREA	CERC-NFRAP
LANAI DRUM SITE NO. 3	CERC-NFRAP
LANAI DRUM SITE NO. 2	CERC-NFRAP
LANAI DUMP SITE	CERC-NFRAP
LANAI DRUM SITE NO. 1	CERC-NFRAP
LANAI CHEMICAL MIXING AREA	CERC-NFRAP
LANAI LANDFILL	SWF/LF
FAA - LANAI	UST
LANAI CITY SERVICE	FINDS, RCRA-NonGen, UST
LANAI OIL COMPANY INCORPORATED	FINDS, RCRA-SQG
TRANSPORTATION SECURITY ADMINISTRATION	RCRA-CESQG
LANAI SANITARY LANDFILL	FINDS
DOLE PINEAPPLE PESTICIDE SITE, LANAI	FINDS
INDEPENDENCE OIL SPILL BETWEEN MOLOKAI & LANAI IN OCEAN	FINDS
LANAI CITY 2.0 MG STORAGE	FINDS
LANAI CITY LANDSCAPING	FINDS
LANAI LANDFILL	FINDS
LANAI OIL COMPANY INC	FINDS
LANAI WATER CO. INC	FINDS
LANAI WASTEWATER RECLAIMATION FACILITY	FINDS
LANAI YARD	FINDS
LANAI CITY	FINDS
LANAI RESIDENCE LOTS, PHASE 1	FINDS
LANAI AIRPORT (PMID LNY620123)	FINDS
LANAI CO., BASEYARD	FINDS
LANAI COMMUNITY HOSPITAL	FINDS
LANAI CENTRAL OFFICE	FINDS
FAA - LANAI	FINDS
LANAI HARBOR	SPILLS
LANAI OIL COMPANY INC	SPILLS
FOUR SEASONS RESORT LANAI	AIRS

OVERVIEW MAP - 2327818.2s

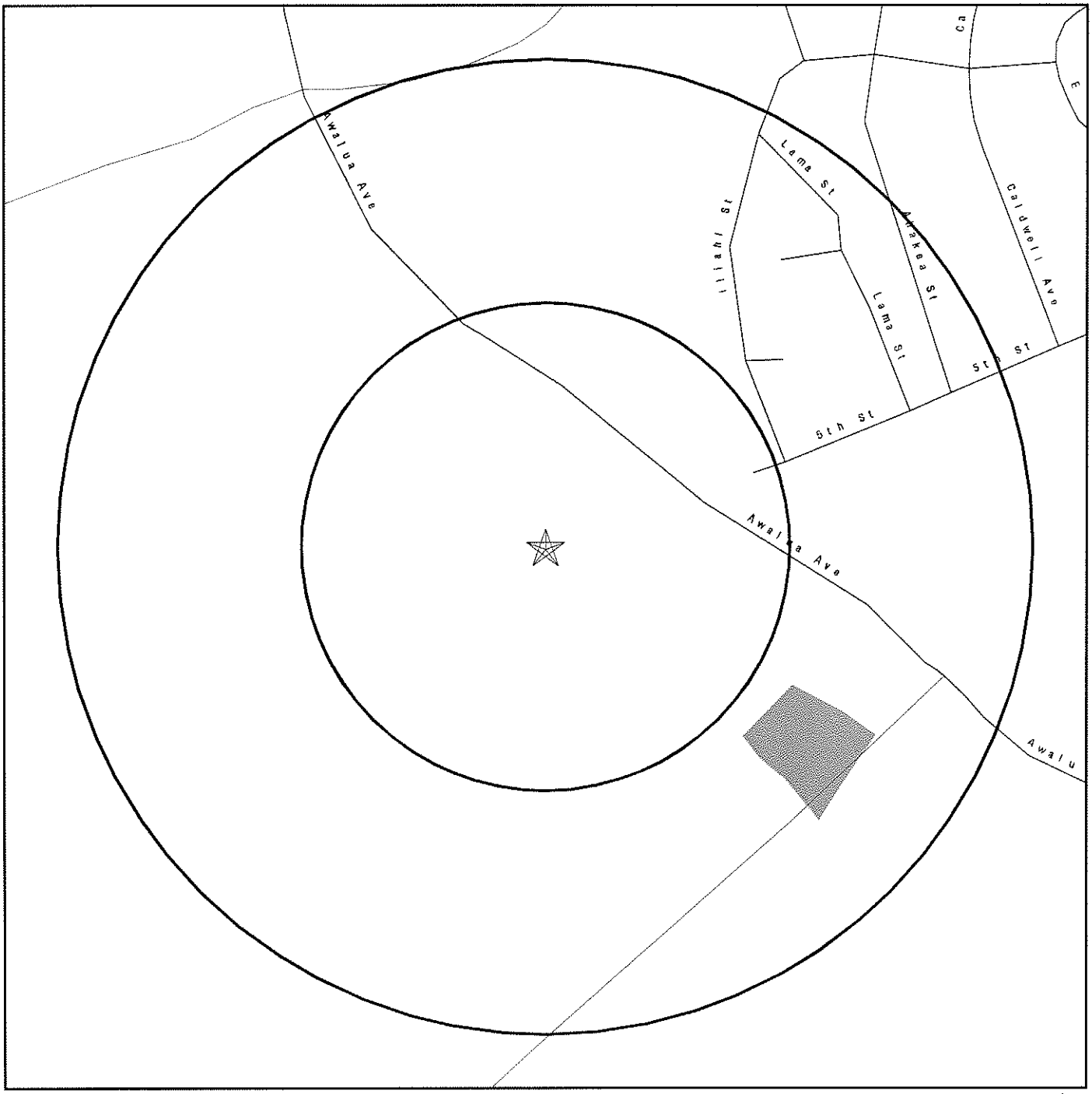


- ☆ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ♟ Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Lanai City ADDRESS: Awalua Ave Lanai City HI 96763 LAT/LONG: 20.8254 / 156.9278	CLIENT: Enviroquest CONTACT: Miles Nirei INQUIRY #: 2327818.2s DATE: October 08, 2008 2:27 pm

DETAIL MAP - 2327818.2s



0 1/16 1/8 1/4 Miles

- ☆ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Lanai City ADDRESS: Awalua Ave Lanai City HI 96763 LAT/LONG: 20.8254 / 156.9278	CLIENT: Enviroquest CONTACT: Miles Nirei INQUIRY #: 2327818.2s DATE: October 08, 2008 2:27 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL RECORDS								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.500	0	0	0	NR	NR	0
LIENS 2		TP	NR	NR	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRA-TSDF		0.500	0	0	0	NR	NR	0
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
US CDL		TP	NR	NR	NR	NR	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
STATE AND LOCAL RECORDS								
SHWS		1.000	0	0	0	0	NR	0
SWF/LF		0.500	0	0	0	NR	NR	0
LUST		0.500	0	0	1	NR	NR	1
UST		0.250	0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS		TP	NR	NR	NR	NR	NR	0
INST CONTROL		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
BROWNFIELDS		0.500	0	0	0	NR	NR	0
AIRS		TP	NR	NR	NR	NR	NR	0
TRIBAL RECORDS								
INDIAN RESERV		1.000	0	0	0	0	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY RECORDS								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
ESE
1/4-1/2
0.465 mi.
2458 ft.

OSHIRO ENTREPRISES, INC.
850 FRASER AVE
LANAI CITY, HI 96763

LUST **U003222163**
UST **N/A**

Relative:
Higher

Actual:
1616 ft.

LUST:

Facility ID:	9-401388
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	19-Jan-01
Release ID:	900130
Project Officer:	Shunsheng Fu

UST:

Facility ID:	9-401388
Owner:	CASTLE & COOKE, INC
Owner Address:	P.O. BOX L
Owndер City,St,Zip:	Lanai City, 96763 96763
Tank ID:	R-1
Date Installed:	7/1/1952
Tank Status:	**Permanently Out of Use**
Date Closed:	6/24/1993
Tank Capacity:	2000
Substance:	Gasoline
Tank ID:	R-2
Date Installed:	7/1/1952
Tank Status:	**Permanently Out of Use**
Date Closed:	6/24/1993
Tank Capacity:	2000
Substance:	Gasoline

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
LANAI	1008172758	LANAI SANITARY LANDFILL	EASTERLY SIDE HONOAPIILANI HWY	96763	FINDS
LANAI	S106818708	LANAI HARBOR	LANAI HARBOR		SPILLS
LANAI	1006820214	DOLE PINEAPPLE PESTICIDE SITE, LANAI	LANAI AVENUE	96763	FINDS
LANAI	1003879123	LANAI LDFL	LANAI	96763	CERC-NFRAP
LANAI	1000726484	LANAI LANDFILL	LANAI		SWF/LF
LANAI	1006820616	INDEPENDENCE OIL SPILL BETWEEN MOLOKAI & LANAI IN OCEAN	IN OCEAN	96763	FINDS
LANAI CITY	U001236618	FAA - LANAI	P.O. BOX 722	96763	UST
LANAI CITY	1009403160	LANAI CITY 2.0 MG STORAGE	1311 FRASER AVENUE	96763	FINDS
LANAI CITY	S108633277	FOUR SEASONS RESORT LANAI	1233 FRASER AVENUE		AIRS
LANAI CITY	1007283988	LANAI ELEMENTARY AND HIGH	FRASIER AVE	96763	FTTS, HIST FTTS
LANAI CITY	1008903015	LANAI CITY LANDSCAPING	3/10 MI FROM FREIGHT YARD ROAD	96763	FINDS
LANAI CITY	1011306747	LANAI LANDFILL	KAUMALAPAU HWY, 1827 KAUHU STREET,WAILUKU,96793	96763	FINDS
LANAI CITY	S108859757	LANAI OIL COMPANY INC	KAUMALAPAU HWY	96763	SPILLS
LANAI CITY	1007447440	TRANSPORTATION SECURITY ADMINISTRATION	KAUMALAPAU HWY	96763	RCRA-CESQG
LANAI CITY	1009802462	LANAI OIL COMPANY INC	KAUMALAPAU HWY	96763	FINDS
LANAI CITY	1006819455	LANAI WATER CO. INC	KAUMALAPAU HWY	96763	FINDS
LANAI CITY	1006819457	LANAI LANDFILL	KAUMALAPAU HWY	96763	SHWS
LANAI CITY	1006819456	LANAI WASTEWATER RECLAIMATION FACILITY	KAUMALAPAU HWY	96763	FINDS
LANAI CITY	1000146613	LANAI OIL COMPANY INCORPORATED	KAUMALAPAU HIGHWAY	96763	FINDS, RCRA-SQG
LANAI CITY	1006819443	LANAI YARD	KAUNALAPAU HWY	96763	FINDS
LANAI CITY	1008038490	LANAI CITY	LANAI CITY	96763	FINDS
LANAI CITY	1008002744	LANAI RESIDENCE LOTS, PHASE 1	LANAI AVE	96763	FINDS
LANAI CITY	1006841683	LANAI AIRPORT (PMID LNY620123)	LANAI AIRPORT	96763	FINDS
LANAI CITY	1006842639	LANAI CO., BASEYARD	949 LANAI AVE	96763	FINDS
LANAI CITY	1000146606	LANAI CITY SERVICE	1036 LANAI AVE	96763	FINDS, RCRA-NonGen, UST
LANAI CITY	1006820213	DOLE PLANTATION (PALAWAI & 5319 BASINS)	PALAWAI ST	96763	FINDS, INST CONTROL, SHWS
LANAI CITY	1000198027	CASTLE & COOKE FOODS-LANAI PLANTATION	PALAWAI & 5319 BASINS	96763	FINDS, CERC-NFRAP, RCRA-TSDF, RCRA-NonGen
LANAI CITY	1006843526	LANAI COMMUNITY HOSPITAL	697 SEVENTH AVE	96763	FINDS
LANAI CITY	1006819458	LANAI CENTRAL OFFICE	423 9TH ST	96763	FINDS
LANAI CITY	1006842723	FAA - LANAI	4 MI SW OF LANAI CITY	96763	FINDS
LANAI ISLAND	1003879697	LANAI DUMP SITE PALAWI BASIN	BOUNDED BY FIELDS NO. 5429, 5421, & 5413	96763	CERC-NFRAP
LANAI ISLAND	1003879692	LANAI DDT STORAGE TANK AREA	SE OF FIELD 5303/NORTHEND OF FIELD 5417	96763	CERC-NFRAP
LANAI ISLAND	1003879695	LANAI DRUM SITE NO. 3	NORTHWEST OF FIELD # 5319	96763	CERC-NFRAP
LANAI ISLAND	1003879694	LANAI DRUM SITE NO. 2	SOUTH OFF MIKI ROAD	96763	CERC-NFRAP
LANAI ISLAND	1003879696	LANAI DUMP SITE	SOUTEAST OF FIELD #5311	96763	CERC-NFRAP
LANAI ISLAND	1003879693	LANAI DRUM SITE NO. 1	SOUTHEND OF FIELD #53190	96763	CERC-NFRAP
LANAI ISLAND	1003879698	LANAI CHEMICAL MIXING AREA	SOUTHEND OF FIELD #5311 BASIN	96763	CERC-NFRAP

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 08/13/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 27

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 08/27/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 08/14/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 27

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 34

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 09/15/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 08/19/2008
Date Data Arrived at EDR: 08/29/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/25/2008
Date Data Arrived at EDR: 06/30/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 56

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/02/2008
Next Scheduled EDR Contact: 12/01/2008
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Transporters, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 08/20/2008
Date Data Arrived at EDR: 08/21/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 19

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 08/20/2008
Date Data Arrived at EDR: 08/21/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 19

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 08/20/2008
Date Data Arrived at EDR: 08/21/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 19

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 08/20/2008
Date Data Arrived at EDR: 08/21/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 19

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 08/20/2008
Date Data Arrived at EDR: 08/21/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 19

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 07/23/2008
Date Data Arrived at EDR: 07/29/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 12/29/2008
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 07/23/2008
Date Data Arrived at EDR: 07/29/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 54

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 07/25/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 07/15/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 41

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 07/15/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 05/14/2008
Date Data Arrived at EDR: 05/28/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 72

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/29/2008
Next Scheduled EDR Contact: 11/24/2008
Data Release Frequency: Varies

CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 12/22/2008
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 08/25/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 07/15/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 08/08/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 09/05/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 18

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/05/2008
Next Scheduled EDR Contact: 12/29/2008
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 09/09/2008
Next Scheduled EDR Contact: 12/08/2008
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 04/25/2008
Date Data Arrived at EDR: 06/12/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 74

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 06/18/2008
Date Data Arrived at EDR: 07/11/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 45

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 12/29/2008
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 09/15/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 03/25/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 09/22/2008
Next Scheduled EDR Contact: 12/22/2008
Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/28/2008
Date Data Arrived at EDR: 06/25/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 61

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 12/22/2008
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 08/11/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/12/2008
Date Data Arrived at EDR: 07/18/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 38

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 09/15/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 07/12/2008
Date Data Arrived at EDR: 07/18/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 38

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 09/15/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/14/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/31/2008
Date Data Arrived at EDR: 08/13/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/14/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 12/04/2007
Date Data Arrived at EDR: 02/07/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 39

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 09/18/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/08/2008
Date Data Arrived at EDR: 08/05/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 20

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 12/29/2008
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/29/2008
Date Data Arrived at EDR: 07/31/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 25

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/31/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 08/25/2008
Number of Days to Update: 47

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 12/29/2008
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 09/12/2008
Next Scheduled EDR Contact: 12/08/2008
Data Release Frequency: Biennially

SCRD DRYCLEANERS: State Coalition for Redediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/10/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 08/25/2008
Next Scheduled EDR Contact: 11/10/2008
Data Release Frequency: Varies

STATE AND LOCAL RECORDS

SHWS: Sites List

Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SWF/LF: Permitted Landfills in the State of Hawaii

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/19/2004
Date Data Arrived at EDR: 05/20/2004
Date Made Active in Reports: 06/22/2004
Number of Days to Update: 33

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 08/04/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

LUST: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 06/30/2008
Date Data Arrived at EDR: 07/02/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 20

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 12/22/2008
Data Release Frequency: Semi-Annually

UST: Underground Storage Tank Database

Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 06/30/2008
Date Data Arrived at EDR: 07/02/2008
Date Made Active in Reports: 07/24/2008
Number of Days to Update: 22

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 09/23/2008
Next Scheduled EDR Contact: 12/22/2008
Data Release Frequency: Semi-Annually

SPILLS: Release Notifications

Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls

Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites

Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 03/28/2008
Date Data Arrived at EDR: 03/28/2008
Date Made Active in Reports: 04/24/2008
Number of Days to Update: 27

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Varies

BROWNFIELDS: Brownfields Sites
With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Varies

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 03/28/2008
Date Data Arrived at EDR: 03/28/2008
Date Made Active in Reports: 04/24/2008
Number of Days to Update: 27

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Varies

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 08/08/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 08/25/2008
Next Scheduled EDR Contact: 11/24/2008
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 08/22/2008
Date Data Arrived at EDR: 08/22/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 18

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 07/11/2008
Date Data Arrived at EDR: 07/11/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 28

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/21/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 5

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/05/2008
Date Data Arrived at EDR: 09/05/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 18

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/21/2007
Date Data Arrived at EDR: 12/21/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 34

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 09/05/2008
Date Data Arrived at EDR: 09/05/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 18

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/01/2007
Date Data Arrived at EDR: 06/14/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 21

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 08/21/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 5

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 07/11/2008
Date Data Arrived at EDR: 07/11/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 08/22/2008
Date Data Arrived at EDR: 08/22/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 18

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

LANAI CITY
AWALUA AVE
LANAI CITY, HI 96763

TARGET PROPERTY COORDINATES

Latitude (North):	20.82538 - 20° 49' 31.4"
Longitude (West):	156.92781 - 156° 55' 40.1"
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	715648.4
UTM Y (Meters):	2304072.8
Elevation:	1562 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	20156-G8 ISLAND OF LANAI OE NW, HI
Most Recent Revision:	Not reported

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

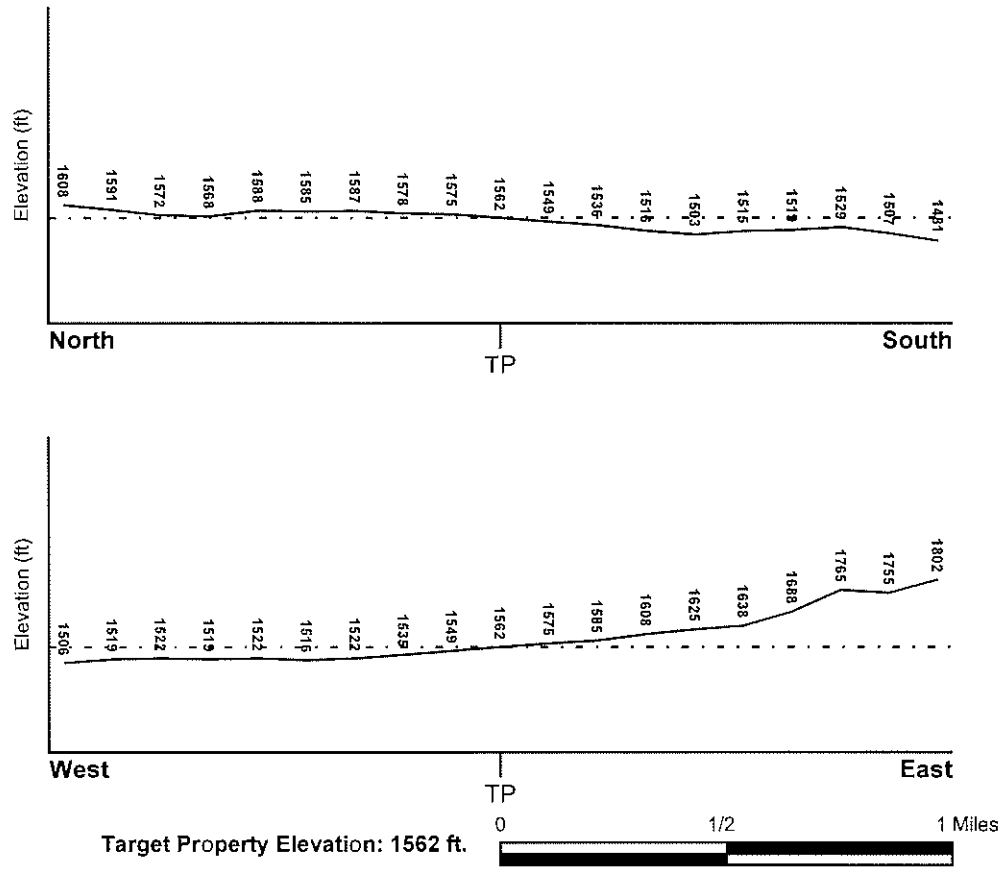
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General WSW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
MAUI, HI	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: Not Reported

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

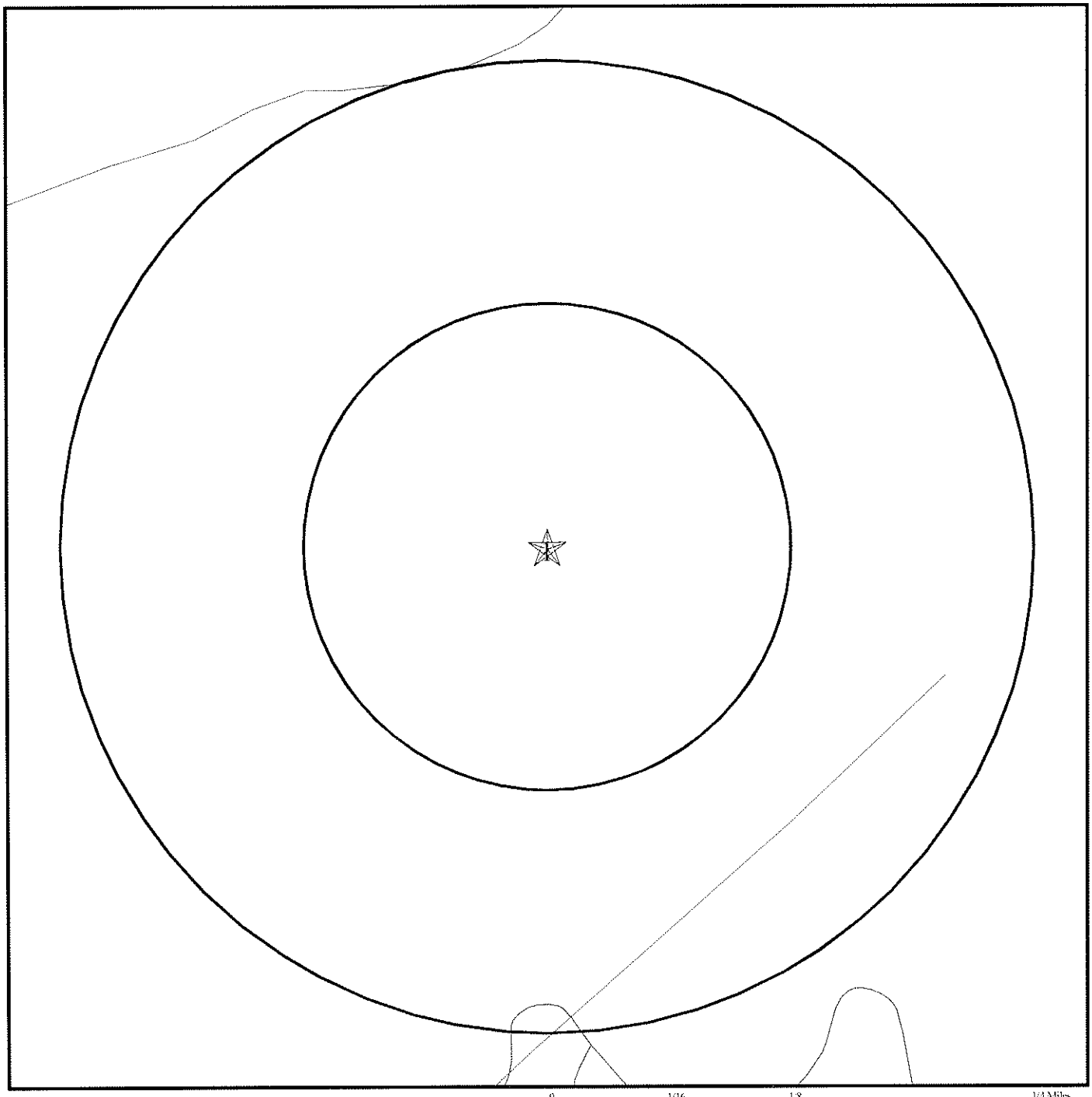
Era:	-
System:	-
Series:	-
Code:	N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 2327818.2s



☆ Target Property

SSURGO Soil

Water

SITE NAME:	Lanai City	CLIENT:	Enviroquest
ADDRESS:	Awalua Ave	CONTACT:	Miles Nirei
	Lanai City Hi 96763	INQUIRY #:	2327818.2s
LAT/LONG:	20.8254 / 156.9278	DATE:	October 08, 2008 2:28 pm

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Waihuna

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 183 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	1 inches	5 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1 Min: 0.01	Max: 7.3 Min: 5.6
2	53 inches	64 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1 Min: 0.01	Max: 7.3 Min: 5.6
3	0 inches	1 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1 Min: 0.01	Max: 7.3 Min: 5.6
4	11 inches	18 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1 Min: 0.01	Max: 7.3 Min: 5.6

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
5	5 inches	11 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1 Min: 0.01	Max: 7.3 Min: 5.6
6	40 inches	53 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1 Min: 0.01	Max: 7.3 Min: 5.6
7	25 inches	40 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1 Min: 0.01	Max: 7.3 Min: 5.6

Soil Map ID: 2

Soil Component Name: Lahaina

Soil Surface Texture: silty clay

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 14 Min: 4.23	Max: 7.3 Min: 5.6
2	14 inches	31 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 14 Min: 4.23	Max: 7.3 Min: 5.6
3	31 inches	59 inches	silty clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 14 Min: 4.23	Max: 7.3 Min: 5.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	HI0000218	1/2 - 1 Mile ENE

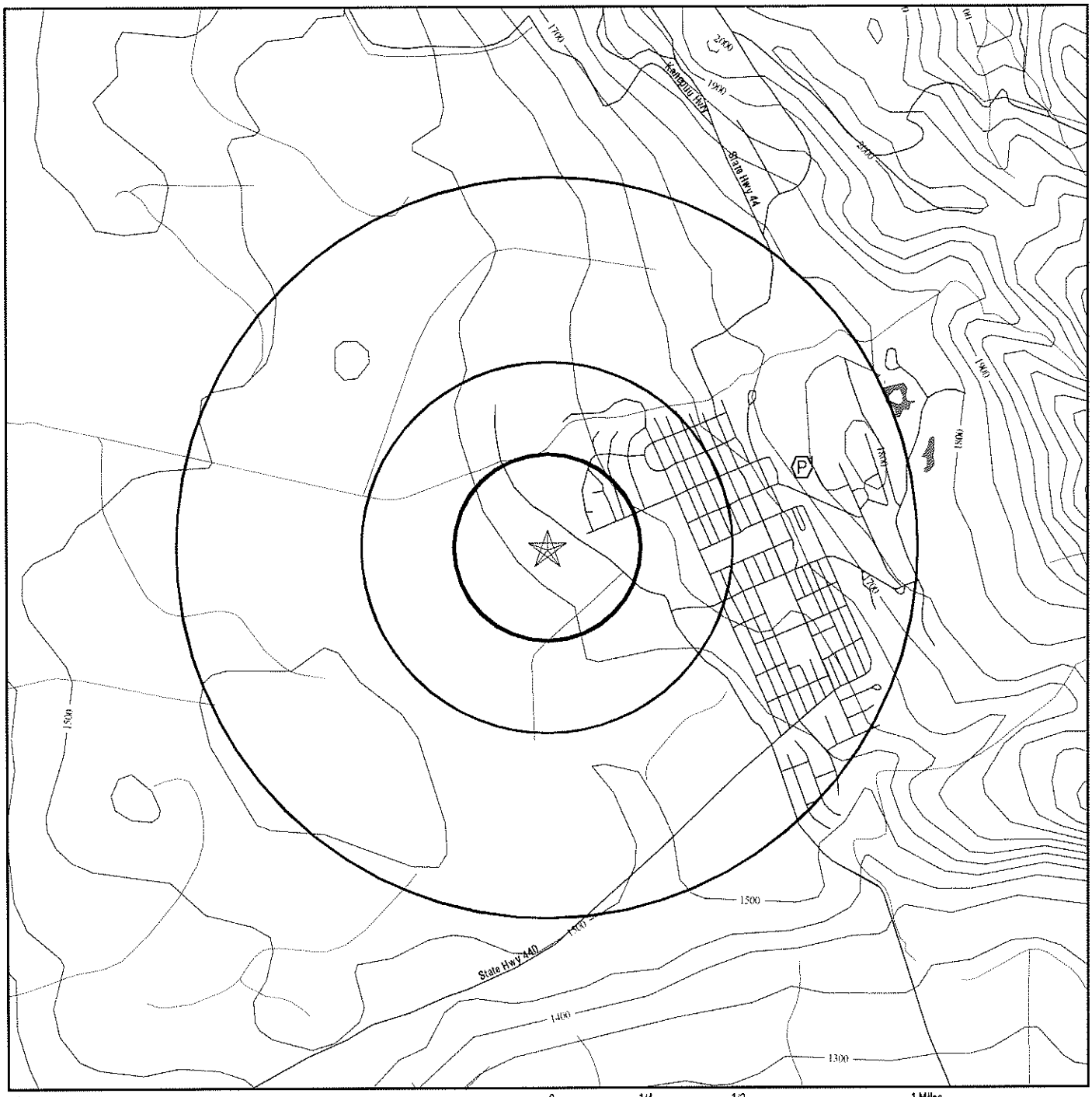
Note: PWS System location is not always the same as well location.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 2327818.2s



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- (GI) Indeterminate Groundwater Flow at Location
- (GV) Groundwater Flow Varies at Location

SITE NAME: Lanai City	CLIENT: Enviroquest
ADDRESS: Awalua Ave	CONTACT: Miles Nirei
Lanai City HI 96763	INQUIRY #: 2327818.2s
LAT/LONG: 20.8254 / 156.9278	DATE: October 08, 2008 2:28 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
1 ENE 1/2 - 1 Mile Higher	**FRDS PWS**	**HI0000218**

PWS ID:	HI0000218	PWS Status:	Not Reported
Date Initiated:	Not Reported	Date Deactivated:	Not Reported
PWS Name:	DWS HONOKOHAU HONOKOHAU, MAUI, HI 96761		
Addressee / Facility:	Laboratory MS. CARI CERIZO DEPARTMENT OF WATER SUPPLY 614 PALAPALA DRIVE KAHULUI, HI 96732		
Facility Latitude:	20 49 54	Facility Longitude:	156 55 12
City Served:	HONOKOHAU		
City Served:	HONOKAHAU		
Treatment Class:	Treated	Population:	54

PWS currently has or had major violation(s) or enforcement: YES

VIOLATIONS INFORMATION:

Violation ID:	9400123	Source ID:	002	PWS Phone:	Not Reported
Vio. beginning Date:	04/01/94	Vio. end Date:	04/30/94	Vio. Period:	001 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	Monitoring, Repeat Minor (TCR)				
Contaminant:	COLIFORM (TCR)				
Vio. Awareness Date:	051094				

Violation ID:	9402006	Source ID:	002	PWS Phone:	Not Reported
Vio. beginning Date:	10/01/93	Vio. end Date:	10/31/93	Vio. Period:	001 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	Treatment Technique (SWTR)				
Contaminant:	Not Reported				
Vio. Awareness Date:	Not Reported				

Violation ID:	9402007	Source ID:	002	PWS Phone:	Not Reported
Vio. beginning Date:	11/01/93	Vio. end Date:	11/30/93	Vio. Period:	001 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	Treatment Technique (SWTR)				
Contaminant:	Not Reported				
Vio. Awareness Date:	Not Reported				

Violation ID:	9402008	Source ID:	002	PWS Phone:	Not Reported
Vio. beginning Date:	12/01/93	Vio. end Date:	12/31/93	Vio. Period:	001 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	Treatment Technique (SWTR)				
Contaminant:	Not Reported				
Vio. Awareness Date:	Not Reported				

Violation ID:	9402009	Source ID:	002	PWS Phone:	Not Reported
Vio. beginning Date:	11/01/93	Vio. end Date:	11/30/93	Vio. Period:	001 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	Monitoring, Routine/Repeat (SWTR-Filter)				
Contaminant:	Not Reported				
Vio. Awareness Date:	Not Reported				

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9400123		
Enforcement Date:	1994-05-24	Enf. Action:	State Violation/Reminder Notice

System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9400123		
Enforcement Date:	1994-05-24	Enf. Action:	State Public Notif Requested

System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9400123		
Enforcement Date:	1994-05-18	Enf. Action:	State Public Notif Issued

System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Average		
Contaminant:	Turbidity		
Compliance Period:	1994-07-01 - 1994-07-31		
Violation ID:	9400124		
Enforcement Date:	1994-08-24	Enf. Action:	State Violation/Reminder Notice

System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Average		
Contaminant:	Turbidity		
Compliance Period:	1994-07-01 - 1994-07-31		
Violation ID:	9400124		
Enforcement Date:	1994-08-24	Enf. Action:	State Public Notif Requested

System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Average		
Contaminant:	Turbidity		
Compliance Period:	1994-07-01 - 1994-07-31		
Violation ID:	9400124		
Enforcement Date:	1994-08-24	Enf. Action:	State Public Notif Issued

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-01-01 - 1994-01-31		
Violation ID:	9402010		
Enforcement Date:	1994-05-09	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-01-01 - 1994-01-31		
Violation ID:	9402010		
Enforcement Date:	1994-05-09	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-02-01 - 1994-02-28		
Violation ID:	9402011		
Enforcement Date:	1994-05-09	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-02-01 - 1994-02-28		
Violation ID:	9402011		
Enforcement Date:	1994-05-09	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-03-01 - 1994-03-31		
Violation ID:	9402012		
Enforcement Date:	1994-05-09	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-03-01 - 1994-03-31		
Violation ID:	9402012		
Enforcement Date:	1994-05-09	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9402013		
Enforcement Date:	1994-07-26	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9402013		
Enforcement Date:	1994-07-26	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9402013		
Enforcement Date:	1994-07-31	Enf. Action:	State Public Notif Issued

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-05-01 - 1994-05-31		
Violation ID:	9402014		
Enforcement Date:	1994-07-26	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-05-01 - 1994-05-31		
Violation ID:	9402014		
Enforcement Date:	1994-07-26	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-05-01 - 1994-05-31		
Violation ID:	9402014		
Enforcement Date:	1994-07-31	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-06-01 - 1994-06-30		
Violation ID:	9402015		
Enforcement Date:	1994-07-26	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-06-01 - 1994-06-30		
Violation ID:	9402015		
Enforcement Date:	1994-07-26	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-06-01 - 1994-06-30		
Violation ID:	9402015		
Enforcement Date:	1994-07-31	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-07-01 - 1994-07-31		
Violation ID:	9402016		
Enforcement Date:	1994-10-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-07-01 - 1994-07-31		
Violation ID:	9402016		
Enforcement Date:	1994-10-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-07-01 - 1994-07-31		
Violation ID:	9402016		
Enforcement Date:	1994-10-31	Enf. Action:	State Public Notif Issued

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-08-01 - 1994-08-31		
Violation ID:	9402017		
Enforcement Date:	1994-10-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-08-01 - 1994-08-31		
Violation ID:	9402017		
Enforcement Date:	1994-10-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-08-01 - 1994-08-31		
Violation ID:	9402017		
Enforcement Date:	1994-10-31	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-09-01 - 1994-09-30		
Violation ID:	9402018		
Enforcement Date:	1994-10-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-09-01 - 1994-09-30		
Violation ID:	9402018		
Enforcement Date:	1994-10-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-09-01 - 1994-09-30		
Violation ID:	9402018		
Enforcement Date:	1994-10-31	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Routine/Repeat (SWTR-Filter)		
Contaminant:	SWTR		
Compliance Period:	1994-08-01 - 1994-08-31		
Violation ID:	9402019		
Enforcement Date:	1994-10-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Routine/Repeat (SWTR-Filter)		
Contaminant:	SWTR		
Compliance Period:	1994-08-01 - 1994-08-31		
Violation ID:	9402019		
Enforcement Date:	1994-10-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Routine/Repeat (SWTR-Filter)		
Contaminant:	SWTR		
Compliance Period:	1994-08-01 - 1994-08-31		
Violation ID:	9402019		
Enforcement Date:	1994-10-31	Enf. Action:	State Public Notif Issued

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Acute (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9500125		
Enforcement Date:	1994-11-25	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Acute (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9500125		
Enforcement Date:	1994-11-25	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Acute (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9500125		
Enforcement Date:	1994-12-11	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9500126		
Enforcement Date:	1994-11-25	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9500126		
Enforcement Date:	1994-11-25	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9500126		
Enforcement Date:	1994-12-11	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-10-01 - 1994-10-31		
Violation ID:	9502020		
Enforcement Date:	1995-01-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-10-01 - 1994-10-31		
Violation ID:	9502020		
Enforcement Date:	1995-01-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-10-01 - 1994-10-31		
Violation ID:	9502020		
Enforcement Date:	1995-01-31	Enf. Action:	State Public Notif Issued

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9502021		
Enforcement Date:	1995-01-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9502021		
Enforcement Date:	1995-01-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9502021		
Enforcement Date:	1995-01-31	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-12-01 - 1994-12-31		
Violation ID:	9502022		
Enforcement Date:	1995-01-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-12-01 - 1994-12-31		
Violation ID:	9502022		
Enforcement Date:	1995-01-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1994-12-01 - 1994-12-31		
Violation ID:	9502022		
Enforcement Date:	1995-01-31	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Routine/Repeat (SWTR-Filter)		
Contaminant:	SWTR		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9502023		
Enforcement Date:	1995-01-18	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Routine/Repeat (SWTR-Filter)		
Contaminant:	SWTR		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9502023		
Enforcement Date:	1995-01-18	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Monitoring, Routine/Repeat (SWTR-Filter)		
Contaminant:	SWTR		
Compliance Period:	1994-11-01 - 1994-11-30		
Violation ID:	9502023		
Enforcement Date:	1995-01-31	Enf. Action:	State Public Notif Issued

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-01-01 - 1995-01-31		
Violation ID:	9502024		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-02-01 - 1995-02-28		
Violation ID:	9502025		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-03-01 - 1995-03-31		
Violation ID:	9502026		
Enforcement Date:	1995-04-20	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-03-01 - 1995-03-31		
Violation ID:	9502026		
Enforcement Date:	1995-04-20	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-03-01 - 1995-03-31		
Violation ID:	9502026		
Enforcement Date:	1995-04-30	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-04-01 - 1995-04-30		
Violation ID:	9502027		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-05-01 - 1995-05-31		
Violation ID:	9502028		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-06-01 - 1995-06-30		
Violation ID:	9502029		
Enforcement Date:	1995-07-14	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-06-01 - 1995-06-30		
Violation ID:	9502029		
Enforcement Date:	1995-07-14	Enf. Action:	State Public Notif Requested

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-06-01 - 1995-06-30		
Violation ID:	9502029		
Enforcement Date:	1995-07-28	Enf. Action:	State Public Notif Issued
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-07-01 - 1995-07-31		
Violation ID:	9502030		
Enforcement Date:	1995-10-17	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-07-01 - 1995-07-31		
Violation ID:	9502030		
Enforcement Date:	1995-10-17	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-08-01 - 1995-08-31		
Violation ID:	9502031		
Enforcement Date:	1995-10-17	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-08-01 - 1995-08-31		
Violation ID:	9502031		
Enforcement Date:	1995-10-17	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-09-01 - 1995-09-30		
Violation ID:	9502032		
Enforcement Date:	1995-10-17	Enf. Action:	State Violation/Reminder Notice
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-09-01 - 1995-09-30		
Violation ID:	9502032		
Enforcement Date:	1995-10-17	Enf. Action:	State Public Notif Requested
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-10-01 - 1995-10-31		
Violation ID:	9602033		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-11-01 - 1995-11-30		
Violation ID:	9602034		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

ENFORCEMENT INFORMATION:

System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1995-12-01 - 1995-12-31		
Violation ID:	9602035		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1998-01-01 - 1998-01-31		
Violation ID:	98002060		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1998-02-01 - 1998-02-28		
Violation ID:	98002061		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1998-03-01 - 1998-03-31		
Violation ID:	98002062		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	DWS HONOKOHAU		
Violation Type:	Treatment Technique (SWTR)		
Contaminant:	SWTR		
Compliance Period:	1998-04-01 - 1998-04-30		
Violation ID:	98002063		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Department of Land and Natural Resources
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

Lanai City
Awalua Ave
Lanai City, HI 96763

Inquiry Number: 2327818.4
September 26, 2008

The EDR Historical Topographic Map Report

EDR® Environmental Data Resources Inc

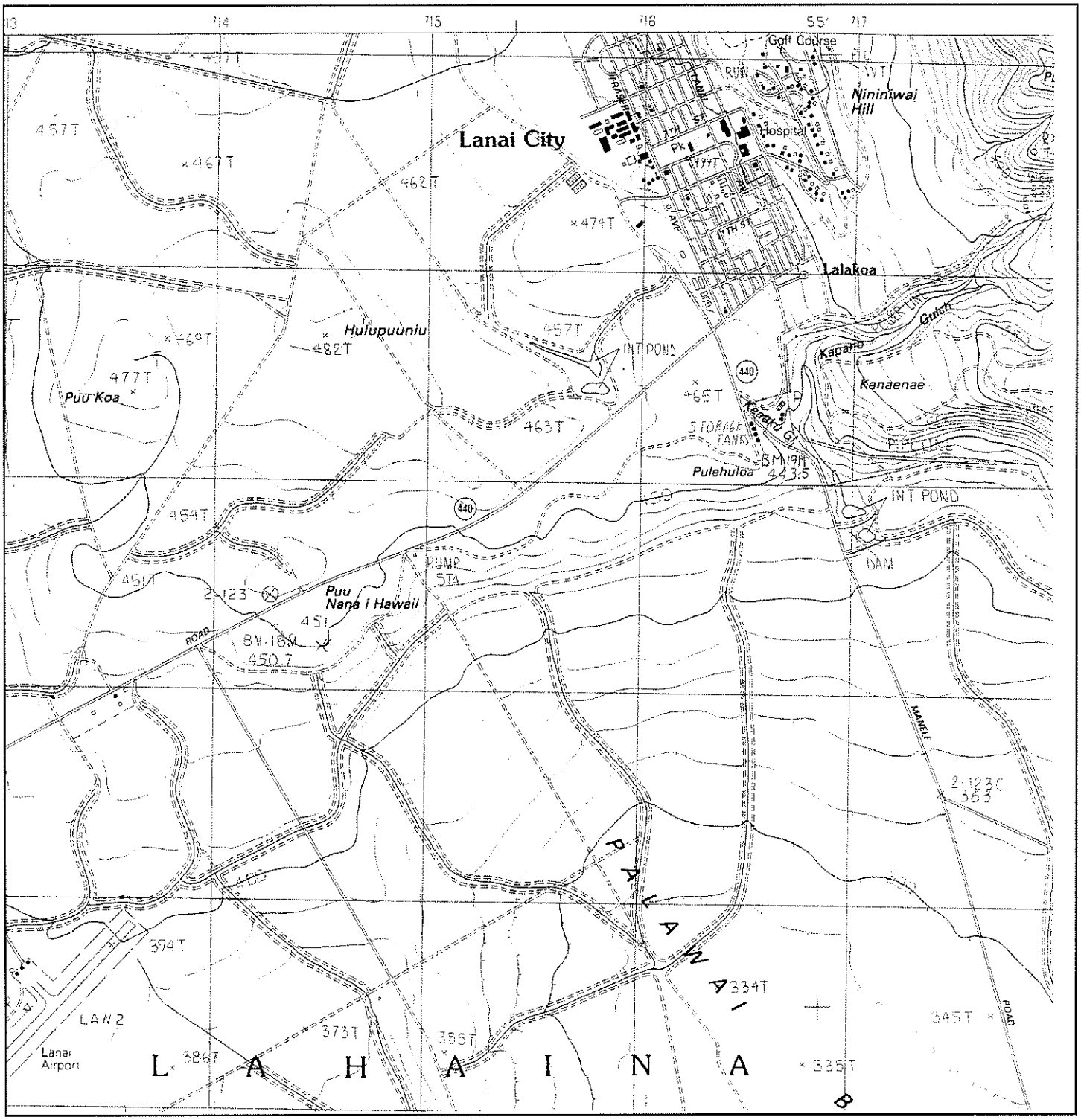
440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

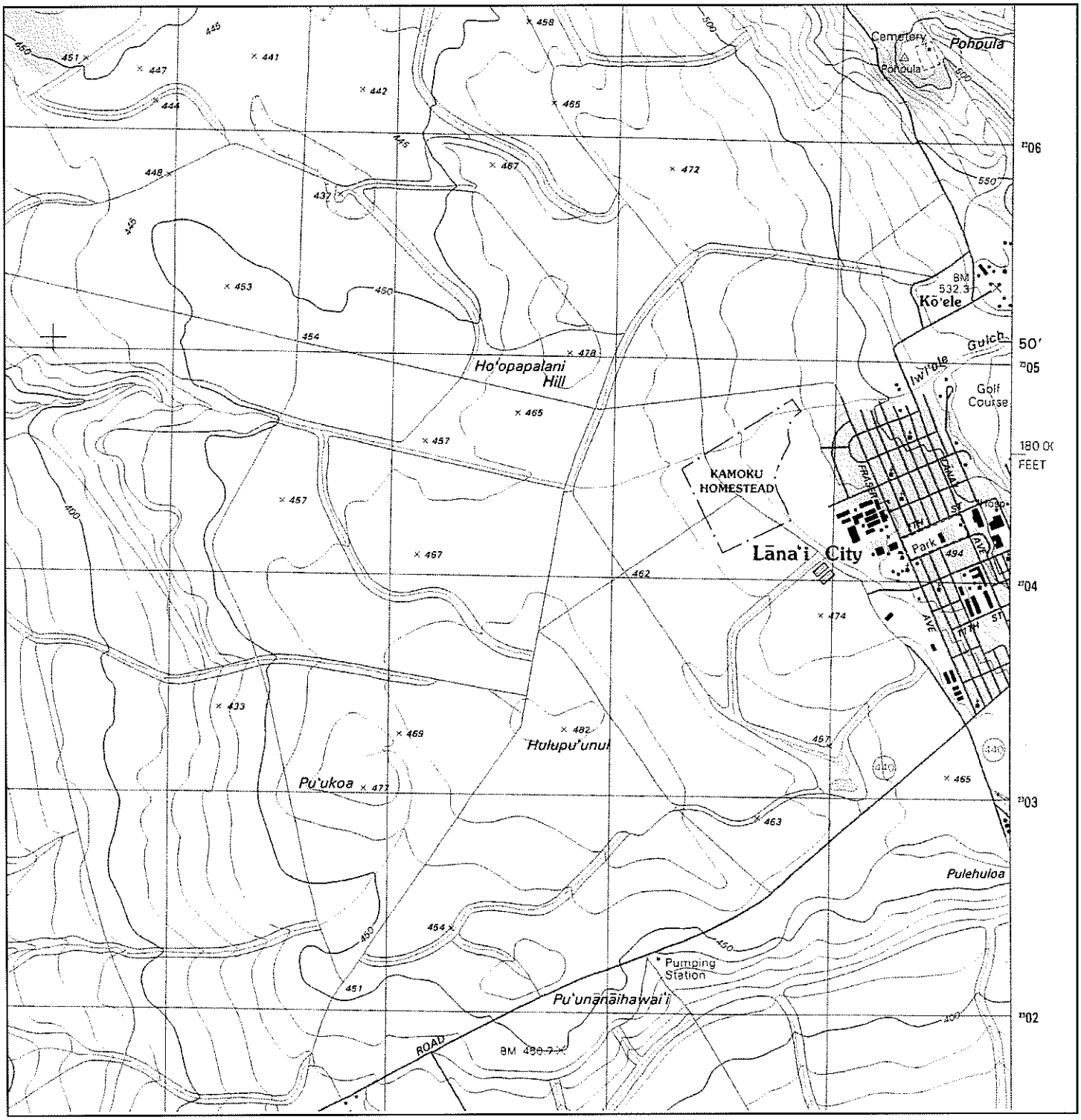
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Historical Topographic Map



N	TARGET QUAD NAME: Lanai South, HI MAP YEAR: 1984 SERIES: 7.5 SCALE: 1:25,000	SITE NAME: Lanai City ADDRESS: Awalua Ave Lanai City, HI 96763 LAT/LONG: 20.8254 / 156.928	CLIENT: Enviroquest CONTACT: Miles Nirei INQUIRY#: 2327818.4 RESEARCH DATE: 09/26/2008

Historical Topographic Map



N	TARGET QUAD NAME: Lanai City, HI MAP YEAR: 1992 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: Lanai City ADDRESS: Awalua Ave Lanai City, HI 96763 LAT/LONG: 20.8254 / 156.928	CLIENT: Enviroquest CONTACT: Miles Nirei INQUIRY#: 2327818.4 RESEARCH DATE: 09/26/2008

Lanai City
Awalua Ave
Lanai City, HI 96763

Inquiry Number: 2327818.3
September 26, 2008

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

9/26/08

Site Name:
Lanai City
Awalua Ave
Lanai City, HI 96763

Client Name:
Enviroquest
98-029 Hekaha Street
Aiea, HI 96701

EDR® Environmental Data Resources Inc

EDR Inquiry # 2327818.3

Contact: Miles Nirei

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Enviroquest were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name: Lanai City
Address: Awalua Ave
City, State, Zip: Lanai City, HI 96763
Cross Street:
P.O. # NA
Project: NA
Certification # 89E8-4886-9818

Sanborn® Library search results
Certification # 89E8-4886-9818

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

Total Maps: 0

Limited Permission To Make Copies

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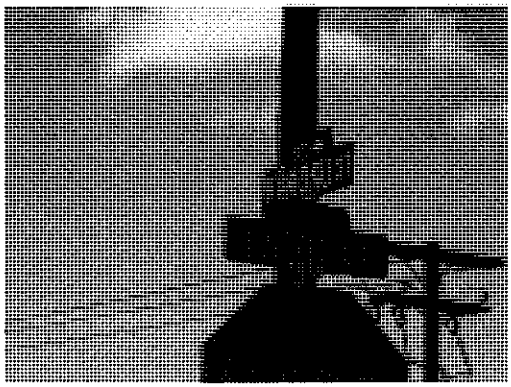
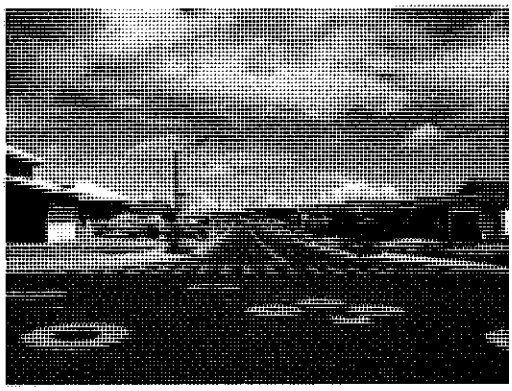
APPENDIX 2

Photograph

Facing east over the property.



Cross streets north of property.



Single family housing east of the property.

Dirt road through the property.

Looking south from the property.

Typical shrubs, brush and grass on the property.
Note surveyors ribbon.

EQI
EnviroQuest INC.

PHOTOGRAPHIC LOG
65 Acre Site in Lanai City
Lanai City, Lanai, Hawaii

West over the property from the single family residential lot.

Northwest over the property from the single family residential lot.

Typical of vegetation found throughout the property.

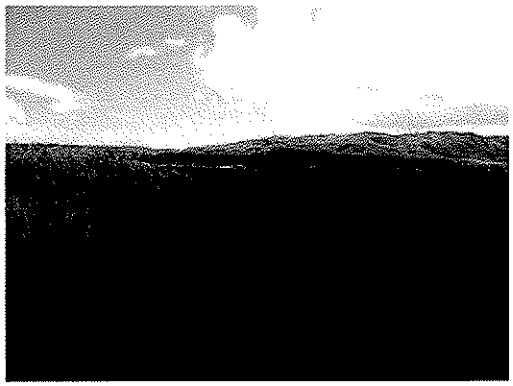
Typical scrub found throughout the property.

Various vehicle trails throughout the property.

Facing east towards Lanai City, single family residential structures.

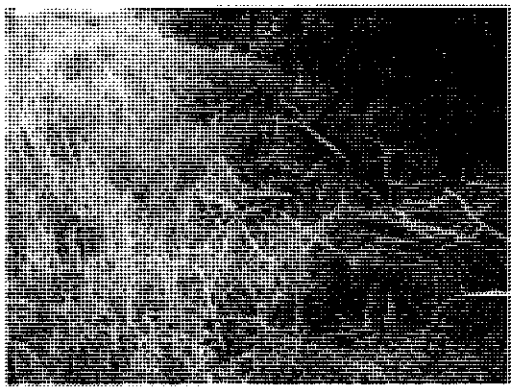
EQI EnviroQuest INC.

PHOTOGRAPHIC LOG
65 Acre Site in Lanai City
Lanai City, Lanai, Hawaii

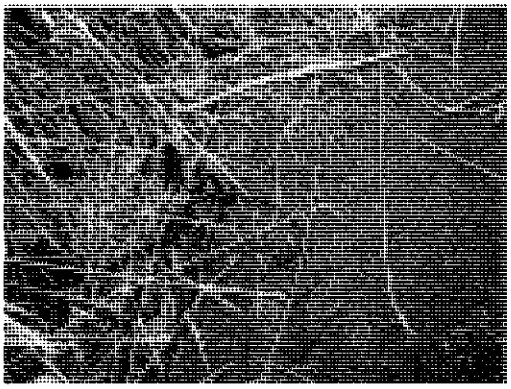


Vegetation variation. Notice clay color topsoil.

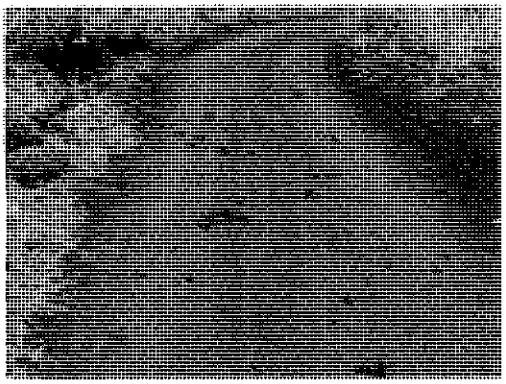
Animal or foot trail throughout the property.



Piles of branches and plant debris.



Black plastic found throughout the property and all around Lanai. Plastic used in the pineapple fields.



Black plastic found throughout the property.

Black plastic.

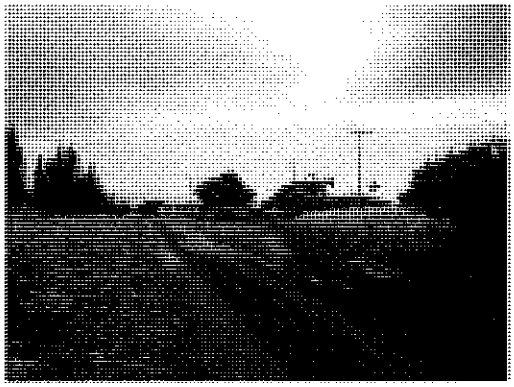
EQI EnviroQuest INC.

PHOTOGRAPHIC LOG
65 Acre Site in Lanai City
Lanai City, Lanai, Hawaii

Pile of debris located east of property on Awalua Ave.

Metal recycle pile south of the property. Run by Tri Isle Inc.

Debris pile from Tri Isle Inc. operation south of the property.



Tri Isle Inc operational building. On Awalua Ave south of the property.

EQI EnviroQuest INC.

PHOTOGRAPHIC LOG
65 Acre Site in Lanai City
Lanai City, Lanai, Hawaii

APPENDIX D.

Archaeological Inventory Survey

An Archaeological Inventory Survey Report for the Proposed Lāna'i City Affordable Housing Project Kamoku Ahpua'a, Lāhainā District, Lāna'i Island

TMK (2) 4-9-002:058 and portions of (2) 4-9-014:001, 009, 011

DRAFT

Prepared for
Munekiyo & Hiraga, Inc.
County of Maui

Prepared by
Tanya L. Lee-Greig, M.A.
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai'i, Inc.
Wailuku, Hawai'i
(Job Code: KAMOKU 5)

AUGUST 2009

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Management Summary

Reference	An Archaeological Inventory Survey Report for the Proposed Lāna'i City Affordable Housing Project Kamoku Ahupua'a, Lāhainā District, Lāna'i Island TMK: (2) 4-9-002:058 and portions of (2) 4-9-014:001, 009, and 011 (Lee-Greig and Hammatt 2009)
Date	AUGUST 2009 (DRAFT)
Project Number (s)	CSH Job Code: KAMOKU 5
Investigation Permit Number	CSH completed the inventory survey fieldwork under state archaeological permit No. 08-14 issued by the State Historic Preservation Division (SHPD), per Hawai'i Administrative Rules (HAR) Chapter 13-13-282.
Project Location	Lāna'i Island, Lāhainā District, Kamoku Ahupua'a, TMK (2) 4-9-002:058 and portions of (2) 4-9-014:001, 009, and 011, as depicted on the South Lāna'i USGS 7.5-minute topographic quadrangle (1998)
Land Jurisdiction	Government: County of Maui Private: Castle & Cooke Resorts, LLC.
Agencies	Department of Land and Natural Resources/State Historic Preservation Division (DLNR/SHPD)
Project Description	The County of Maui is proposing to convert 73 acres of former pineapple lands into an affordable housing project that will preliminarily consist of approximately 12 acres of multi-family dwellings and 29 acres of single-family dwellings. In addition to the residential area, eight acres are proposed for public-quasi-public use, while three acres will be used for park development and a drainage retention basin. Access to the proposed development is anticipated to extend off of both Fifth Street and Ninth Street through currently undeveloped property.
Project Acreage (Hectares)	**Affordable Housing and Multi-Purpose Parcel**: 73 acres (approximately 29.5 hectares) **Access Corridors**: The acreage for the Fifth Street access route is included in the calculation above. Access off of Ninth Street consists of an approximate 250-foot wide corridor extending from the southwest terminus of Ninth Street that tapers to a 150-foot wide corridor along the proposed Lāna'i High and Elementary School Expansion Parcel. In all, the acreage encompassed by the Ninth Street access corridor consists of approximately 20 acres (approximately 8 hectares).
Area of Potential Effect (APE) and Survey Acreage	Based on available information, the proposed residential development and corridor construction will not impose adverse visual, auditory or other environmental impact to any historic properties, including standing architecture, located on lands adjacent to the project area. Accordingly, the project's APE extends no further than the proposed 73-acre footprint of the affordable housing development and 20-acre footprint of the access corridor. The entire approximate 93-acre (37-hectares) APE was surveyed as a part of this investigation.

<table>
<tr><td>Historic Preservation Regulatory Context</td><td>At the request of Munekiyo & Hiraga, Inc. on behalf of Maui County, CSH undertook this archaeological inventory survey to comply with the historic preservation review process (Hawai'i Revised Statutes [HRS] Chapter 6E-42 and HAR Chapter 13-284) for the proposed project. This inventory survey investigation was designed and carried out to fulfill the state requirements for archaeological inventory survey per HAR Chapter 13-13-276.</td></tr>
<tr><td>Fieldwork Effort</td><td>The pedestrian survey of the 93 acres was accomplished on April 22nd and 23rd, 2009, while the subsurface testing of the Ninth Street Corridor was completed on May 6th, 2009. The archaeological pedestrian survey crew consisted of Hallett Hammatt, Ph.D.; Tanya Lee-Greig, M.A.; Michael Willman B.A.; and archaeological assistants Kaulana Kaho'ohalahala and Warren Osako of Lāna'i. Subsurface testing was accomplished by Hallett Hammatt, Ph.D.; Tanya Lee-Greig, M.A.; and archaeological assistants Warren Osako, Kaulana Kaho'ohalahala, and Kawena Maly of Lāna'i. A total of two and a half working days were required to complete the fieldwork for the archaeological inventory survey of this parcel.</td></tr>
<tr><td>Number of Historic Properties Identified</td><td>One historic property, SIHP 50-40-98-6649, was identified within the project APE. Additionally, two historic properties, CSH-2 and CSH-3, were identified outside and directly adjacent to the current project area.</td></tr>
<tr><td>Historic Properties Recommended Eligible to the Hawai'i Register of Historic Places (Hawai'i Register)</td><td><table><tr><th>SIHP (50-40-98-)</th><th>Site Type</th><th>Site Function</th><th>Age</th><th>Significance Criteria</th></tr><tr><td>6649</td><td>Culvert headwall</td><td>Water control</td><td>Historic</td><td>D</td></tr></table>Because CSH-2 and CSH-3 are located outside of the current project area, they are not evaluated for significance in this report.</td></tr>
<tr><td>Historic Properties Recommended Ineligible to the Hawai'i Register</td><td>None</td></tr>
</table>

Effect Recommendation	Under Hawai'i state historic preservation legislation, the only two possible effect determinations for a given project under historic preservation review are "no historic properties affected" and "effect, with proposed mitigation commitments" (HAR Chapter 13-284-7). In the circumstance of the current project area, one historic property was documented within the current project area that cannot be avoided by the proposed residential and roadway development. This historic property is considered significant for informational content. The current inventory survey investigation has adequately recorded the information available from this property, through location documentation, written descriptions, and photographs. Because the information that gives this historic property significance has already been recorded and additional historic preservation mitigation would not add to the body of information concerning this historic property, CSH recommends a project specific effect determination of "no historic properties affected." This is believed to be appropriate, despite the potential removal of this feature by the proposed project as the information that makes this historic property significant has been adequately recorded.
Mitigation Recommendation	Based on the above evaluation of effect, CSH recommends no further historic preservation work for SIHP 50-40-98-6649 (see also Section 7.2 Mitigation Recommendations). While the pedestrian survey did not identify any significant surface historic properties during the course of this study and limited subsurface testing of the eastern portion of the Ninth Street access corridor resulted in negative findings, it should be noted that poor ground visibility throughout the majority of the project area made the identification of low density surface artifact scatters difficult to recognize and pre-empted an intensive subsurface testing program. Community consultation has revealed that formal indigenous artifacts, although out of context, have been found within former pineapple fields following tilling after harvest (see also Section 5) thus presenting some possibility for encountering historically significant materials both on the surface and in a subsurface context. Therefore, it is recommended that precautionary archaeological monitoring of the initial grubbing and grading activities associated with the proposed project be implemented as a means to thoroughly evaluate the current project area for historic properties. Continuation and/or termination of the monitoring program following early preparation of the project site should be re-evaluated with SHPD based on the initial monitoring findings.

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Section 1 Introduction

1.1 Project Background

The County of Maui is proposing to convert 73-acres of former pineapple lands into an affordable housing project that will preliminarily consist of approximately 14.46 acres of multi-family dwellings (173 housing units) and 27.5 acres of single family dwellings (239 housing units). In addition to the residential units, the master plan calls for a 4.94 acre area set aside for public-quasi-public use, as well as two (2) park sites consisting of 2.83 acres and 2.08 acres and a 4.0 acre drainage detention pond. Access to the proposed development is anticipated to extend off of both Fifth Street and from Ninth Street through currently undeveloped property.

At the request of Munekiyo & Hiraga, Inc., on behalf of the County of Maui, Cultural Surveys Hawai'i, Inc. (CSH) conducted an archaeological inventory survey of an approximate 73 acres that includes both the parcel intended for affordable housing development and the Fifth Street extension from the Department of Hawaiian Home Lands subdivision in to the proposed project site, hereafter referred to as the "affordable housing parcel". In addition to the affordable housing parcel, an approximate 20-acre corridor extending off of Ninth Street was surveyed as an additional access route.

Based on available information, the proposed affordable housing development and intended access routes will not impose adverse visual, auditory or other environmental impact to any significant historic properties, including standing architecture, located in lands adjacent to the project area. Accordingly, the area of potential effect (APE) for this study extends no further than the proposed 73-acre footprint of the affordable housing parcel and 20-acre footprint of the Ninth Street access corridor. The entire approximate 93-acre (37-hectares) APE, hereafter referred to as the current project area was surveyed as a part of this investigation.

The current project area is located in the *ahupua'a* of Kamoku, Lāhainā District, Lāna'i Island (TMK [2] 4-9-002:058 and portions of [2] 4-9-014:001, 009, 011) (Figure 1, Figure 2, and Figure 3). More specifically, the affordable housing parcel is located to the southwest of the 50-acre Department of Hawaiian Home Lands (DHHL) parcel and surrounded by undeveloped, fallow pineapple fields while the Ninth Street aceess corridor extends off of the southern end of Ninth Street and across fallow pineapple fields.

The archaeological fieldwork for this study was conducted under state archaeological permit number 08-14 issued by Hawai'i State Historic Preservation Division (SHPD), per Hawai'i Administrative Rules (HAR) Chapter 13-282. This archaeological inventory survey report was prepared to fulfill the proposed project's historic preservation requirements in accordance with Hawai'i Administrative Rules (HAR) Chapters 13-275-5(A) and 13-276 and details the survey methods of the archaeological investigation and subsequent results.

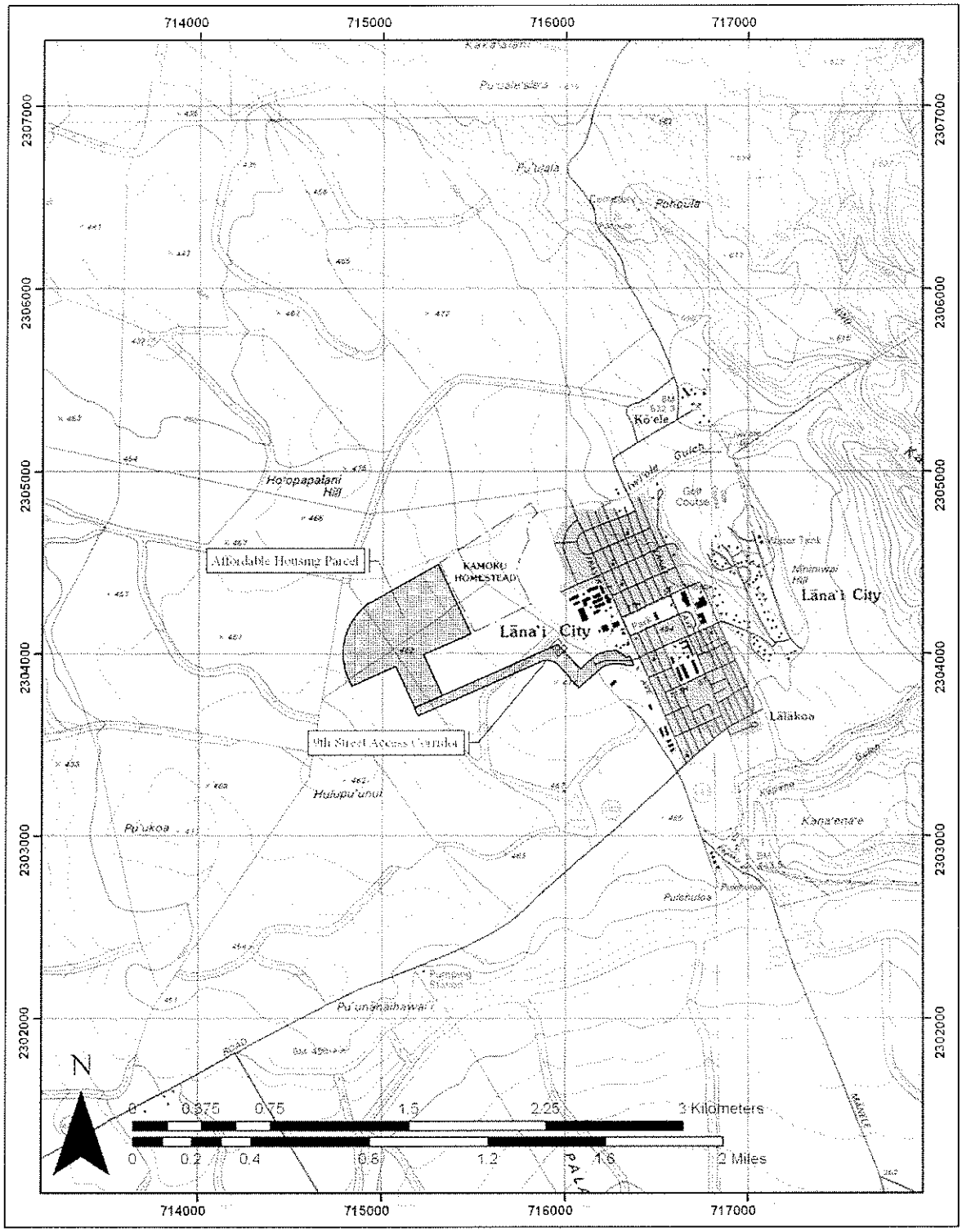

Figure 1. A portion of the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle showing the location of the current project area (shaded in black)

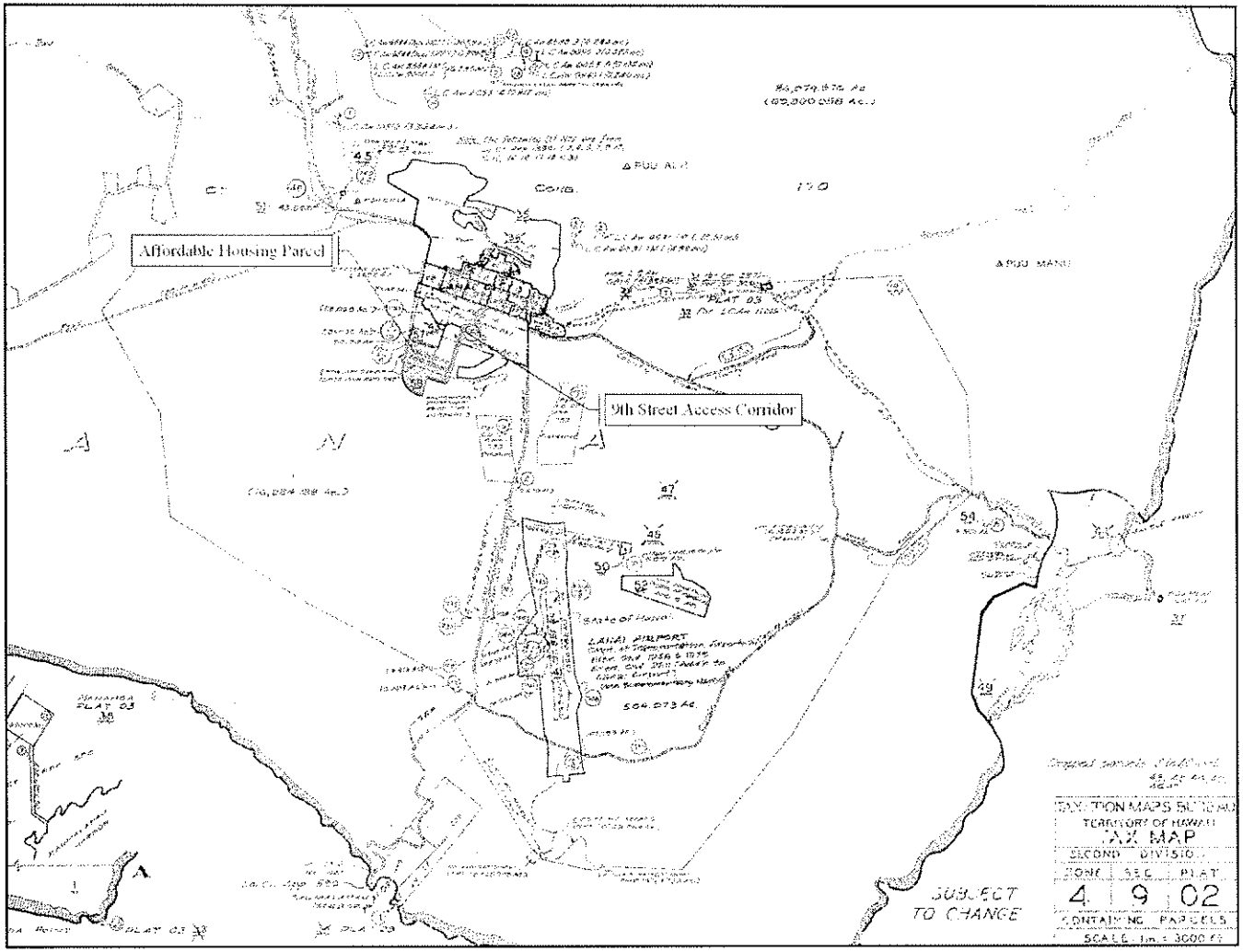

Figure 2. A portion of TMK 4-09-02 showing location of project area (shaded in red).

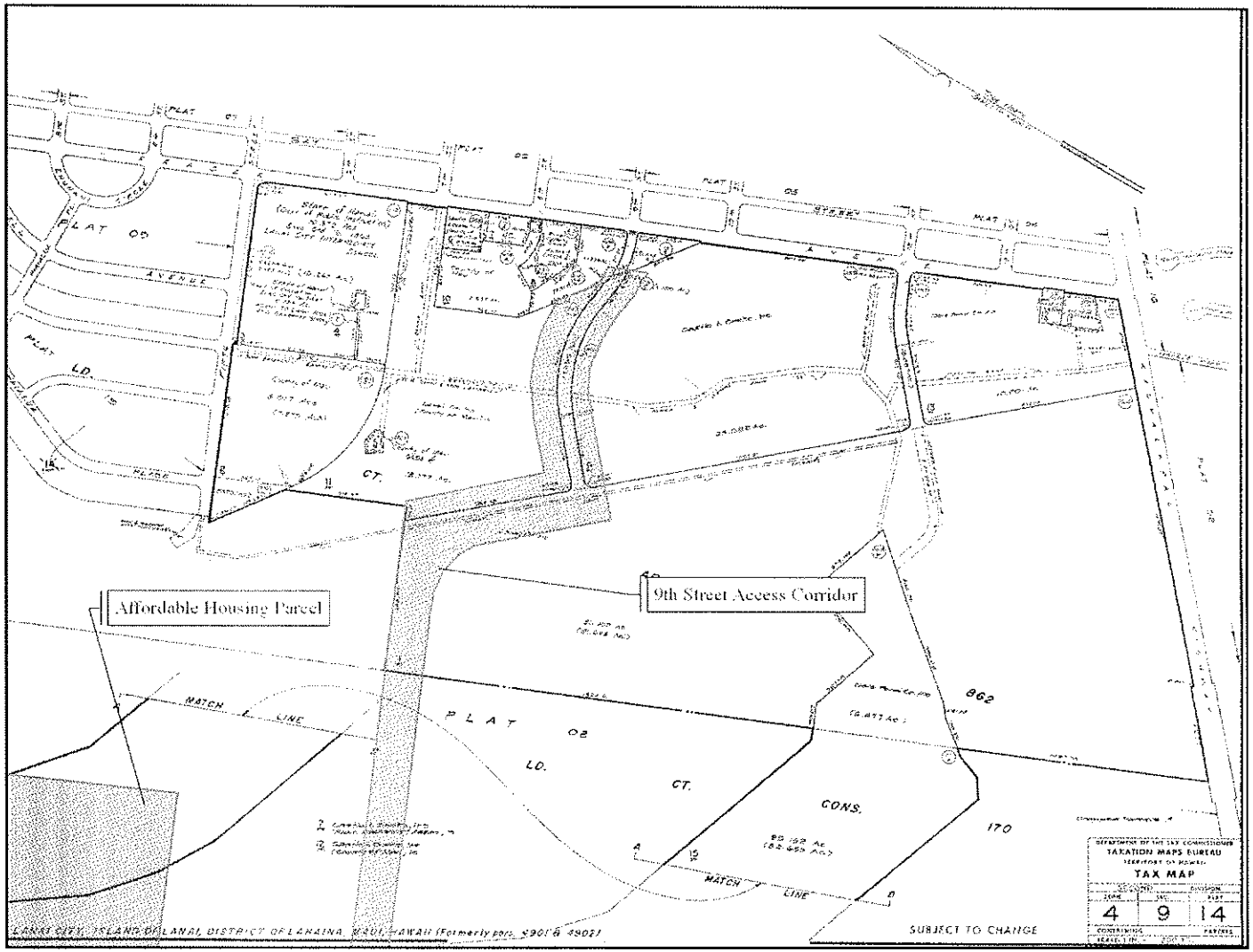

Figure 3. A portion of TMK 4-09-14 showing location of project area (shaded in red).

1.2 Scope of Work

The following archaeological inventory survey scope of work was proposed to satisfy state and county historic preservation review requirements:

1. A complete ground survey of the entire project area for the purpose of historic property identification and documentation. Any identified historic properties would be located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation would include photographs and scale drawings of selected historic properties. Any identified historic properties would be assigned State Inventory of Historic Properties numbers by the State (SIHP) and located using a GPS and/or GIS Software;
2. Subsurface testing, if necessary, would be focused on locating and evaluating subsurface deposits, such as buried cultural layers and/or deposits with significant paleo-environmental data, which could not be located by surface pedestrian inspection. If appropriate samples from these excavations were found, they would be analyzed for chronological and paleo-environmental information;
3. Research on historic and archaeological background, including search of historic maps, written records, and Land Commission Award documents. This research would focus on the specific area with general background on the traditional Hawaiian land divisions, *ahupua'a* and *moku*, emphasizing settlement patterns;
4. Preparation of a survey report that would include the following:
    a. A topographic map of the survey area showing all historic properties;
    b. Description of all identified historic properties with selected photographs, scale drawings, and discussions of function;
    c. Historical and archaeological background sections summarizing pre-contact and historic era land use as they relate to the project area's historic properties;
    d. A summary of historic property categories and their significance in an archaeological and historic context; and
    e. Recommendations based on all information generated that will specify what steps should be taken to mitigate impact of development on the project area's significant historic properties - such as data recovery (excavation) and preservation of specific areas.

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is situated within the upper plateau region of Lāna'i island, just to the west of Lāna'i City. Elevation ranges between 460 to 480 feet above mean sea level (amsl) where the temperature ranges between 60° and 80° F. The sediments of the area are of the Waihuna and Lahaina soil series. These series consists of well drained and moderately well drained soils on alluvial fans and in depressions in the former and upland environments in the latter. More specifically, the sediments within the project area are Waihuna clay (WoA), Lahaina silty clay

with three to seven percent slopes (LaB), Lahaina silty clay with zero to three percent slopes (LaA), and Lahaina silty clay with seven to 15 percent slopes (LaC) (Figure 4). WoA soils, the most extensive soil in the series and within the current project area is represented by a surface layer that is about 34 cm thick and underlain by relatively soft, weathered pebbles and stones. This soil is strongly acid in the surface layer due to pineapple cultivation (Foote et al. 1972:129).

LaB soils are found on smooth uplands where cobblestones are common on the surface, permeability is moderate, runoff is slow, and the erosion hazard is slight (Foote et al. 1972:78). A representative profile shows that the first 15 inches consist of a reddish-brown, silty clay followed by a 45 inch thick subsoil of dusky-red and dark reddish brown subangular block silty clay and silty clay loam overlying soft, weathered basic igneous rock (Foote et al. 1972:78). LaB soils were used primarily for sugarcane and pineapple with small acreage used for truck crops, pasture, and home sites (Foote et al. 1972:79).

While the soil profiles of LaA soils and LaC soils are similar to that of LaB soils (Foote et al. 1972:79), LaA soils have a slow runoff with a no more than slight erosion hazard (Foote et al. 1972:79) and LaC soils have a medium runoff rate with a moderate erosion hazard (Foote et al. 1972:79). Both soil types were primarily used for sugarcane and pineapple with small acreages used for truck crops, pasture, and wildlife habitat (Foote et al. 1972:79).

With the entire island lying in the rain shadow of Mauna E'eka (the West Maui Mountains) on Maui and winds across Lāna'i Island dominated by consistent northeasterly trades, the overall environment of the island as a whole is one of drier leeward environment. The average annual rainfall in the area ranges from 25-35 inches (699-800 mm) with the heaviest rains in January and the lightest in June. This growing environment currently supports a vegetation community where the dominant plant species within the previously cultivated pineapple field consist of a dense growth of Lantana (*Lantana camara*) and low-growing or "scrubby" Christmas Berry (*Schinus terebinthifolius*) trees. Also present within the project area are small stands of Ironwood Trees (*Casuarina equisetifolia*) Guinea grass, Balloon plant (*Asclepias physocarpus*), 'Uhaloa (*Waltheria indica uhaloa*), Milk Thistle (*Silybum marianum*), and sourgrass (*Digitaria inslularis*).

1.3.2 Built Environment

Overall development surrounding the project area is nominal as the majority of the study area is surrounded by fallow pineapple fields. The primary feature of the built environment near the affordable housing parcel consists entirely of the Hawaiian Homestead turn-key lots to the northeast and Lanai High and Elementary School to the east, while the upper portion of the Ninth Street Access route borders Lāna'i City off of Fraser Avenue and extends into former pineapple fields to the south and west.

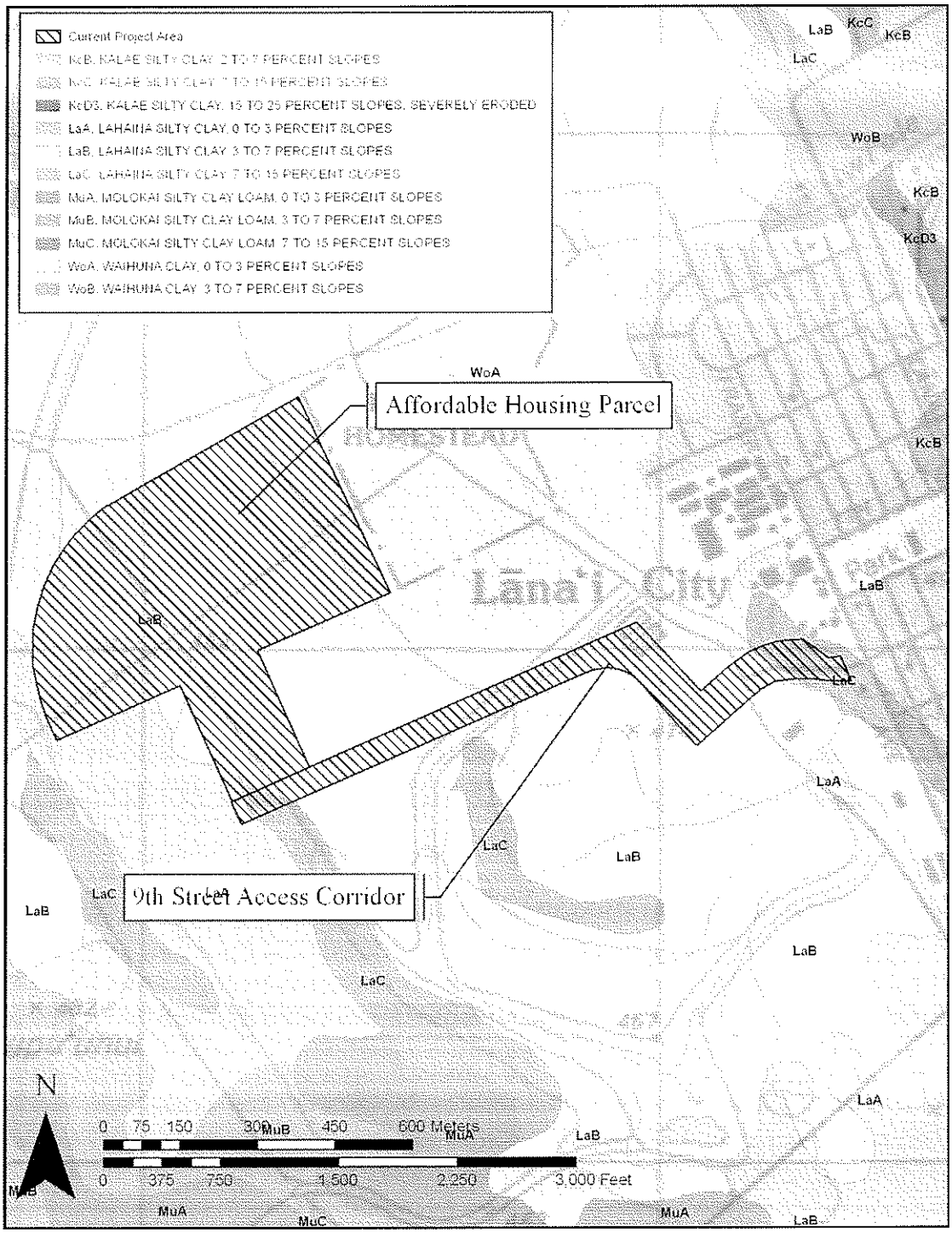

Figure 4. A portion of the Soil Survey Map for the Island of Lāna'i showing the location of the current project area (delineated in black diagonal cross hatching) (U.S. Department of Agriculture 2001).

Section 2 Methods

2.1 Field Methods

2.1.1 Pedestrian Survey

A complete ground survey of the entire project area was undertaken for the purpose of historic property identification and documentation. The following methods were used to complete the pedestrian inspection of the current project area:

1. The boundary of the project area was identified and maintained during the course of the pedestrian survey using two Garmin GPSMap 60CSx handheld GPS units, one on either side of the survey line, with the project area data uploaded and visible on the map screen;
2. The pedestrian inspection of the study area was accomplished through systematic sweeps of the affordable housing parcel (TMK [2] 4-9-002:058) with five archaeologists spaced at 15-20 meter intervals, and of the Ninth Street access corridor (portions of TMKs [2] 4-9-014:001, 009, and 01) with four archaeologists spaced at 15-20 meter intervals;
3. Pedestrian sweeps of the affordable housing parcel were oriented northeast to southwest (240° - 60°) while sweeps of the access corridor followed the corridor configuration.

2.1.2 Subsurface Testing

Mechanical subsurface testing was conducted of a portion of the Ninth Street Access corridor that had not undergone previous cultivation, approximately 3-acres, and accessible for the backhoe as well a small portion of accessible lands that were previously cultivated in pineapple for comparative purposes. In total, the subsurface testing program consisted of the mechanical excavation of five trenches averaging 30 ft (feet) or 10 m (meters) long by one meter wide, using a one and one-half foot, or approximately one-half meter, wide backhoe bucket. The following methods were used to document each backhoe trench:

1. The soil stratigraphy of each trench was drawn to scale and photographed;
2. The sediment layers of each trench were described using standard USDA soil description terminology which included Munsell color, texture, consistency, structure, plasticity, cementation, origin of sediments, descriptions of any inclusions such as cultural material and/or roots and rootlets, lower boundary distinctiveness and topography, and other general observations;
3. The location and orientation of each backhoe trench was recorded using the Garmin 60 GPS Map 60CSx hand held GPS unit.

2.2 Document Review and GIS Methods

Document review included a search for, and examination of, archival sources, historic maps, traditional practices assessments, and previous archaeological reports from the SHPD and CSH libraries, as well as various online resources and digital reproductions of primary sources made available through the Lāna'i Culture and Heritage Center Website and courtesy of Castle & Cooke Resorts LLC. These resources were accessed in order to understand the background history of the lands surrounding current project area and formulate a predictive model of the types of historic properties that may be encountered during this investigation.

Historic maps were georeferenced in relation to Lanai Island TMK shapefile (County of Maui 2009) and the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle using known points and ArcView 9.1. The project area boundary depicted on historic maps included as a part of this report should be considered approximate and used for reference information only.

Coordinate data collected with the Garmin GPS Map 60CSx GPS unit was downloaded using DNRGarmin (Version 5.03.002) (Minnesota Department of Natural Resources 2001) and exported to the ESRI Shapefile format UTM Coordinate System, Zone 4 North, NAD 1983 (Hawaii) Datum. All topographic maps presented herein were created using ArcView 9.1 and TOPO! ©2003 National Geographic Maps, All Rights Reserved.

All original paperwork, electronic media, and data gathered during this project are on file at the Maui Office of Cultural Surveys Hawai'i, Inc. 1993 Main Street, Wailuku, HI 96793 under CSH Job Code Kamoku 5. Copies are also on file at the O'ahu Office of Cultural Surveys Hawai'i, Inc., 41-1537 Kalanianaole Hwy. Suite 200, Waimanalo, HI 96795.

Section 3 Background Research

The division of Lāna'i's lands into political districts may have occurred under the direction of the chiefs of Maui, as Lāna'i historically appeared to be "subject or tributary to Maui" during the times of Kamalalawalu (about 1550-1600 AD) (Fornander 1919 Part I: 206-8). The island was apportioned into the following thirteen *ahupua'a* land divisions that were established during traditional times: Ka'ā, Kamoku, Kalulu, Kaunolū, Keāliakapu, Keāliaaupuni, Pālāwai, Kāma'o, Ka'ohai, Pawili, Maunalei, Mahana, and Paoma'i. Unlike *ahupua'a* divisions of the other seven major islands of the Hawaiian chain, three of the thirteen *ahupua'a* divisions on Lāna'i Island have the unique characteristic of traversing across the island from one coastline to the other (Hawai'i Department of Survey 1903:66; Figure 5). The current project area is located along the upper plateau of Kamoku Ahupua'a within the *mokupuni* of Lāna'i (Moffat and Fitzpatrick 1995:23).

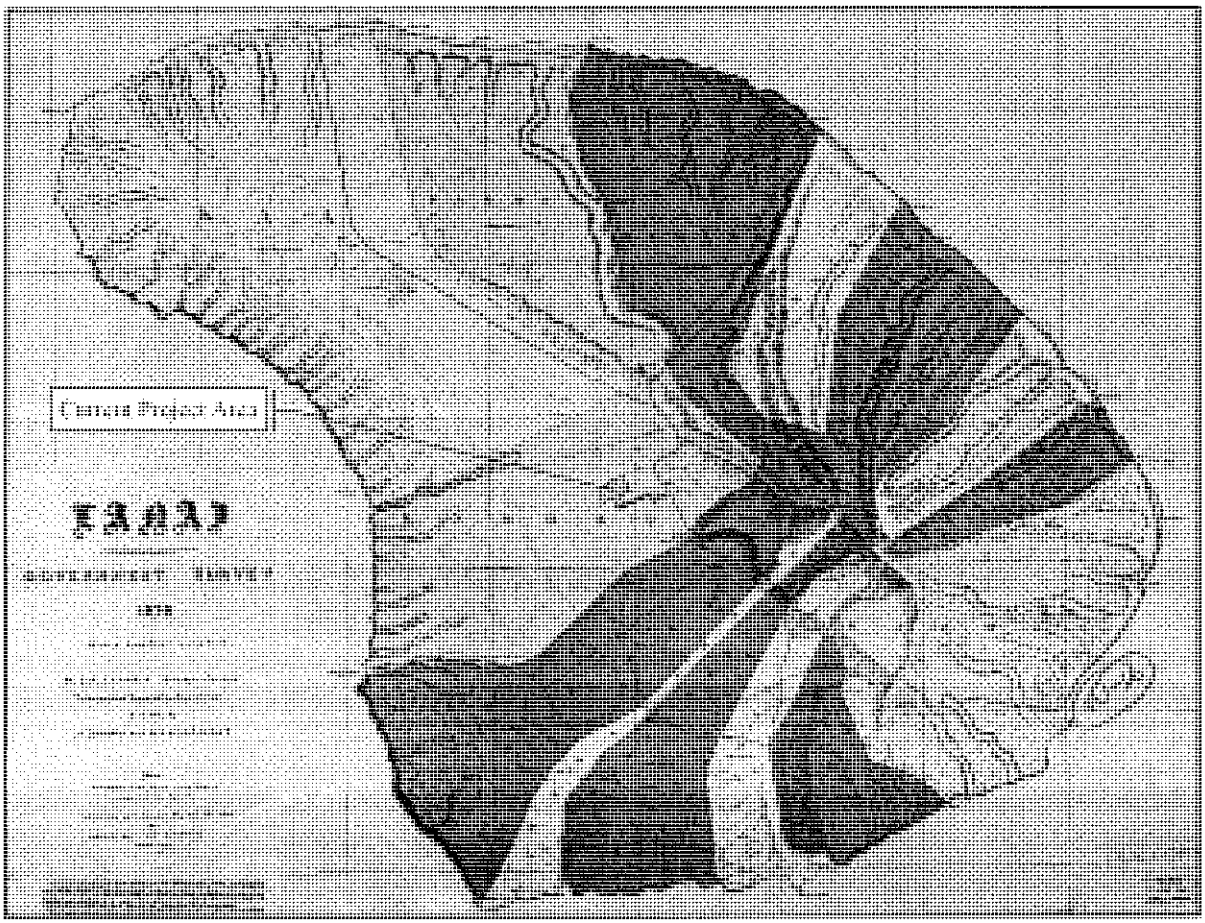

Figure 5. The J. F. Brown and M. D. Monsarrat map (1878) showing Kamoku Ahupua'a as a traditional land division of the island of Lāna'i (crown land in yellow, government lands in green).

The *ahupua'a* of Kamoku is representative of the traditional *ahupua'a* formation from ocean to mountain and includes 8,291 acres of the western portion of Lāna'i from the shoreline upslope to the base of the high northwest to southeast trending ridge crest of the island. The following

description of Kamoku Ahupua'a was presented to the U.S. Government in Part 3 of the *Hawaiian Investigation* to the U.S. Senate Committee on Pacific Islands and Porto Rico [sic] (1903:1340):

> The ahupua'a of Kamoku on this island is a large and valuable tract extending from the sea to the top of the mountain ridge where a good supply of drinking water from a spring is obtained not far from the Gibson homestead. The government road crosses the land a short distance below the homestead. From this point commences a beautiful stretch of country extending for miles around. The soil is very rich and is capable of producing large crops of corn and potatoes.

3.1 Traditional and Historical Background

The most comprehensive summary of traditional accounts pertaining to the "formation of Lāna'i, first habitation, general traditions, early history and place names" appears in Kenneth P. Emory's *The Island of Lāna'i: A Survey of Native Culture* (1924). Emory suggests through "genealogies and traditions" that Lāna'i "began to be populated by important numbers about 1400 A.D." (Emory 1924:123). Based on the number of house sites he observed and approximately five persons per household (Figure 6), Emory estimated the pre-1778 population of the island at 3,150 (1924:122). The traditional life style focused on subsistence farming and fishing within the context of the *ahupua'a* or traditional land unit that extended from the coastal reaches to the upland resources.

3.1.1 Mythological and Traditional Accounts

3.1.1.1 The Story of the 'Ōhelo

The "Story of the *'Ōhelo*", as translated from the original Hawaiian by Abraham Fornander (1919), describes the origin of the sacred offering of *'ōhelo* to the goddess Pele, and the importance of Lāna'i Island in the telling of the story. According to Fornander, the many sisters of Pele followed her east from Tahiti across the Pacific Ocean. As Malulani, Kaohelo, Hi'iaka, and Pele arrived at the Hawaiian Islands, Malulani choose Lāna'i to dwell on, while Pele, Kaohelo, and her younger sisters traveled on to the island of Hawai'i.

Kaohelo had a son named Kiha, who was given instructions by Kaohelo as she neared death where she should be buried. "Take my body to the very navel of your grandmother, right on top of Kīlauea; then bury me there." This her son did. The flesh of Kaohelo became the creeping vine and her bones became the bush-plant of the *'ōhelo*. Her head was treasured by Pele as the smoldering fire of Kīlauea. The remainder of her body brought volcanic fire to Haleakalā on Maui, Keālia on Oahu, and also to Kaua'i.

When Malulani, living on Lāna'i, heard of the death of their youngest sister, she went to Hawai'i to retrieve her body, but found that small pieces of her body were strewn across the landscape sprouting into vines and bushes of the *'ōhelo*. She gathered as much of her sister's remains as she could, but upon returning to Lāna'i, was surprised to find the pieces of Kaohelo's body had been strung as leis and worn as adornment. Saddened by this, Malulani died.

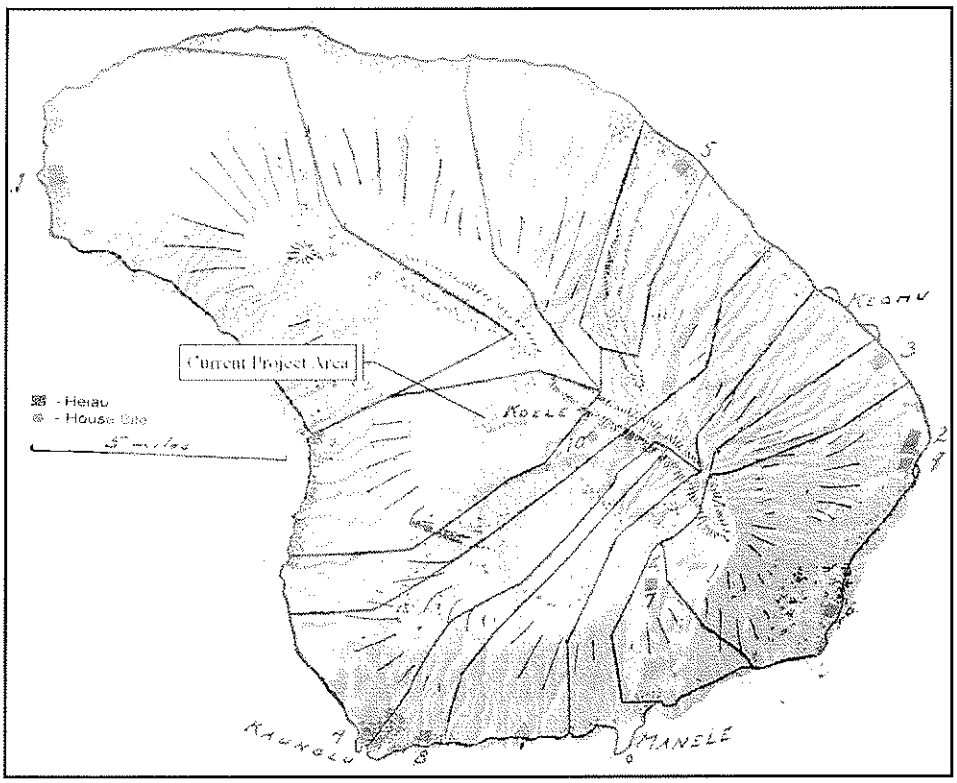

Figure 6. Map of Lāna'i showing *ahupua'a* and the distribution of house sites and *heiau* known to Kenneth Emory in 1921 in relation to the current project area (green dots represent visible house sites, rectangles correspond to *heiau* locations, and the numeric reference ranks the *heiau* [brown rectangles] according to size). (Emory 1924:49)

Hi'iaka then came to Lāna'i to recover the body of Malulani, whereupon small bundles containing her remains were scattered across the island of Hawai'i, causing small hills and islets to remain to this day. In this way, the island of Lāna'i is part of the legend of how the *'ōhelo* came to be spread across the islands of Hawai'i, and why the *'ōhelo* is the special sacred offering to Pele (Fornander 1919, V, III: 576-580).

3.1.1.2 The Ghosts of Lāna'i

The northern coastal place name of Laewahie refers to the point on Lāna'i where Kaululā'au built a signal fire to the people of Lahaina. Fornander (1918:542) recorded the story of Kaka'alaneo, the chief of all of West Maui. His son, Kaululā'au, grew up as a boy involved in great mischief. Because he uprooted the sacred breadfruit grove of Lahaina, his father had no choice but to banish his son to the uninhabited island of Lāna'i. At that time, Lāna'i was the abode of ghosts, and Kaululā'au was sent there to be killed by them. Tabrah (1976) notes the many tricks the ghosts tried to use to murder Kaululā'au, and her account identifies Naha, located in the *ahupua'a* of Kaohai, as the location of the signal fire to the people of Lahaina after he had defeated all of the ghosts of the island (the literal translation of Kaohai is "firebrand.") Kalākaua (1888:212, 230) records the legend of Kaululā'au conquering the ghosts of Lāna'i in two separate stories, one of which details his fight with the *Mo'oaleo*, a lizard god of the island

as the most difficult of the ghosts to overcome. He does not give the location of the signal fire used by Kaululā'au. (There is a village named Kaululā'au on the coast of Pawili Ahupua'a.) The legend ends with Kaululā'au being reunited with his father, mending his mischievous ways, and opening the island of Lāna'i for settlement.

3.1.1.3 Traditional Hawaiian Habitation and Subsistence of the Lāna'i Central Plateau

In terms of place names and people that may be related to mythological and traditional accounts for Lāna'i, Tomonari-Tuggle and others (2000:23) note that there are no known royal genealogies that are preserved and only a few of the names of Lāna'i chiefs are mentioned in the traditions that are available in translation. Literal translations of several of the place names for land areas near to the project area are listed below (see also Figure 7). Most all translations are taken from Emory (1924) and supplemented by Pukui and others (1974) where appropriate:

Hokuao	Morning star (Emory 1924:29)
Hulupu'uniu	Whirling feather hill (Emory 1924:30)
Iwiole	*Lit.,* fang bone. Type of adze (Pukui and Elbert 1986). Emory (1924) notes the name of the upper valley of Iwiole is called Kaiholena. Iwiole is located just east of Lāna'i City.
Kaiholena	The *iholena* banana (Emory 1924:31)
Kamoku	*Lit.,* the district or the cut-off portion (Pukui et al. 1976:82); the piece cut off (Emory 1924:31)
Kaumaikahoku	The stars are out (Emory 1924:32)
Keaaku	The standing root (Emory 1924:32)
Kihamānienie (Kihamāniania)	According to Emory (1924), the site of the protestant church, built in 1851. Emory stated that the "smooth hill covered in *maniania* grass" was the origin of the place name. According to Pukui and Elbert (1986), *mānienie 'ula* (golden beardgrass, or *Chrysopogon aciculatus*), is the upland grass found in the region of the church.
Kō'ele	*Lit.,* dark sugar cane (Pukui et al. 1976:114); Place seized by a chief (Emory 1924:33)
Makapaia	Enclosed eyes (Emory 1924:34)
Nininiwai Hill	*Lit.,* pour water (Pukui et al 1976). The region of northeastern Lāna'i City, according to Emory 1924a), and site of a reservoir.
Pu'ukoa	*Lit.,* koa tree hill (Pukui et al. 1976). Emory (1924) shows this hill in the plateau of Kamoku.
Pu'u Nana o Hawai'i	Hill to view Hawai'i (Emory 1924:36)
Pu'u Nēnē	Land section of Lāna'i. *Lit.,* goose hill (Pukui et al. 1976). Emory (1924) cites two locations, one just above Kō'ele in Kamoku Ahupua'a, and one on a promontory in Ka'ōhai Ahupua'a
Pulehuloa (Pu'ulehuloa)	Big roasting (Emory 1924:36)

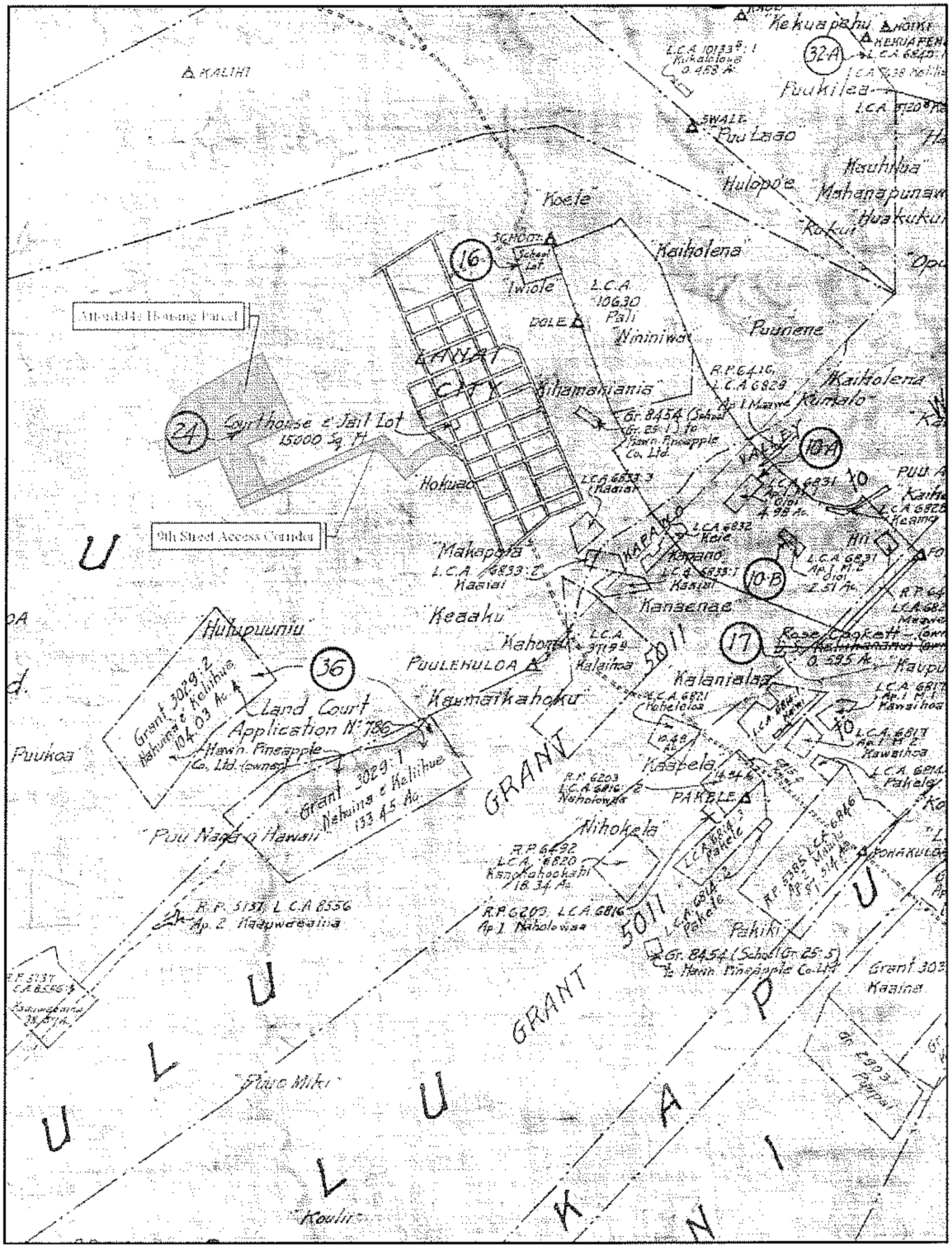

Figure 7. Hawaiian Pineapple Company, Ltd. (1929) survey map showing, place names, areas of Land Commission Awards, and development of Lāna'i City relative to the current project area.

The above place names, together with the environmental data, suggest that the lands of the central plateau basin were productive agriculturally and of great traditional significance. Prior to Polynesian settlement, the current project area was probably below the fringe of the native Hawaiian forest. Even in the early 1900s, vestiges of this forest could still be seen. "Most of the lands along the upper portion of the island were those above the 1,000 ft. elevation, as evidenced by the presence of dead tree skeletons along this elevation and above" (Gay, 1965:51). Clearing of this forest was undoubtedly initiated by traditional Polynesian agriculturists. In Emory's 1920 survey of Lāna'i, he did not observe any house sites within the project area but noted that the upper plateau lands were utilized intensively for agriculture (see also Figure 6).

In this region of Lāna'i, gulches, ridges, hilltops and other terrestrial landmarks were given descriptive names, some referring to heroic characters of Hawaiian mythology, and others suggestive of actions which could be accomplished (i.e., the sighting of the island of Hawai'i) from its' promontory. The upland plateau region was likely of great importance, both in terms of habitation and subsistence during the traditional or pre-contact time period, as well as an area somewhat sheltered from coastal raiding parties from other islands.

Emory (1924a: 122) estimated the aboriginal population of Lāna'i as about 3,150 prior to 1778. He stated that the inhabitants of Lāna'i survived by collecting dew on "oiled *tapas* or whipped from heavy shrubbery." Water that accumulated in natural depressions was husbanded carefully, and a few wells were dug along the coast and were "plastered on the seaward side with mud and straw" to stop the infiltration of sea water. Emory stated that the water derived from these wells was brackish, but usable by the Hawaiians because they had become accustomed to the salinity. He further postulated that survival along the leeward coastline also depended on Hawaiians visiting small springs in the distant hills, and carrying water in gourds back to the coast.

Early historical accounts of Lāna'i attest to the general barrenness and small population (Ellis 1963, Menzies 1920). However, in 1779 Capt. King of the Cook expedition related that Lāna'i "appeared to be well inhabited" and "that it abounds in roots such as yams, sweet potatoes and tarrow" (Emory 1924:6). Emory deduced that the differences in these early descriptions were probably due to the devastating raid on Lāna'i and Kaho'olawe by Kalani'ōpu'u. The *ahupua'a* of Kamoku figures prominently in the recollections of this raid. S.M. Kamakau writes:

> During Kalani'ōpu'u's occupancy of Lāna'i, the food ran out, and the men had to eat the root of a wild plant called *kūpala*, this had a loosening effect upon the bowels when eaten in quantity. The war is therefore called "The-land-of-loose-bowels (Kamoku-Hī)" and it is a war still talked of [circa 1866] among the descendants on Lāna'i (Kamakau 1992:91).

Kamoku refers to the *ahupua'a* where the *kūpala* grew thick, and *Hī* refers to a form of dysentery/diarrhea that could result from eating too much *kūpala*. "*Kūpala*" may refer to a variety of famine foods such as an endemic cucurbit (*Sicyos pachycarpus*), and a wild sweet potato or morning glory (Pukui and Elbert 1984:170).

Another explanation of the name of the district "Kamoku - the piece cut off" suggested to Emory that the etymology and history of a similarly named *ahupua'a* in the Hamakua district of the Big Island. In Hamakua C.J. Lyons (Emory 1969:31) recorded an *ahupua'a* named Kamoku

that was once cut off from a number of *ahupua'a* for the use of the whole district, hence its name.

3.1.2 Early Historic Period

Specific events for this time period within the project vicinity are difficult to pinpoint but several significant events for the island as a whole are noteworthy. Lāna'i was first seen by Captain James Cook during his voyage to the Sandwich Islands in January and February of 1779. The expedition had returned to the Hawaiian Islands in order to resupply following many months of mapping the west coast of America (Ellis 1963). William Ellis, Assistant Surgeon to the expedition, noted the first time that the ships *HMS Resolution* and *Discovery* sighted "*Aranni*" [Lāna'i], as the ships made their way past "Kaaowr'vee [Kaho'olawe] nearly adjoining to Mow'whee" in 1779. It was during this voyage that Ellis went on to describe Lāna'i as an island under the dominion of the king of Maui (Ellis 1969: Vol. 2, 187). Kamehameha conquered O'ahu and Maui in 1795 and soon unified all of the Hawaiian Islands. In 1798, he returned to Lāna'i to make a summer residence at Kaunolū. The sandalwood trade began in 1810 and by the early to mid 1800s there was an increased reliance on western technology, supplies, and commerce which had a dramatic economic impact across the islands. With the death of Kamehameha in 1819 and the arrival of western missionaries in 1820, Hawai'i experienced dramatic changes. Western influence brought increased ship traffic to Lāna'i and in 1826, the American ship "London" was wrecked on Lāna'i but was rescued by an American military schooner (Ashford 1974:18). Between 1830 and 1842 there was a women's penal colony established on Lāna'i at Kaena and a male penal colony was established on Kaho'olawe.

Table 1 provides census data adapted from Emory (1924) and Schmitt (1973) for different time periods. While, population stability is suggested during 1832 and 1836, the trend shows a steady population decline for Lāna'i that follows similar trends on the other Hawaiian Islands.

Table 1. Population Estimates for Lāna'i from Various Time Periods

Emory estimate (pre-1778)	Missionary estimate (1823)	Missionary census (1832)	Missionary census (1836)	Official census (1850)
3,000	2500	1600	1200	604

It is perhaps noteworthy that during the early Historic Period, there appear to be some discrepancies in historical accounts of the physical descriptions of Lāna'i. Captain King's description previously presented indicates that the island had every appearance of being agriculturally productive and well populated. However, by 1792, Archibald Menzies, who was the surgeon attached to the Vancouver Expedition, described Lāna'i as follows:

> ...observing the state and naked appearance of the island which seemed thinly covered with shriveled grass in a scorched state. No hamlets or plantations were to be seen, no trees or bushes adorned the face of the country, which swelled out gradually to a moderate height, so that we have reason to think that the island is but very thinly inhabited (Menzies 1920).

Emory (1924) suggested that the dramatic differences portrayed in these descriptions may be attributed to the effects of Kalani'ōpu'u's raid. Fornander (1996:156) states that Kalani'ōpu'u "ravaged the island thoroughly." Kamakau's account of Kalani'ōpu'u's men having to resort to eating *kūpala* would seem to support this theory.

3.1.3 Mid- to late-1800s

In 1848, the Mahele initiated extreme social, economic, and political changes within traditional Hawaiian culture on all of the islands. The Mahele resulted in the division of lands according to a system of private ownership based on Western legal concepts. In the first phase of this process, Kamehameha III subdivided his lands among the highest *ali'i* (royalty) *konohiki* (chiefs), and some favored *haole* (foreigners). This process of redistribution severed the political and social relationships of the traditional system of land use (Moffatt and Fitzpatrick 1995:11). Following this change, *maka'āinana* (commoners) were then permitted to pursue legal title to and ownership of land they had cultivated and inhabited through a Land Commission Award, in addition to the outright purchase of other government lands. At the end of the Mahele, naturalized foreign citizens were given the right to purchase land in Hawai'i. The ultimate result of this decision placed more land in the hands of non-Hawaiians than native Hawaiians between the years of 1850 and 1865 (Moffat and Fitzpatrick 1995:51). In many cases, the purchases or leases to non-Hawaiians included entire *'ili* (a subdivision of an *ahupua'a*) or *ahupua'a* (land division usually extending from mountain to sea).

An additional aspect of the Mahele was the sale of land to naturalized foreigners. These changes in land tenure had a significant impact across the Hawaiian Islands. On Lāna'i, by the mid-1800s much of the upper plateau lands of Kamoku and adjacent *ahupua'a* had been become open *pili* grasslands. This is indicated in the native and foreign testimonies given during the mid-1800s as part of the Mahele and Kuleana Acts. The *ahupua'a* of Kamoku, in which the project area lies, was "omitted" (Interior Department Memos 1860-70s) at the time of the Mahele (1848) and was subsequently leased as government lands (ca. 1860) (Hammatt, et al. 1988:20).

Based on tax map keys, historic maps, a search of the Waihona 'Aina database (Waihona Aina 2000), and consultation with Mr. Kepa Maly of the Lāna'i Culture and Heritage Center and the Lāna'i Representative to the Maui County Cultural Resource Commission, there are few Land Commission Award records for lands within the uplands of Kamoku Ahupua'a near the current project area (Table 2). This scarcity is a possible result of the omission of the *ahupua'a* during the original division of lands. Examination of the Land Court Map of Lāna'i commissioned by Hawaiian Pineapple Company (1929; see also Figure 7) shows four Land Commission Awards (LCAs) in the upland area of Kamoku Ahupua'a, some of which have boundaries that cross into the *ahupua'a* of Kalulu. One of the awards went to Noa Pali, LCA# 10630 located *mauka* and northeast of the Lāna'i City and the current project area, who was the *konohiki* (headman) and school superintendent of Kamoku. In 1856, Noa Pali corresponded with the Minister of the Interior (under Kamehameha IV) requesting that Kamoku be sold to him because he had been living there since Kamehameha III had granted him the lands in 1841. At this time, there appears to have been confusion as to who owned the *ahupua'a* of Kamoku; however, by 1858 it appeared on a list of Crown Lands and Royal Domain of the Hawaiian Kingdom (Kingdom of Hawaii Legislative Assembly 1890:158). It is apparent that at the time of

the Mahele, Pali was cultivating lands "all over" (Waihona 'Aina 2000) and was wanting to consolidate is holdings within a 112.25-acre area.

Table 2. Summary of Land Commission Awards (LCAs) identified within the upland areas of Kamoku Ahupua'a (Maly 2009).

LCA #	Claimant	Ahupua'a	Land Use
1063	Pali	Kamoku	Houselot=1; Sweet Potatoes=1; Bitter Melon/Gourd=1; Various Other Plants
03719B	Kalaihoa	Kamoku and Kalulu	Apana=1 (no description of land use provided)
6833:1-3	Kaaiai	Kamoku and Kalulu	Parcel 1 and 2 = Pili grass areas; Parcel 3=Houselot
85563:3	Kaauwaeaina	Kamoku and Kalulu, *ili* of Pueo	Planting section (*pauku* land)=1

In the 1860s Ahsee, a Chinese immigrant, procured a lease for lands within Kamoku to raise goats. Concurrently, Walter Murray Gibson arrived at the Pālāwai Basin Mormon Commune and ultimately gained control, through government leases, over most of Lāna'i, becoming Hawai'i's "Premier of Everything". During the 1880s, Gibson's Lanai Ranch eventually had up to 18,000 goats and 12,000 sheep that were permitted to forage freely, virtually denuding the island of vegetation and causing severe erosion problems.

In 1888, Gibson left the islands for California after a series of troubles as Prime Minister of Hawai'i. His interests in Lāna'i were left to his daughter Talula and her husband, Fredrick Hayselden, and from 1888 to 1902, the Hayseldens were essentially in charge of Lāna'i. At this time, Kō'ele was the sheep ranch center for the island. Tabrah (1976:79) noted that in 1898 there were 174 people on the island and approximately 50,000 sheep. In an effort to control erosion, eucalyptus, and Norfolk pine were planted at Kō'ele and thousands of acres across the island were planted in Bermuda grass (also see Maui County Council 1998).

Charles Gay bought up the Gibson holdings in 1902. The Gay family eventually bought virtually the entire island in fee simple. The ranch center was still at Kō'ele, the location where Gibson's headquarters had been moved in the 1870s. The Gays also successfully cultivated pineapples on Lāna'i, both at Keōmuku and Lālākoa. The Gay family went into considerable debt to get the island converted to fee simple ownership, and was unable to retain the vast holdings. The family was forced to liquidate all holdings, except some 600 acres.

3.1.4 1900s to Modern Era

The period from 1910 to 1922 represents a shift from primarily sheep to cattle ranching. From 1910 to 1917, the Lanai Company Ltd. downsized its sheep operations and eventually sold all of their holdings to Harry and Frank Baldwin. At this point in time, they successfully converted the island into a cattle ranching operation. At the height of this operation, the ranching center at Kō'ele had approximately thirty buildings that included: the ranch manager house, an office, a store, a bachelor's quarters, a blacksmith shop, additional residences, and stables (Maui County Council 1998).

Botanist J. M. Lydgate, visiting Lāna'i with an expedition to obtain rare specimens of trees and flowering plants, reported that 40 continuous years of livestock grazing had, "pretty well

denuded [Lāna'i] of its forest cover; only on the summit of the island ridge was there a somewhat moth-eaten mantle of it left, and only on the slopes of the higher ravines and the steep hillsides was that mantle really intact and undisturbed" (Lydgate 1920). Lydgate also reported the extinction of plant species observed on Lāna'i only four years prior: plants that had been documented by fellow botanist Horace Mann of Harvard University. Lydgate (1920) commented that, "the ravages of cattle, sheep and goats, as well as forest diseases, hastened the decadence of the indigenous forest [of Lāna'i]."

In 1922, the Baldwins sold their holdings on Lāna'i Island to the Hawaiian Pineapple Company (Figure 8) in order to finance a real estate transaction on the island of Maui (Maui County Council, Lāna'i Community Plan 1998:28). The construction of office buildings, warehouses, shops and dwellings for 250 workers and their families began immediately (Figure 9). By 1927, three thousand acres of the Pālāwai Basin had been planted in pineapple, the first construction phase to establish Lāna'i City had been finished, and a roadway linking the new piers at Kaumālapa'u with Lāna'i City had been paved (Freeman 1927). A 1929 aerial photograph (Figure 10) shows the project area, with the exception of the upper portion of the Ninth Street access corridor, and surrounding lands heavily cultivated in commercial pineapple agriculture. The cultivation of pineapple on Lāna'i had become integral in Hawai'i supplying more than 90 percent of the world output of canned pineapple.

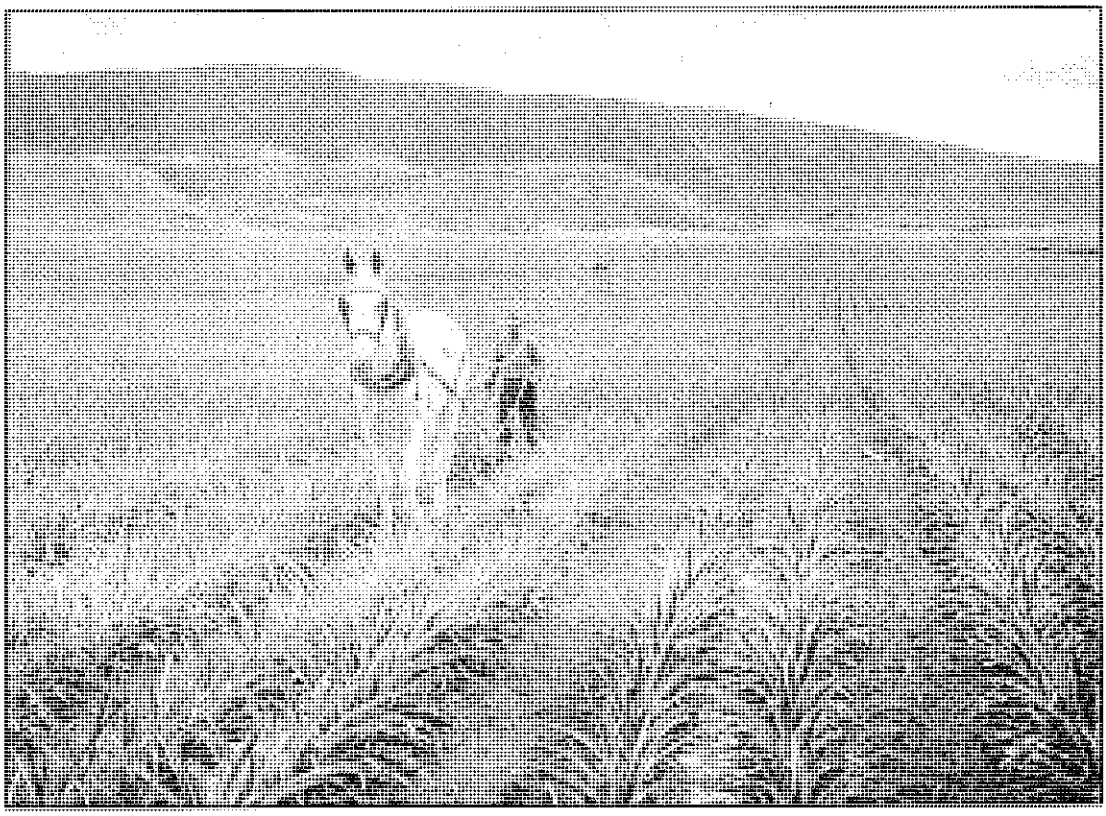

Figure 8. The plateau region of Lāna'i is visible in this early photo of pineapple cultivation on the island (*Paradise of the Pacific*, December 1936, Vol. 48, No. 12).

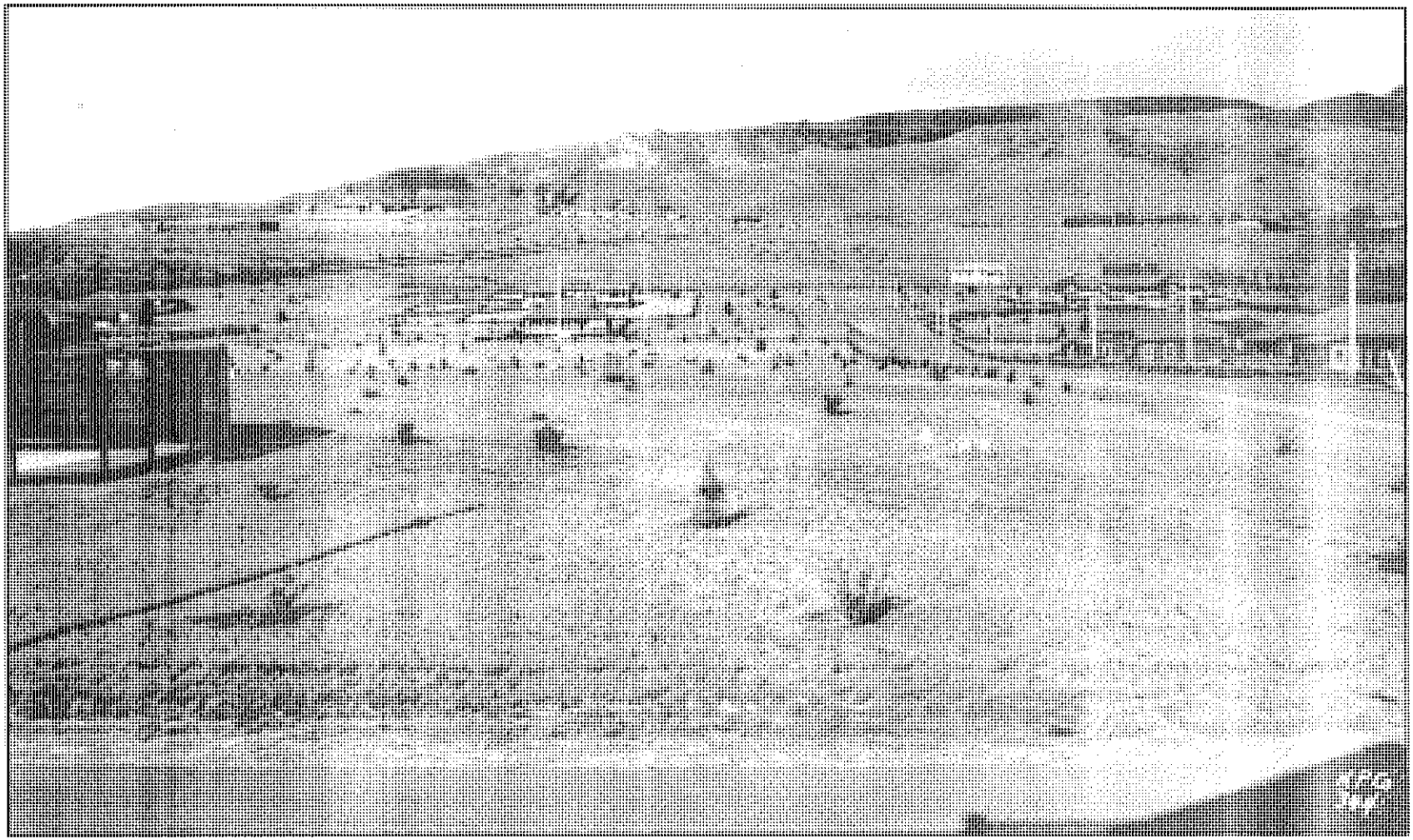

Figure 9. Dole Park circa 1923, following the acquisition of Lāna'i by the Hawaiian Pineapple Company, and the subsequent construction of laborer and management housing. (Hawaiian Pineapple Company photo courtesy of Castle & Cooke Resorts LLC)

Figure 10. An aerial photograph of Lāna'i City dated 1929 the locations of Ninth Street and Fraser Avenue for reference, project area approximately located to the upper left of frame (aerial courtesy of Castle and Cooke Resorts, LLC.).

Harold T. Stearns traversed the island of Lāna'i between June and August of 1936, conducting studies of the geology and ground-water resources. He was assisted by personnel from the U.S. Geological Survey, completing hydrographic maps for the study. His work highlighted the explorations for ground water in Maunalei and at Kō'ele, to improve sources of drinking water, and for irrigation of the expanding fields of pineapple cultivated on the island (Stearns 1940). He reported that the westernmost slopes of the Pālāwai Basin of Lāna'i "[are] not sheltered by other islands on the southerly side, [and] *kona* storms are unobstructed. Heavy downpours during a single *kona* [southern exposure] storm commonly account for a considerable

part of the annual rainfall, and in some of the arid sections a single rain storm a single rain may contribute as much as 80 percent of the annual total" (Stearns 1940:65).

By 1939, the population of Lāna'i was reported at four thousand, with virtually all of the residents working to maintain the fifteen thousand acres of pineapple fields. The expansion of the market to accommodate Hawaiian pineapples occurred so rapidly, with so much success, that new machinery was quickly developed to take advantage of the gentle topography of Lāna'i (Mackie 1939). The long, flat fields could accommodate mechanical harvesters, which operated by straddling rows of pineapple plants, and moving slowly behind men who broke the ripe fruit off their stalks. Once aboard the harvester, pineapples had their crowns removed, were sorted for size, and crated. Pineapples picked in the morning on Lāna'i, about sixty miles from Honolulu, were barged to Honolulu, canned and ready for shipment by nightfall the same day (McClellan 1939).

In 1961, James D. Dole's pineapple land on Lāna'i was merged with the assets of Castle & Cooke, a prominent Hawai'i-based corporation. World-wide prices for pineapple continued to drop throughout the 1970's as competing countries supplied the market with cheaper pineapple. While pineapple cultivation continued on Lāna'i through the 1970s it is clear that some of the fields were starting to transition into fallow agricultural lands (Figure 11) and during the 1980's, Castle & Cooke began a long-term program to phase the island out of pineapple cultivation and expand tourism. In 1988, David Murdock, Chairman of Castle & Cooke, Inc., opened a resort hotel and companion championship golf course at Mānele Bay. A second resort hotel and golf course in the uplands of Kō'ele was opened in 1990. The final pineapple harvest and phasing out of all pineapple operations in 1993 (Boyd 1996) marked the end of an era for Lāna'i Island leaving much of the lands that were once in pineapple, including the current project area, open and fallow.

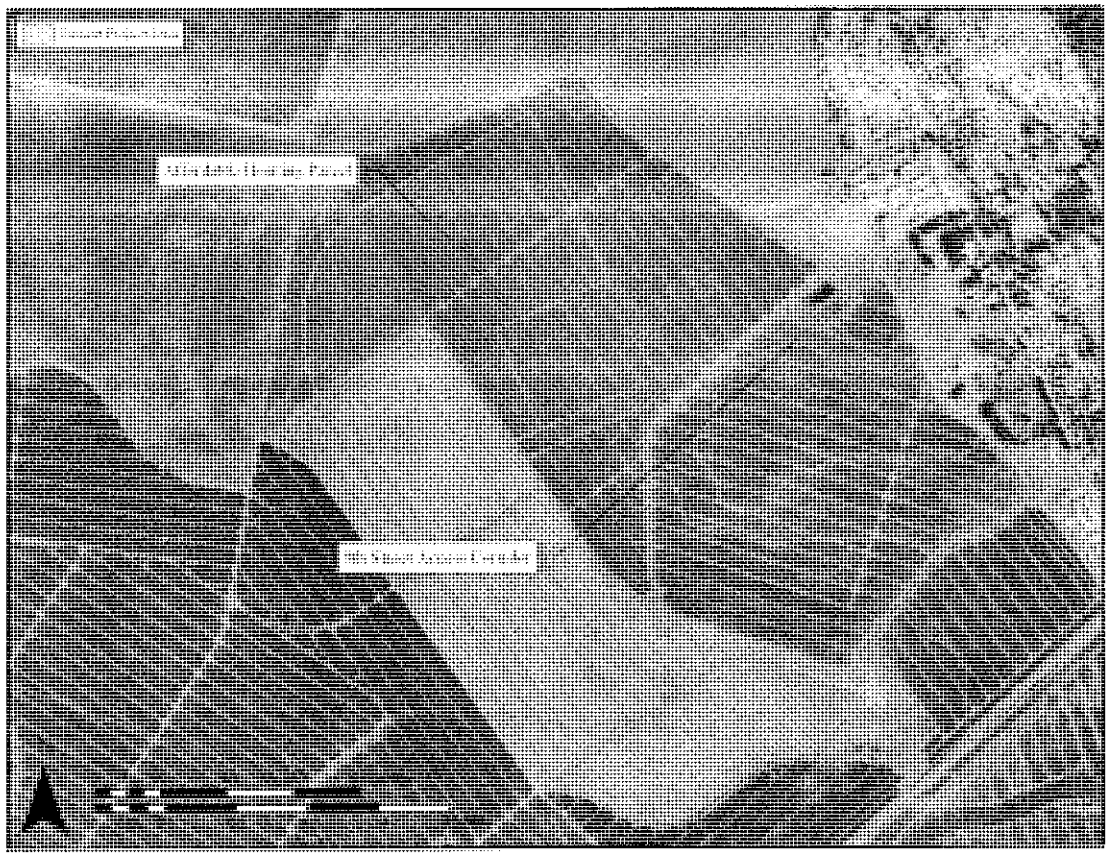

Figure 11. A portion of the 1979 USGS Orthophotoquad, Lanai City Quadrangle 7.5' Series showing the current project area (shaded in red) in relation to Fraser Avenue, Ninth Street, and lands being transitioned to fallow to the north and southwest.

3.2 Previous Archaeological Research

Archaeological studies that address the general history of Lāna'i, with specific mentions of the *ahupua'a* of Kamoku include: Emory (1924), the statewide survey of Lāna'i Island, Hommon (1974), Ahlo (1985), Nagata (1987), Walker and Haun (1987), Hammatt and others (1988), Hammatt and Borthwick (1988, 1989 and 1993), Hommon (1974), Borthwick and Hammatt (1989 and 1992), Borthwick and others (1990), Hammatt and others (1990), Hammatt and Chiogioji (1991), Colin and Hammatt (1996), Creed and others (2000), Raymond (2003), Hammatt and Schideler (2004), Dockall and others(2004), and Lee-Greig and Hammatt (2005).

Previous archaeological studies specific to upper plateau of Kamoku Ahupua'a are listed in Table 3 according to year and are depicted on Figure 12 with an expanded explanation of studies conducted in the immediate vicinity of the current project area immediately following.

Table 3. Archaeological Studies within, and adjacent to, the outer limits of Lāna'i City.

Reference	Year	Location	Description
Emory	1924a	Island-Wide	Archaeological Reconnaissance: Island-wide survey that recorded house sites to the north of Kamoku Ahupua'a.
Hommon	1974	Island-Wide	Archaeological Inventory Survey: Kō'ele nominated as a historic district and assigned SIHP number 50-40-1004 which included three houses and one church.
Hammatt and Borthwick	1988	Lālākoa III Subdivision	Archaeological Inventory Survey: A scatter of various materials was observed and documented in a fallow pineapple field; historic era artifacts were observed but not collected; coarse-grained basalt fragments collected and determined to come from recently introduced road gravel; numerous fine-grained basalt flakes and basalt artifacts (one finished adze fragment, eight adze performs, a core, and thirteen retouched flakes) collected and determined to have been imported with road gravel from the Ko'i Adze quarry.
Hammatt et al.	1988	Kō'ele	Archaeological Data Recovery: Excavation and analysis of recovered ranch era historic material from two trash pits correlated with events during ranching era.
Borthwick and Hammatt	1989	Iwi'ole Dorms	Archaeological Reconnaissance: Observed basalt and volcanic flake scatters in a disturbed context within fallow pineapple fields.
Hammatt and Borthwick	1989	1) Kō'ele Golf Course; 2) Kō'ele Single Family Housing; 3) Queens Multi-Family Housing; 4) Waialua Annex Subdivision (Olopua Woods Subdivision)	Archaeological Reconnaissance: Reconnaissance of multiple areas: 1) Four historic ranching era features (three associated with the water system and a historic scatter from the Gay's Homestead), a volcanic glass source, and a lithic concentration were recorded. In addition, 28 lithic artifacts collected within the former pineapple fields in association with road gravel; 2) No historic properties identified; 3) A few basalt flakes encountered in a concentration of road gravel 4) A scatter of basalt flakes mixed with road gravel and modern cultural materials was observed on a fallow pineapple field dirt road and presumed to have been "mechanically transported".
Hammatt and Borthwick	1990	Kō'ele Golf Course	Archaeological Inventory Survey: Survey of 100-acres behind the Kō'ele golf course. No historic properties identified.
Borthwick and Hammatt	1992	Proposed Kō'ele Reservoir	Archaeological Inventory Survey: No historic properties identified.
Hammatt and	1992	Waialua Annex Subdivision	Archaeological Investigation and Monitoring: Previously recorded scatter was

Reference	Year	Location	Description
Chiogioji			not relocated during sewer line installation likely due to grubbing activities.
Hammatt and Borthwick	1993	Sewerline from Kō'ele to Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Creed et al.	2000	DHHL Lots, Lāna'i City	Archaeological Inventory Survey: Encountered debris from firs Lāna'i Airport. No significant historic properties identified.
Raymond	2003	Lāna'ihale	Cultural Resource Investigations: Reconnaissance of the summit fenceline. No historic properties identified within the project APE.
Dockall et al.	2004	Behind Kō'ele Golf Course Clubhouse	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Shideler	2004	Lower west slope of Niniwai Hill	Archaeological Inventory Survey: Documentation of Kihamanienie Church (Site 50-50-98-1946) and associated graveyard
Conley-Kapoi and Hammatt	2005	Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Lee-Greig and Hammatt	2005	Courts Affordable Multifamily Housing Development, Central Lāna'i City	Archaeological Field Inspection with Subsurface Testing: No historic properties identified.
Lee-Greig and Hammatt	2009 (in progress)	Lāna'i High and Elementary School Expansion	Archaeological Assessment: No historic properties identified.

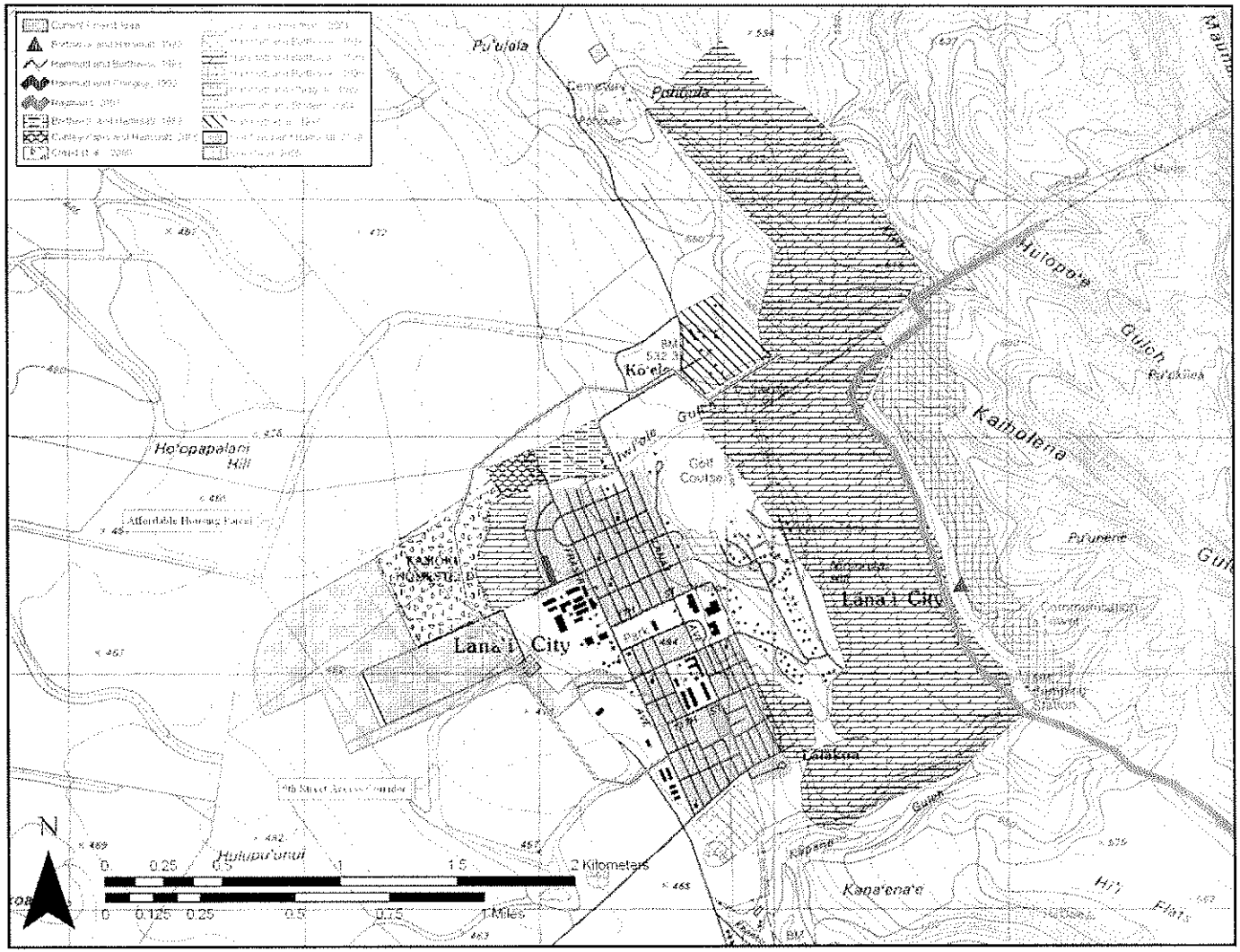

Figure 12. Portion of the South Lāna'i 7.5-minute U.S.G.S. topographic quadrangle showing the locations of previous archaeological investigations in relation to the current project area.

Of the archaeological studies summarized in Table 3 above, four studies were carried out in the vicinity of the current project area. An archaeological reconnaissance was conducted of three areas consisting of the Kō'ele Golf Course; the Kō'ele Single Family Housing; the Queens Multi-Family; and the Waialua Annex Subdivision (currently known as the Olopua Woods Subdivision) (Hammatt and Borthwick 1989). Pertinent to this study is the reconnaissance of the planned 30-acre Waialua Annex Subdivision (Hammatt and Borthwick 1989:27). The pedestrian reconnaissance identified a single concentrated surface scatter of road gravels, modern trash (bottle glass and spent gun cartridges) intermixed with basalt flakes (Hammatt and Borthwick 1989:28). The presence of the scatter on the surface and mixed nature of the materials indicated that the scatter was a secondary deposit likely transported through mechanical means with the roadbed gravels (Hammatt and Borthwick 1989:28). Observations of the nearby Iwiole Gulch embankments clearly showed the pineapple plow zone ranging from 30-70 cm thick with black plastic fragments (Hammatt and Borthwick 1989:28). This range for the plow zone is consistent with soils documented during backhoe testing conducted for the expansion of the Kanepu'u Subdivision (Conley-Kapoi and Hammatt 2005; see also Figure 12).

In 1992, CSH conducted an investigation and archaeological monitoring of a short length of sewer line within the Waialua Annex Subdivision following the completion of the above reconnaissance (Hammatt and Chiogioji 1992). An inspection of the surface following initial grubbing resulted in no significant findings. During this project site inspection, the material scatter identified during the reconnaissance was not relocated likely due to the ongoing grubbing activities at that time (Hammatt and Chiogioji 1992). Inspection of soil stratigraphy of the sewer line trenches also confirmed the observations made during the reconnaissance survey that the upper stratum (0-75 cm) represented the highly disturbed plow zone consisting of material associated with commercial pineapple cultivation (Hammatt and Chiogioji 1992:5-8). No historically significant cultural materials were identified during the inspection of the sewer line trench sidewalls (Hammatt and Chiogioji 1992:8).

Hammat and Borthwick (1993) conducted an archaeological inventory survey approximately 13,000 feet of sewer line west of the current survey area, for the proposed Kō'ele Waste Water Treatment Project. While special attention was given to locating flake or midden scatters in the former pineapple fields, no evidence of pre-contact activity was identified within the project corridor (Hammatt and Borthwick 1993:16).

An inventory survey of a fifty-acre Department of the Hawaiian Home Lands parcel (Creed et al. 2000) in former pineapple lands in northwest Lāna'i City was conducted by CSH. With the exception of some historic debris associated with Lāna'i's first airport and modern trash (car parts, PVC pipe fragments, and other trash) the inventory survey found nothing of significance (Creed et al. 2000:18).

Finally, CSH conducted an archaeological inventory survey of an approximate 42-acre area within former pineapple lands. With the excepton of a modern era fenceline, the archaeological inventory survey did not identify any significant historic properties (Lee-Greig and Hammatt 2009).

3.3 Background Summary and Predictive Model

Research into the historic record indicates that the thick soils of the plateau lands of central Lāna'i were traditionally use for dryland agriculture. This use, although fading, continued into the mid 1850s and is reflected in the *kuleana* testimony for Kamoku and the adjacent *ahupua'a* that mention cultivation of sugar cane, sweet potatoes and gourds. It is not coincidental that all of the LCAs in Kamoku, Kalulu and Kaunolū are well above 1,000 feet in elevation where rainfall was adequate to support dryland crops. Physical remnants of this settlement in along this wetter elevation was identified during Emory's island-wide survey (1924) where house sites were found *mauka* of the current project area and along the base of Lānaihale, the ridge crest of Lāna'i Island.

Before widespread pineapple cultivation, traces of the ancient upland forest were observed as late as the early 1900s (Gay 1964:51). Clearly the pre-contact agricultural pattern involved forest clearing, probably including slash-and-burn methods.

During the mid-to late-1800s the plateau was transformed to open grassland as grazing of goats and later sheep became a dominant land use. In the late 1920s, after successful experimental planting, the entire plateau area of Lāna'i was eventually plowed for large-scale commercial pineapple cultivation.

Lāna'i City was constructed in the 1920s as an entirely new residential area, specific to the Dole Pineapple Plantation. The city has been expanded upon recently in association with the changeover to tourism as the main economic force on Lāna'i City and the increasing need for housing.

Archaeological and historical data suggest that the project area and adjacent areas were suitable for both dryland agriculture and habitation. In Emory's 1920 survey of Lāna'i, house sites were documented within the Kamoku Ahupua'a less than a kilometer to the north-north/west and less and two kilometers to the south-south/east in the adjacent Kalulu Ahupua'a (see also Figure 6). These habitation sites are located in areas with similar natural environments to that of the project area. The parcel is also situated at an elevation were rainfall was documented as being adequate to support dryland crops. For these reasons, it seems possible that pre-contact habitation and/or agriculture activities could have been conducted within the boundaries of the project area.

Previous studies in and around the vicinity have documented lithic scatters and/or artifacts in a disturbed context (Borthwick and Hammatt 1989 and Hammatt and Borthwick 1988 and 1989). In addition, there has been documentation of historic ranching era materials encountered in the Kō'ele region to the northeast. With the history of pineapple cultivation for more than 70 years within the project area, the chances of encountering an intact historic property on the surface would be nominal with a slight potential for sub-surface cultural remains, . The agricultural activities would have destroyed or severely impacted all structural and/or subsurface deposits. While cultural material may be observed occasionally, their archaeological context would be anticipated to have been significantly impacted if not completely destroyed.

Section 4 Results of Fieldwork

The pedestrian survey of the 93-acres was accomplished over a period of two days, April 22nd and 23rd, 2009, while the subsurface testing of the Ninth Street Corridor was completed on May 6th, 2009. The archaeological pedestrian survey crew consisted of Hallett Hammatt, Ph.D.; Tanya Lee-Greig, M.A.; Michael Willman B.A.; and archaeological assistants Kaulana Kaho'ohalahala and Warren Osako of Lāna'i. Subsurface testing was accomplished by Hallett Hammatt, Ph.D.; Tanya Lee-Greig, M.A.; and archaeological assistants Warren Osako, Kaulana Kaho'ohalahala, and Kawena Maly of Lāna'i. A total of two and a half working days were required to complete the fieldwork for the archaeological inventory survey of this parcel.

4.1 Pedestrian Survey Findings

4.1.1 Affordable Housing Parcel

The dominant vegetation of the proposed affordable housing parcel consisted of dense, head high lantana (*Lantana camara*) (Figure 13 and Figure 14) and low-growing Christmas berry (*Schinus terebinthifolius*) groves (Figure 15). Other plants observed within the study area included *uhaloa* (*Waltheria* indica), milk thistle (*Silybum marianum*), and patches of an introduced grass species. Ground visibility within the affordable housing parcel of the project area ranged from good in areas of Christmas berry growth to poor in areas of heavy lantana growth and dense grasses. Where ground visibility was good, these areas were thoroughly inspected for indications of cultural activities represented by remnant traditional or historic era cultural materials. Over the course of the pedestrian survey, it became clear that the entire project area had been heavily modified by agriculture activities associated with commercial pineapple cultivation and recent bulldozing. While the ubiquitous remnants of black plastic associated with pineapple cultivation and some modern era trash (e.g. beer bottles, plastic bottles, and corrugated metal) was observed throughout the study area, no surface indications of significant historic properties were identified.

4.1.2 Ninth Street Access Corridor

The vegetation of the Ninth Street access corridor varies with areas of modern use: the eastern terminus of the corridor near the police station and ballpark consists of landscaped grasses and Ironwood trees; the southeast-northeast trending portion was primarily barren and serves as an abandoned vehicle and green waste dump site (Figure 16 and Figure 17); and the northeast to southwest section is comparable to the vegetation of the residential parcel (see Section 4.1.1 above). Ground visibility across the corridor under these conditions ranged from excellent to poor. During the course of the pedestrian survey, it was noted that the entire corridor had been modified by either commercial pineapple cultivation, as remnants of black plastic used in pineapple agriculture were observed throughout the project area, and/or modern era use of the area as evidenced by recent bulldozer push (see also Figure 17) and modern era infrastructure around the ballpark (Figure 18).

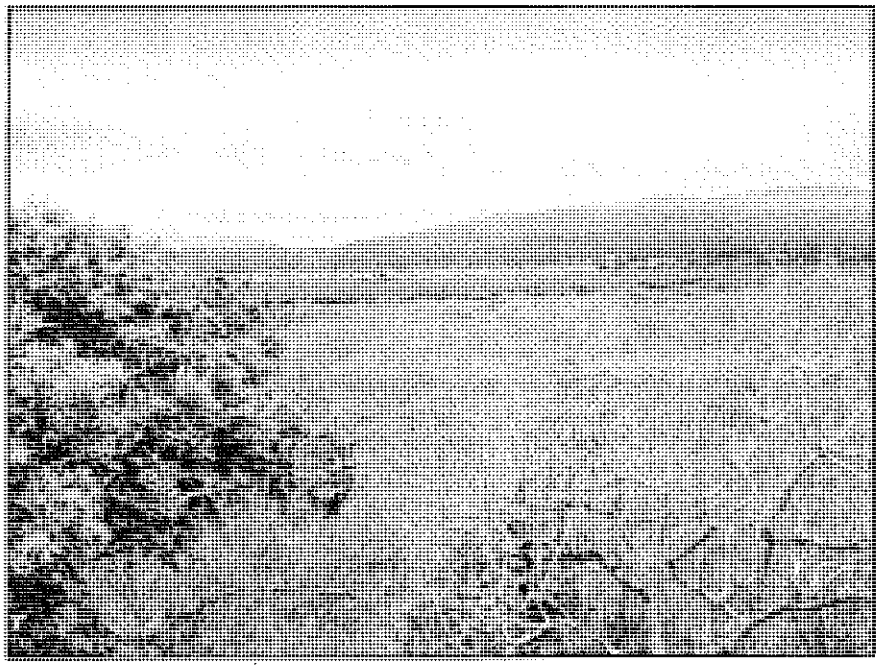

Figure 13. Overall project area from the southwest boundary showing dominant vegetation groups, lantana in the foreground, Christmas berry in the middle ground, Lāna'i City in the background, view to northeast.

Figure 14. Central portion of the proposed residential parcel showing vegetation density, view to southwest.

Figure 15. Southwest portion of the proposed residential parcel showing ground visibility in areas of Christmas berry growth, view to northeast.

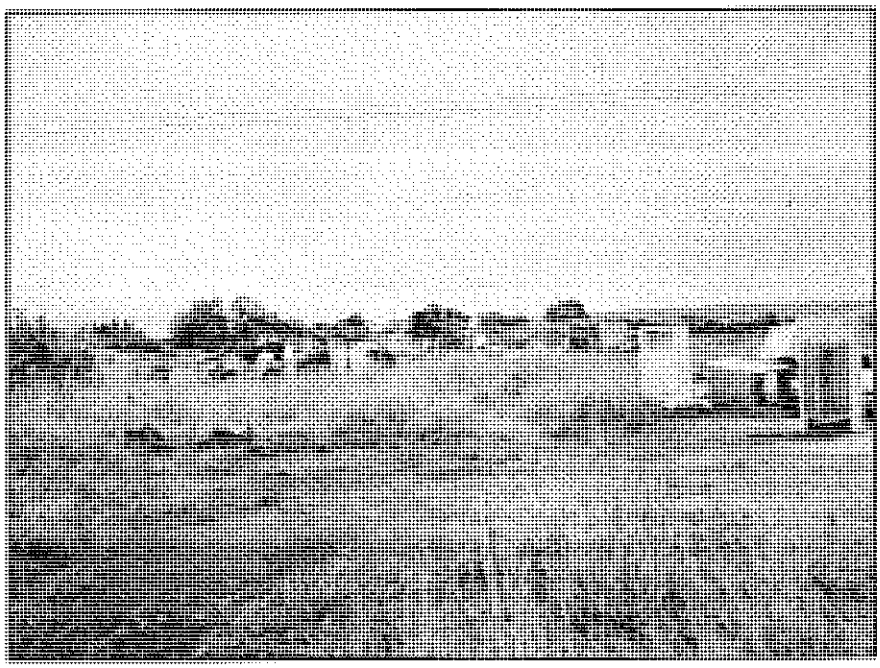

Figure 16. Ninth Street access corridor, view to west-southwest.

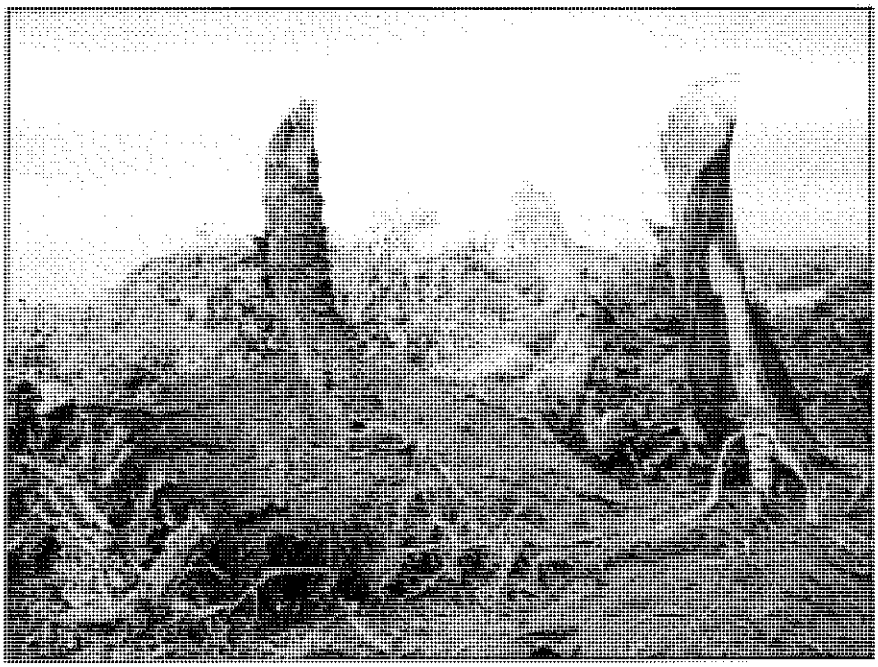

Figure 17. Ninth Street access corridor and green waste dump site, view to west-southwest.

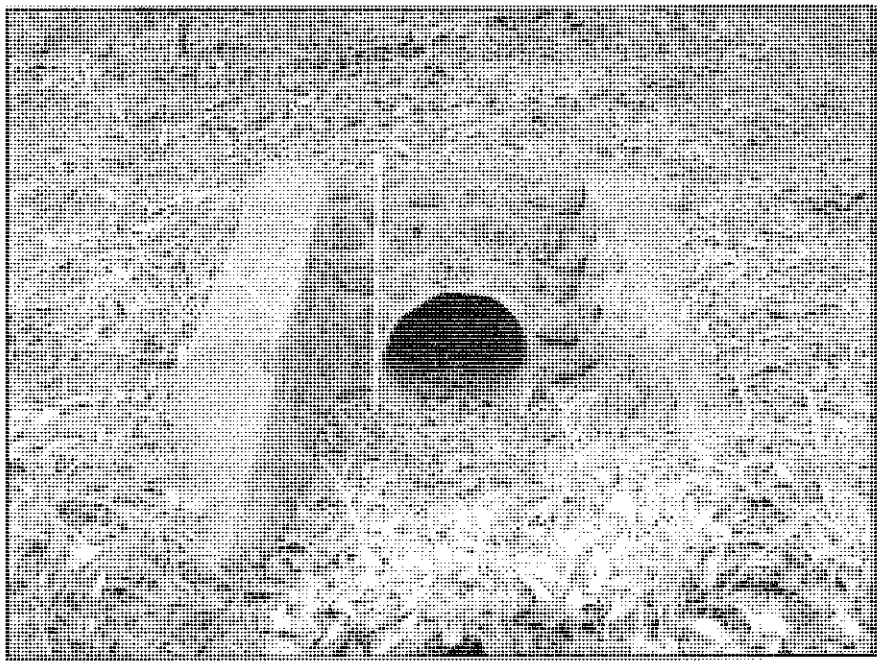

Figure 18. Modern culvert at the base of fill that comprises the ball park, view to north.

Continuous use and modern modifications to the landscape notwithstanding, three historic properties, located along the easternmost terminus of Ninth Street access corridor, were identified and documented during the course of this study (Table 4 and Figure 12). It should be noted that only State Inventory of Historic Properties (SIHP 50-40-98-6649) is located within the area of potential effect (APE) for the Ninth Street access corridor. CSH-2 and CSH-3 are located outside of the corridor APE and reported herein due to the close proximity of these properties to the current study area.

Table 4. Historic Properties Identified Within and Directly Adjacent to the Current Project Area

Temporary Field Number	SIHP (50-40-98-)	Site Type	Function	Age	Significance Criteria
CSH-1	6649	Culvert headwall	Water control	Historic	D
CSH-2	--	Wood board structure	Education	Historic	D
CSH-3	--	Wood board structure	School house; residence	Historic	D

4.1.2.1 SIHP Number 50-40-98-6649

Site Type: Wall
Site Function: Water Control, Culvert Headwall
Dimensions: 5.5m(18') m by 0.43m (17') m
Condition: Good
Age Historic/Plantation
Significance Criteria: D

Description: SIHP 50-40-98-6649 (Figure 20 through Figure 23) is a small culvert headwall located within the upper eastern portion of the proposed Ninth Street access corridor along the northern edge of existing pavement. Vegetation surrounding this historic property consists only of maintained lawn grass.

The overall construction of SIHP -6649 consists of four courses of cut basalt blocks held together by fine sand aggregate mortar. The south facing wall appears to have been treated with a thin layer of white plaster that is currently cracking and peeling away. The north face of the culvert headwall does not appear to have undergone any surface treatment. Consistent with most wall structures built by the Lanai Company, a construction date of "1948" was inscribed on the eastern or northeastern end of the wall. Additionally, the letters "H.Shimono" or "H.Shimong" were inscribed at the approximate midpoint of this feature, possibly indicating the name of the mason who constructed this wall.

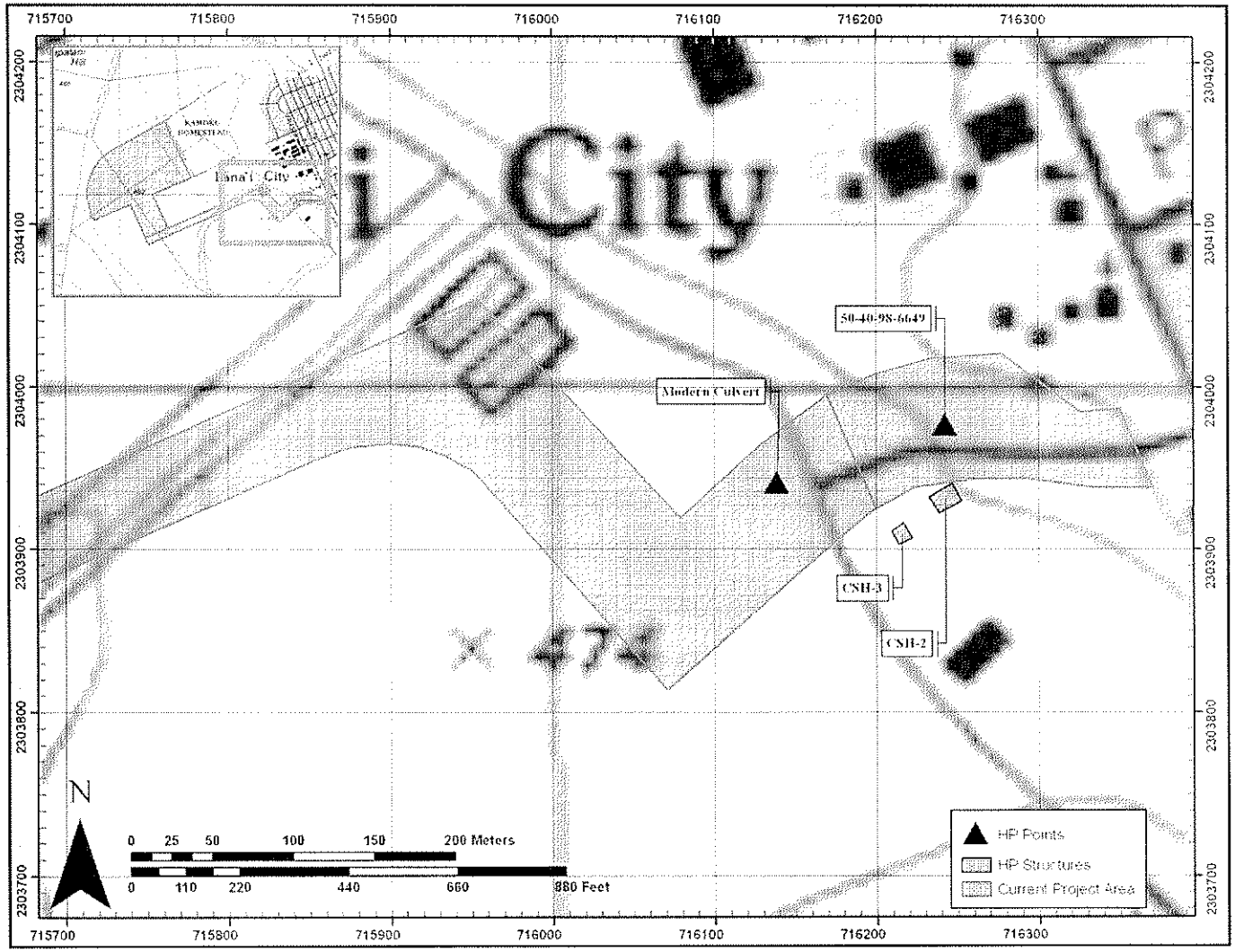

Figure 19. A portion of the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle, primary frame: historic property locations, inset: entire study area.

Figure 20. SIHP 50-50-98-6649, view to north.

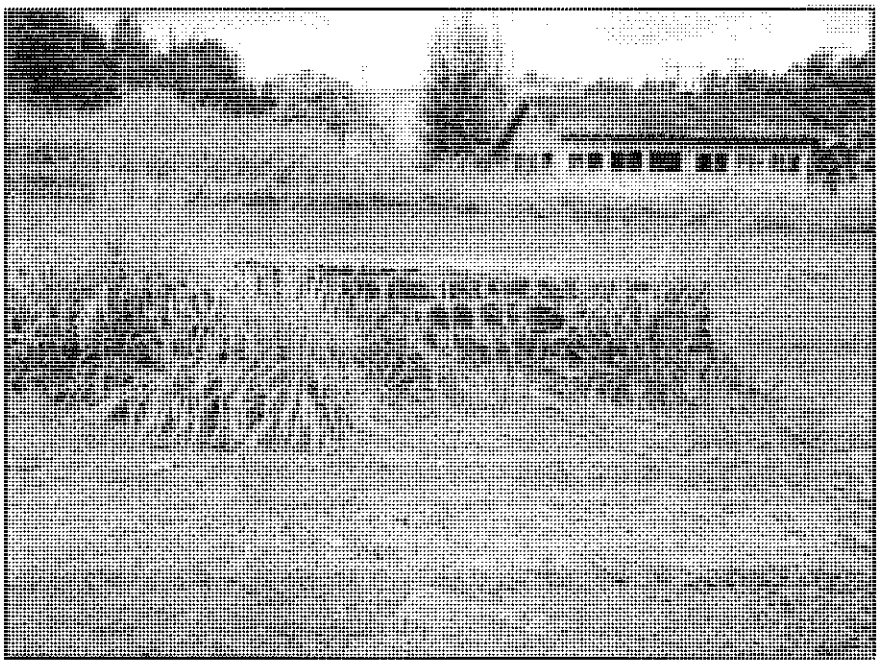

Figure 21. SIHP 50-40-98-6649, view to south.

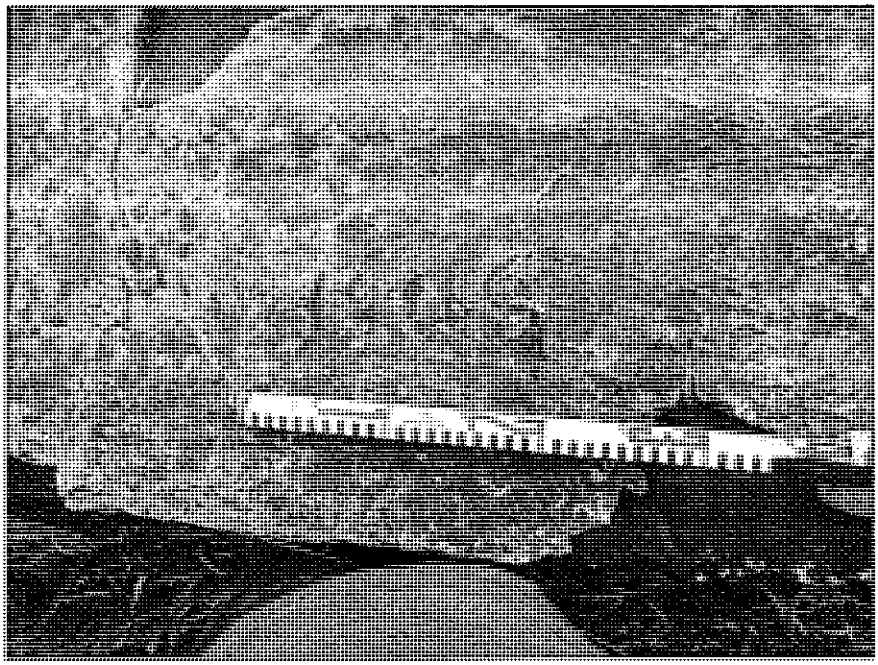

Figure 22. SIHP 50-40-98-6649, construction date "1948".

Figure 23. SIHP 50-40-98-6649, name inscription "H. Shimono".

4.1.2.2 CSH-2

Site Type: Wood board structure
Site Function: Education, School room
Condition: Poor
Age Historic

Description: Constructed around the mid-1920s, CSH-2 is one of three buildings associated with the former Kō'ele school complex (Mr. Kepa Maly – Executive Director of the Lāna'i Cultural Heritage Center, personal communication July 27, 2009) (Figure 24 and Figure 25). This structure is a double-room building with a covered deck or *lanai* fronting the entry ways and an add-on room on the west end of the building and off of the *lanai*. Overall assembly is of single wall construction consisting of timbers and wood boards with horizontal sliding windows. Roof construction is of conventional wood framing and asphalt shingles with cross ventilation facilitated by shuttered vents below the roof line (Figure 26). The interior lighting of both rooms consisted of suspended fluorescent lighting, hanging from a drop ceiling and the floors appear to be of plywood construction.

Room one is an open room with built-in cabinetry and counter space constructed from the floor to window sill (Figure 27). Room two is also an open room floor plan with a green board mounted to a shared wall between rooms one and two (Figure 28).

The floor boards of the *lanai* and a portion of the roof that once sheltered the *lanai* have collapsed. Additionally, the majority of the window glass from the surrounding windows is missing from the framework and the cabinetry and walls have been subject to extensive wood rot. While prominent elements of the building construction are still discernable, on the whole, and as evidenced in the photographs below, CSH-2 is in extremely poor condition. The surrounding vegetation consists of a sparse stand of Ironwood trees (*Casuarina equisetifolia*) and knee-high grasses.

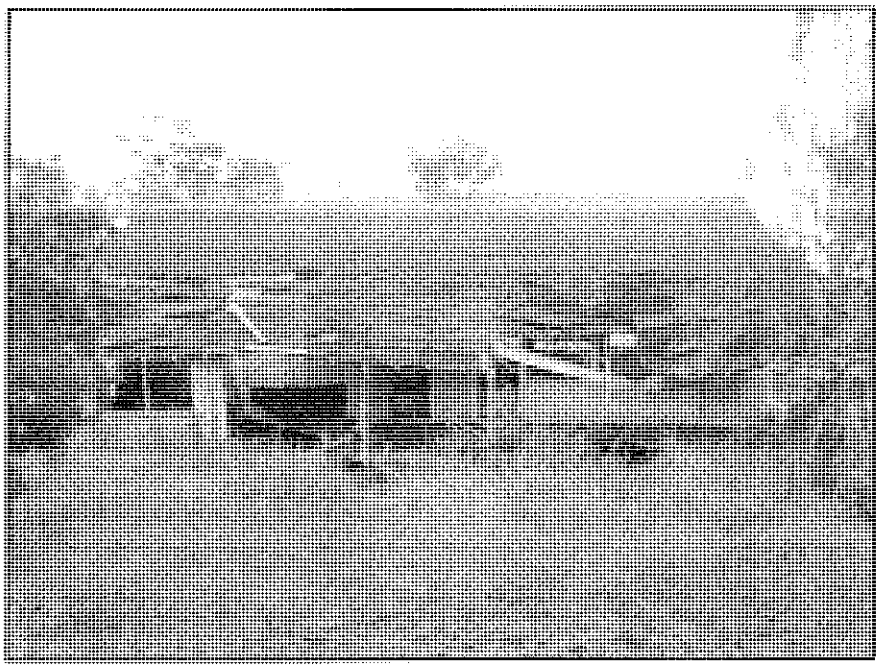

Figure 24. CSH-2, front of structure, view to north.

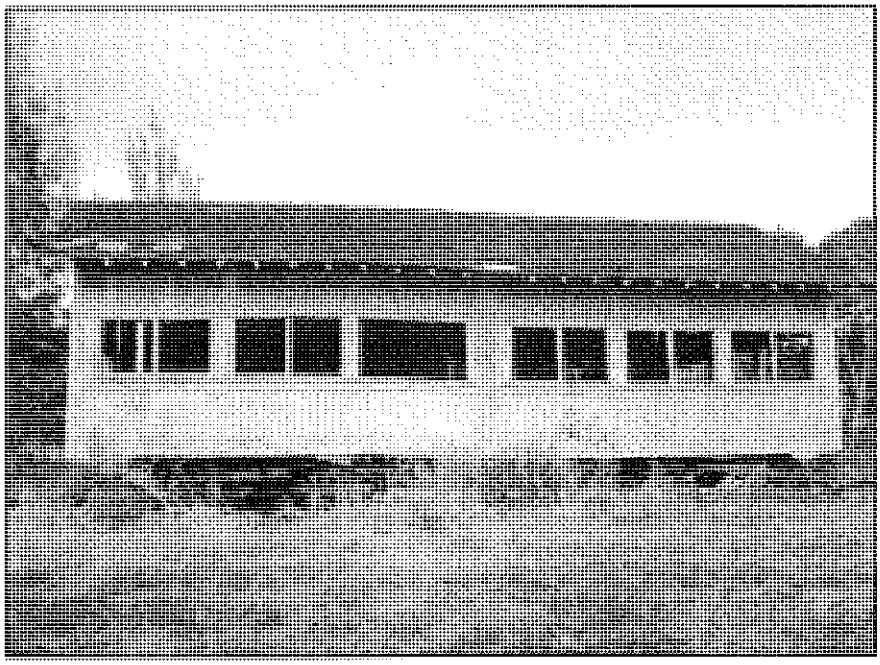

Figure 25. CSH-2, back of structure, view to south.

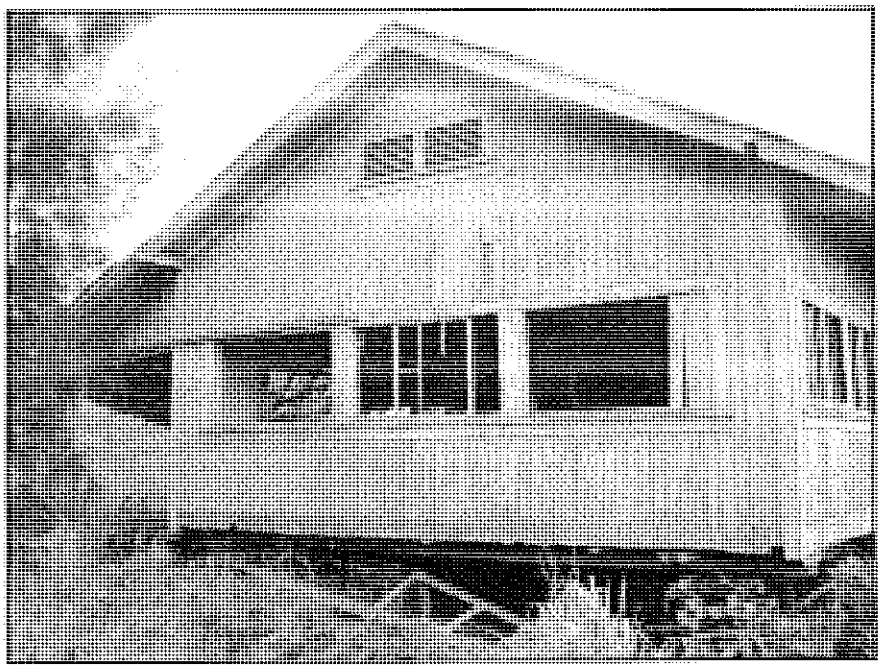

Figure 26. CSH-2, east facing wall, view to west.

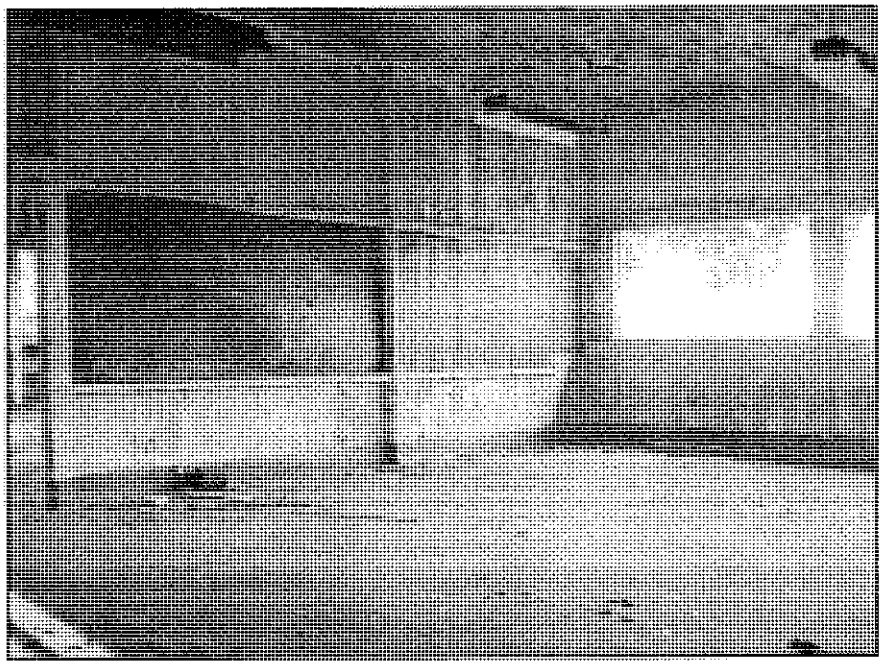

Figure 27. CSH-2, interior of room one, view to northwest.

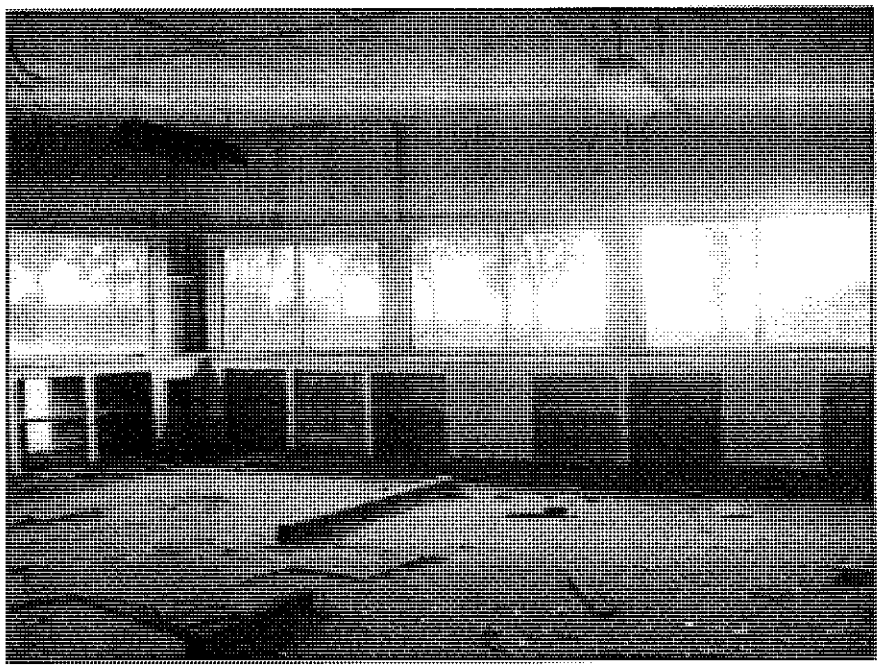

Figure 28. CSH-2, interior of room two, view to north.

4.1.2.3 CSH-3

Site Function: School house; residence
Site Type: Wood Board Structure
Coudition: Poor
Age Historic

Description: CSH-3 is the original Kō'ele single room school house that was refurbished during the mid-1920s into the Richardson residence (Mr. Kepa Maly – Executive Director of the Lāna'i Cultural Heritage Center, personal communication July 27, 2009). Currently, the structure is a multi-roomed building of conventional wood frame construction and wood board siding (Figure 29), single hung windows (Figure 30), and a *lanai* that extends off of the apparent front entryway The roof of this structure consists of corrugated sheet metal while the floors are entirely cosntructed of plywood.

Like CSH-2, this structure is in extremely poor condition as ¾ of the roof is no longer intact, the floor of the *lanai* and south-facing wall has completely collapsed (Figure 31), and the window glass has been completely removed. The surrounding vegetation consists of a single Ironwood tree (*Casuarina equisetifolia*) and ankle- to knee-high grasses.

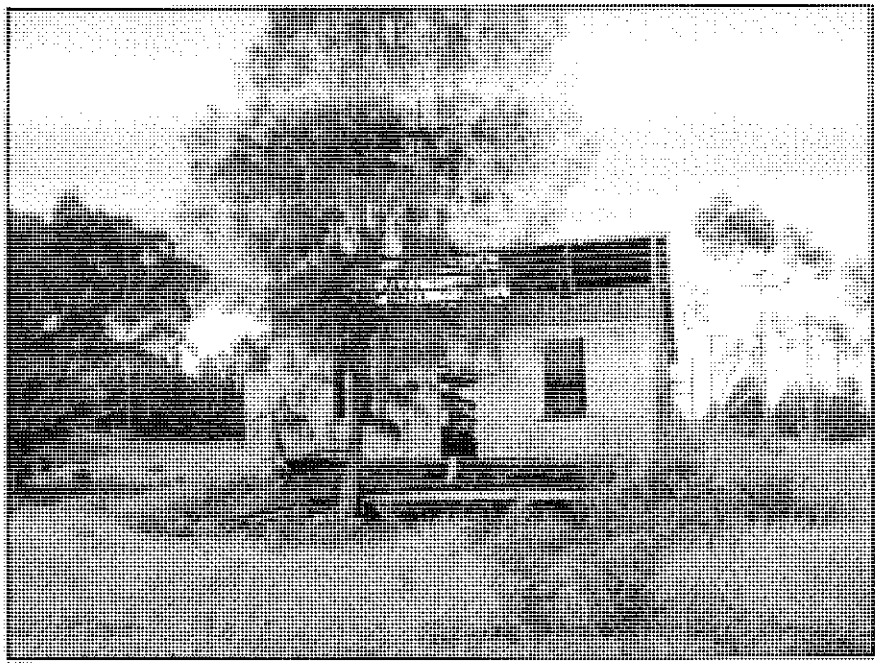

Figure 29. CSH-3, front of structure, view to south.

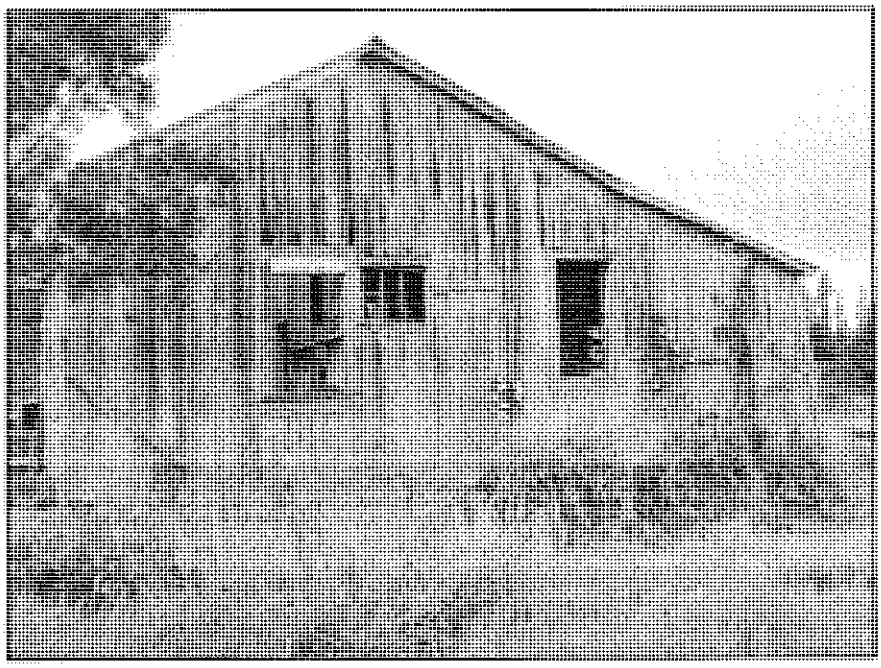

Figure 30. CSH-3, west facing wall, view to east.

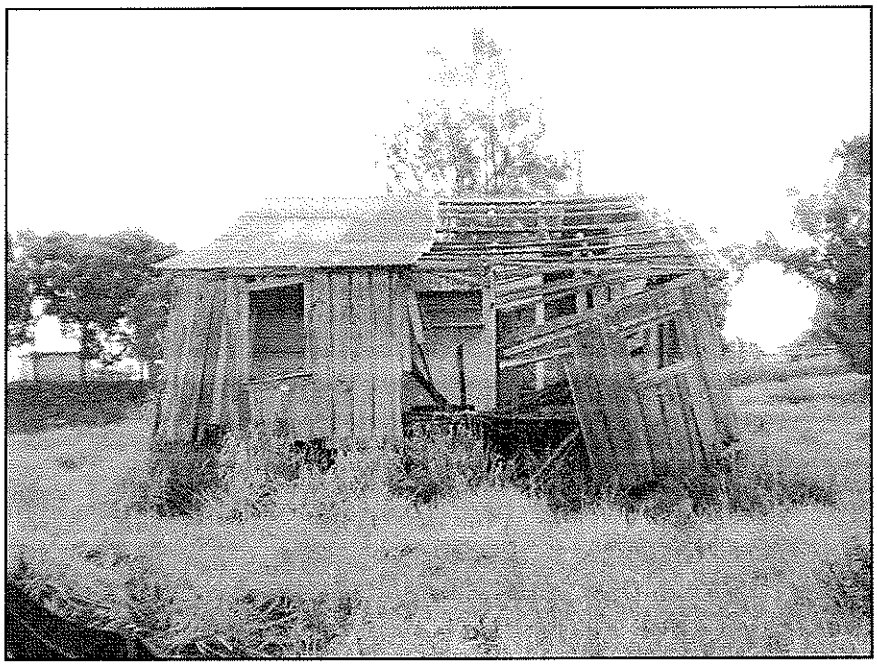

Figure 31. CSH-3, back of structure, view to north.

4.2 Subsurface Testing Findings

Mechanical subsurface testing was conducted of a previously uncultivated portion of the Ninth Street Access corridor, approximately 3-acres, that was accessible for the backhoe, as well as a small portion of accessible land that was previously cultivated in pineapple for comparative purposes (Figure 32 and Figure 33). Due to the dense vegetation growth and low overhead shrubbery of the proposed residential parcel, subsurface testing of the affordable housing parcel was not feasible at this time. Background research further shows that the area of the proposed affordable housing parcel has undergone over 50 years of intensive cultivation related to commercial agriculture and, as a result indicates little to no potential for encountering *in situ* significant subsurface cultural deposits.

In total, the subsurface testing program consisted of the mechanical excavation of five trenches within the overall Ninth Street access corridor. While the initial goal was to standardize the orientation of each trench in either a north-south or east-west direction topographic and potential underground utility constraints dictated a more random trench orientation. The soil and trench sidewalls were inspected for cultural remains during and after excavation.

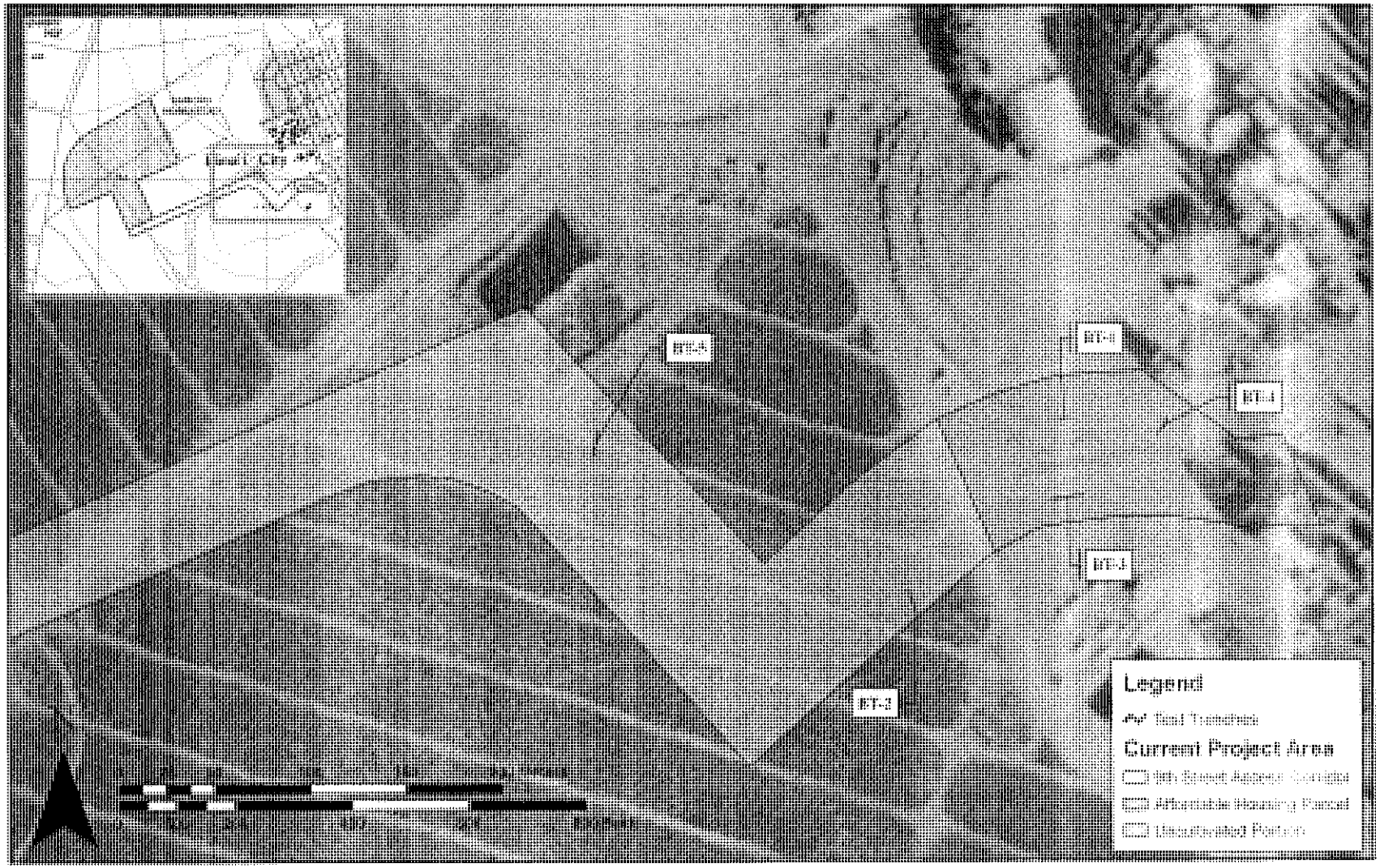

Figure 32. A portion of the 1979 USGS Orthophotoquad, Lanai City Quadrangle 7.5' Series showing backhoe trench locations within the Ninth Street access corridor of the current project area.

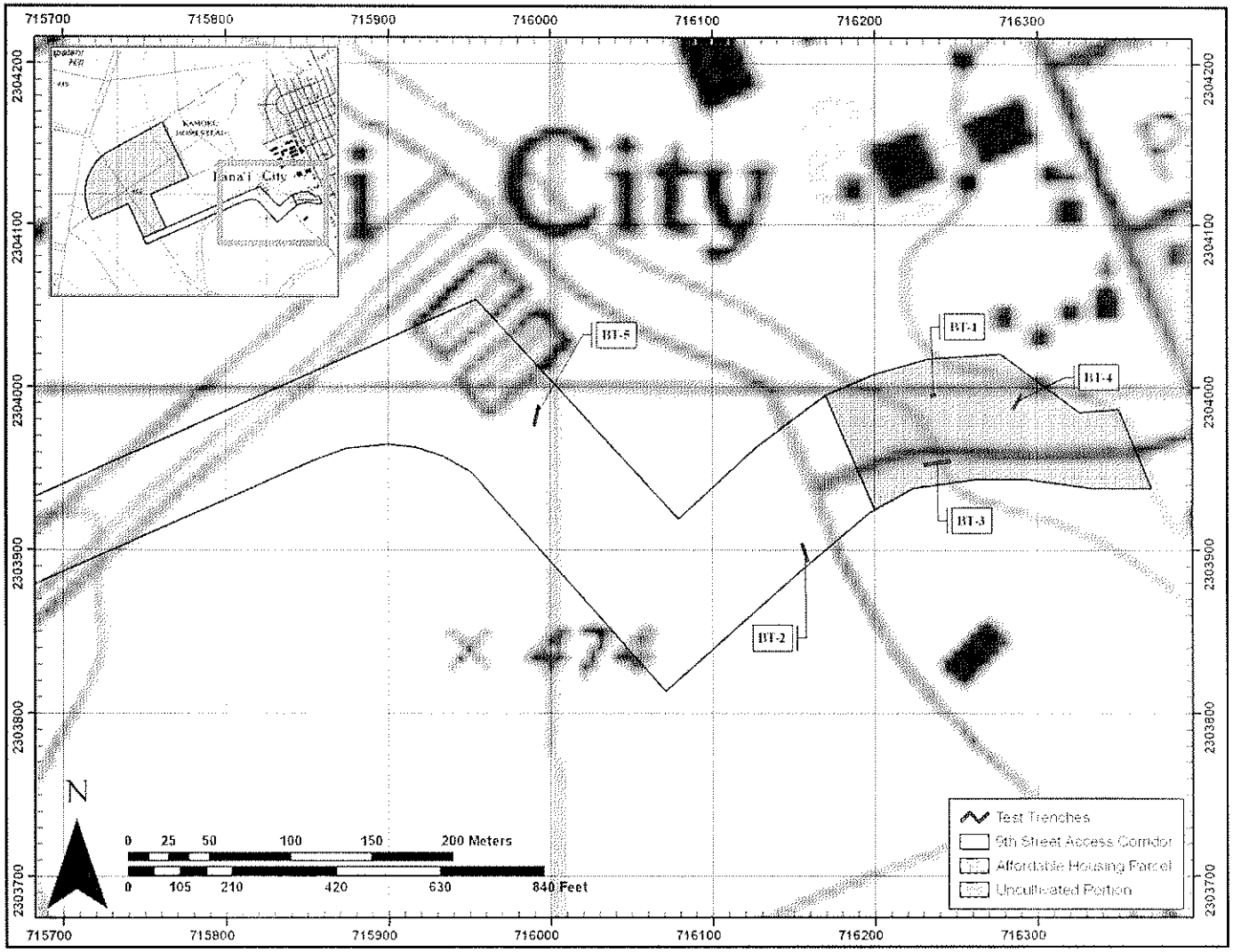

Figure 33. A portion of the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle showing backhoe trench locations within the Ninth Street access corridor of the current project area.

4.2.1 Lands Previously Uncultivated in Commercial Pineapple

The previously uncultivated portion of the Ninth Street access corridor is in the easternmost segment of the proposed access to the affordable housing parcel (see Figure 32) and, as previously noted, comprises a total of three acres. Three backhoe trenches were laid out and excavated within this portion of the current project area. For the most part, the soils stratigraphy and ground surface topography of the eastern portion of the Ninth Street access corridor shows relatively little disturbance of *in situ* soils along in Backhoe Trenches 3 and 4 with clear B Horizon soils underlying the A Horizon. Backhoe Trench 1, located adjacent to the ballpark, shows a fair amount of fill in Stratum II indicating that fill was imported to the area in order to create and level out the ball field.

4.2.1.1 Backhoe Trench 1 (BT-1)

Backhoe Trench 1 was located north of Ninth Street as it extends into the current project area and nearest to the baseball park (see also Figure 32 and Figure 33). During the course of excavation, a previously unknown irrigation line was punctured at approximately 30 cm below surface (cmbs) effectively halting further excavation (Figure 34). Final trench dimensions measured 4.5m by 1m oriented in an east-west direction (see also Figure 33). A total of two stratigraphic layers, an A horizon overlying a fill layer, were observed within the soil profile (see soil description below). With the exception of black plastic mulch near the surface and within Stratum I, no additional cultural materials were observed within the trench sidewalls or during the course of excavation. Excavation of this trench reached a maximum of 80 cm below surface (cmbs) and was terminated at bedrock.

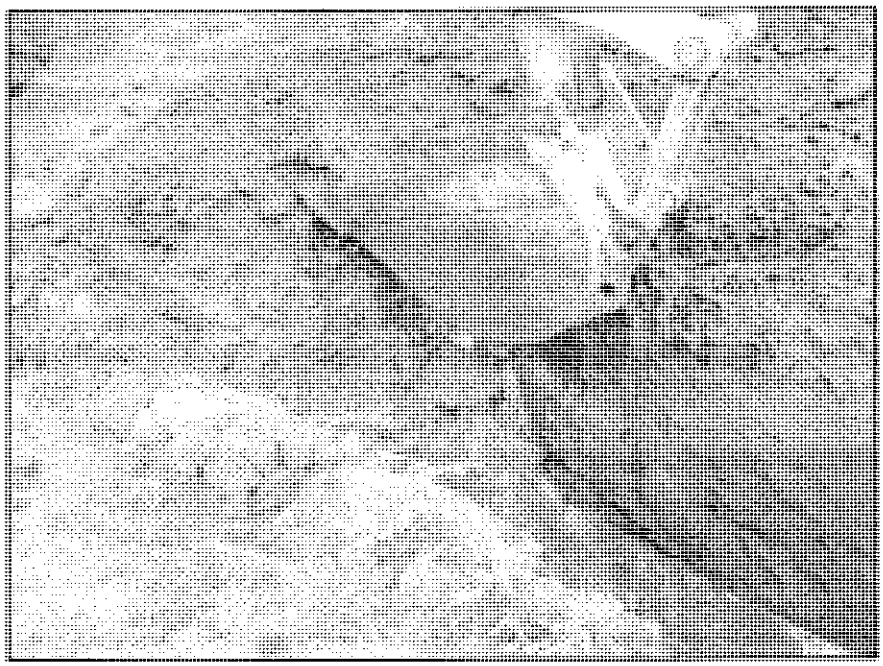

Figure 34. Backhoe Trench 1, showing the breach in irrigation water pipe, view to southeast.

Soil Description for BT-1

Stratum I (0-20 cmbs)	A Horizon: 5YR 3/3, dark reddish brown silt clay loam; strong, medium, blocky structure; slightly hard dry consistency; sticky wet consistency; slightly plastic; no cementation; clear lower boundary.
Stratum II (20+cmbs)	Fill layer; 5 YR 5/3, reddish brown silt clay loam; moderate, medium, blocky structure; slightly hard dry consistency; sticky wet consistency; no cementation; lower boundary unknown.

4.2.1.2 Backhoe Trench 3 (BT-3)

Backhoe Trench 3 was located directly south of Ninth Street as it extends into the current project area (Figure 35, see also Figure 33) and adjacent to CSH-2. Oriented in an east-west direction, the trench measured 17m (55') long by 1m (3') wide. It was excavated to a maximum depth of 106 cmbs (3 ½') (Figure 35). A modern era trash pit, filled with paper and plastic bag debris, was observed at the eastern terminus of BT-3 and south facing trench wall. Overall, the soil stratigraphy and presence of the modern trash pit in this test trench indicates that this portion of the project area has undergone a moderate level of modification. Unlike BTs 1 and 4, black plastic mulch from commercial pineapple cultivation was surprisingly absent from the upper levels of Stratum I. No historically significant cultural materials or layers were identified during the documentation of this test trench.

Figure 35. Overall view of BT-3, view to east.

Soil Description for BT-3 (Figure 36 and Figure 37)

Stratum I (0-28 cmbs) — A Horizon: 10 R 3/4, dusky red; clay; moderate, medium, blocky structure; slightly hard dry consistency; non-plastic; no cementation; clear wavy lower boundary; no plastic mulch.

Stratum II (28-106 cmbs) — Weak B Horizon grading to laterite; 10 R 3/4, dusky red clay; moderate, fine, crumb structure; slightly hard dry consistency; plastic; no cementation; lower boundary unknown.

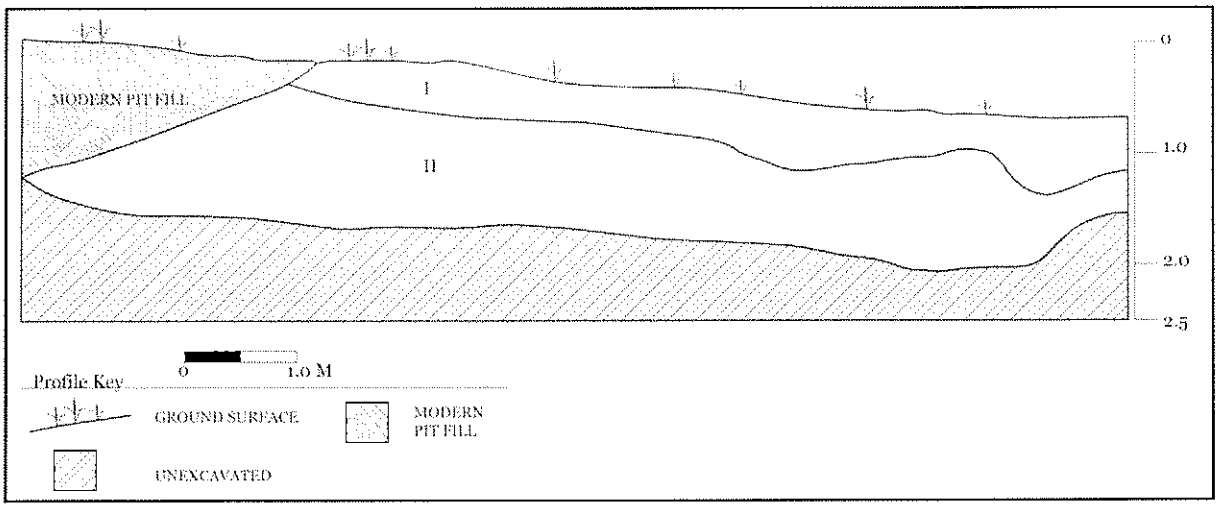

Figure 36. Soil profile for BT-3, south wall.

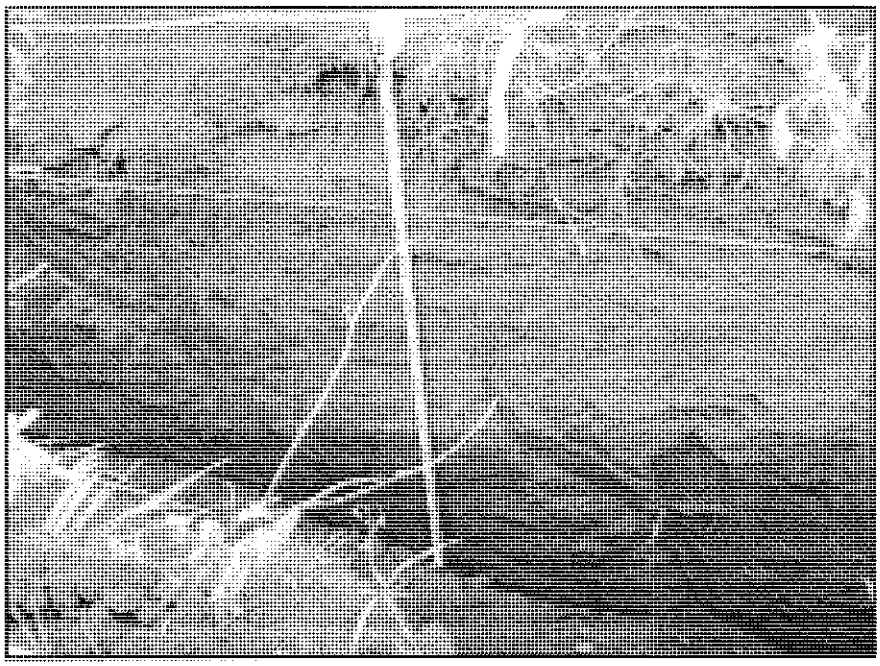

Figure 37. BT-3, profile type section, south wall.

4.2.1.3 Backhoe Trench 4 (BT-4)

Backhoe Trench 4 was located north of Ninth Street as it extends into the current project area. The trench measures 11m (36') long by 1m (3') wide. In order to avoid encountering the irrigation water pipe discovered during the excavation of BT-1, this test trench was oriented in a northeast-southwest direction (Figure 38, see also Figure 33). Excavation of this trench reached a maximum of 158 cmbs (5') and terminated at the C Horizon. A total of four stratigraphic layers were observed within the soil profile (see soil description below) showing a fairly thin A horizon overlying an equally thin and weak B Horizon. Like BT- 1, black plastic mulch associated with commercial sugar cultivation was identified in the upper depths of Stratum I. Other than the ubiquitous presence of the black plastic, no historically significant cultural materials or layers were observed within the soil profile.

Figure 38. BT-4, post-excavation view to northeast.

Soil Description for Backhoe Trench 4 (Figure 39 and Figure 40)

Stratum I (0-15 cmbs)	A Horizon; 10 YR 4/4, dark yellowish brown medium to coarse, clay loam; strong, medium, blocky structure; very hard dry consistency; non-plastic; no cementation; abrupt wavy lower boundary.
Stratum II (15-36 cmbs)	B Horizon; 2.5 YR 4/8, red silty clay; strong, medium sized blocky structure; hard dry consistency; slightly plastic; no cementation; abrupt wavy lower boundary.

Soil Description for Backhoe Trench 4 (continued)

Stratum III (36-139 cmbs)	C Horizon; 7.5 YR 7/6, strong brown gravels; strong, medium, blocky structure; slightly hard dry consistency; slightly plastic; no cementation; clear wavy lower boundary; decomposing bed rock.
Stratum IV (139-158 cmbs)	C Horizon; 10 YR 3/6, dark yellowish brown fine clay; weak, fine, crumb structure; loose moist consistency; non-plastic; no cementation; lower boundary unknown.

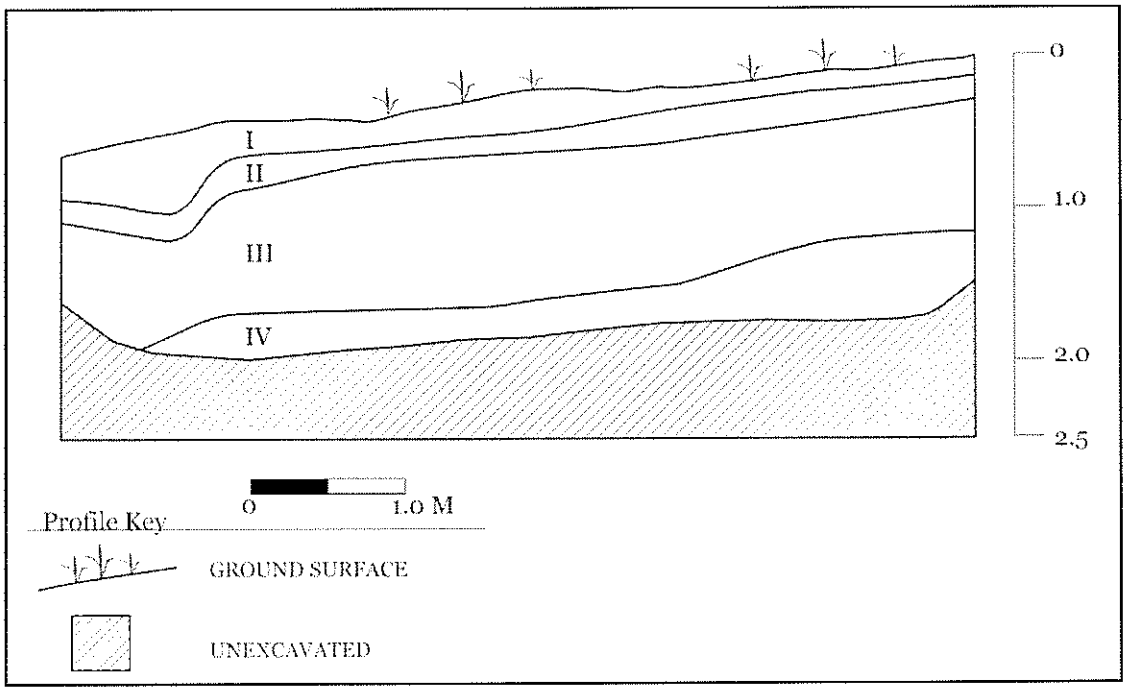

Figure 39. Soil profile for BT-4, west wall.

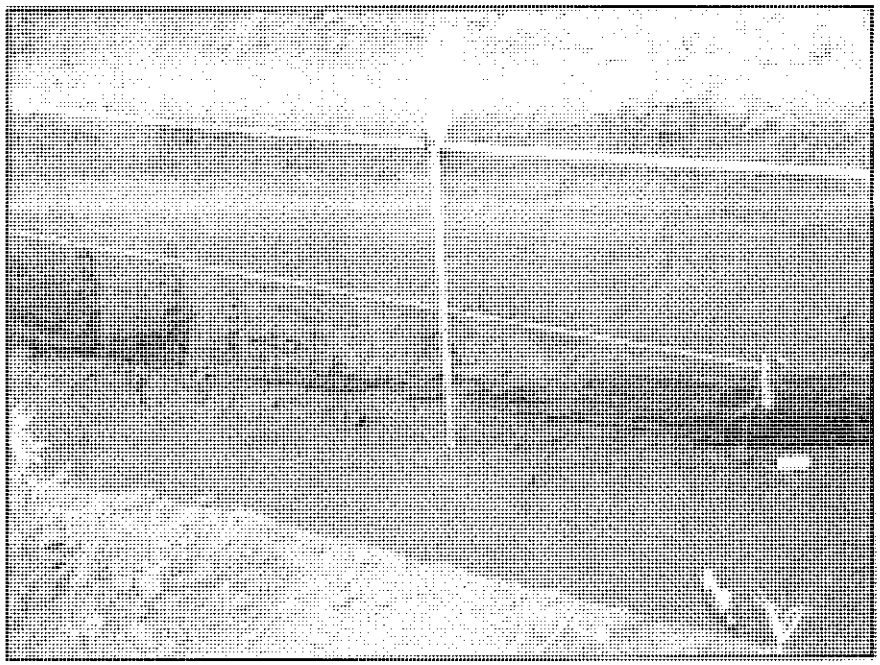

Figure 40. BT-4, profile type section, west wall.

4.2.2 Lands Previously Cultivated in Commercial Pineapple

For comparative purposes, two backhoe trenches were excavated within accessible portions of the Ninth Street access corridor with trench placement and orientation dictated by vegetation growth and modern use areas (see Figure 32 and Figure 33). The stratigraphic profiles of both backhoe trenches showed a distinct agricultural plow zone (Ap Horizon) measuring 30-35 cm thick. The pedontology of this stratum is consistent with the previous commercial agricultural use of the lands in this portion of the project area. It is of interesting note, however, that while Backhoe Trench 2 revealed a rather thin and weak B Horizon (40cm) with *in situ* inclusions of weathered bedrock, Backhoe Trench 5 represented a soil disconformity where the Ap Horizon directly overlaid C Horizon soils. Such a profile may indicate a rather short time frame for soil development in this area or an anomalous event that altogether wiped out the B Horizon soils in the immediate area of Backhoe Trench 5.

4.2.2.1 Backhoe Trench 2 (BT-2)

Backhoe Trench 2 measured 11m (36') long by 1m (3') wide and was generally oriented in a north-south direction (Figure 41, see also Figure 33). Excavation of this trench reached a maximum of 134 cmbs (4') and terminated at the C Horizon. A total of four stratigraphic layers were observed within the soil profile and showed a well-defined Ap horizon overlying a thin and weak B Horizon. Black plastic mulch associated with commercial sugar cultivation was identified throughout Stratum I and, other than the ubiquitous presence of the black plastic, no historically significant cultural materials or cultural layers were observed within the soil profile.

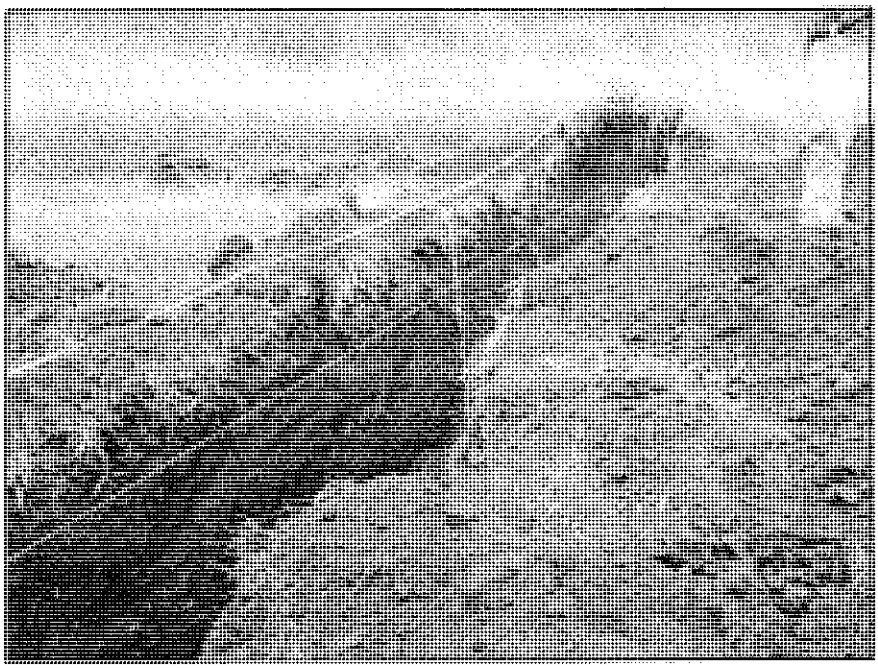

Figure 41. BT-2, view to west-northwest.

Soil Description for Backhoe Trench 2 (Figure 42 and Figure 43)

Stratum I (0-30 cmbs)	Ap Horizon; 10 YR 3/6, dark yellowish brown clay loam; moderate-strong, medium, blocky structure; very hard dry consistency; plastic; no cementation; diffuse wavy lower boundary.
Stratum II (30-70 cmbs)	Weak B Horizon; 10 YR 3/4, dark yellowish brown; clay; weak, medium, blocky structure; weakly coherant dry consistency; plastic; no cementation; diffuse wavy lower boundary; in place weathered bedrock.
Stratum III (70-134 cmbs)	C Horizon; 10 YR 4/6, dark yellowish brown clay with granular inclusions; weak-moderate, fine, blocky structure; very friable moist consistency; slightly plastic; no cementation; clear wavy lower boundary.
Stratum IV (134 cmbs+)	C Horizon; 10 YR 2/2, very dark brown clay; weak, fine, blocky structure; firm moist consistency; plastic; no cementation; lower boundary unknown.

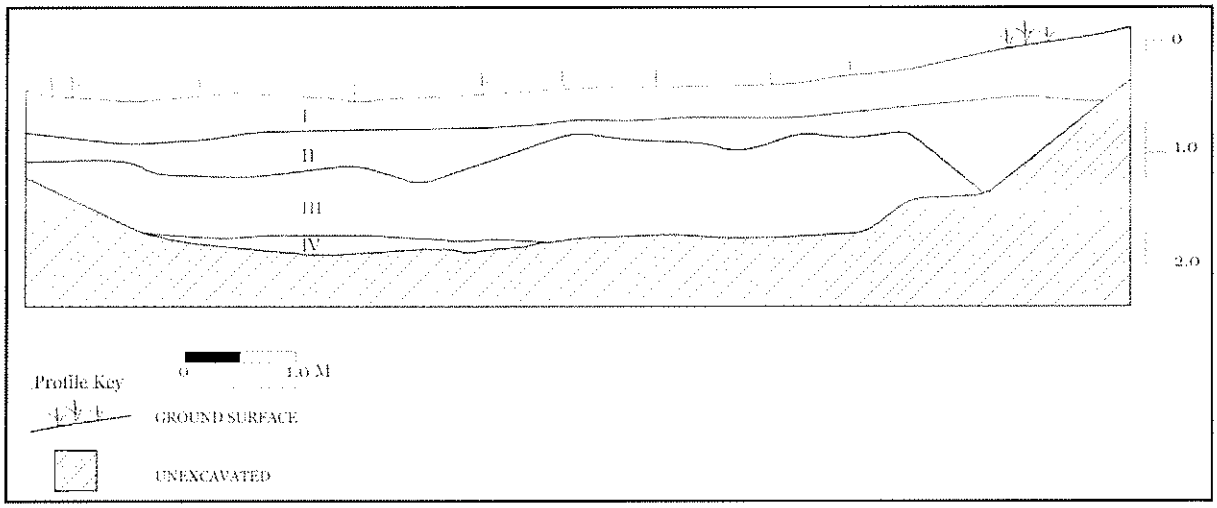

Figure 42. Soil profile for BT-2, west wall.

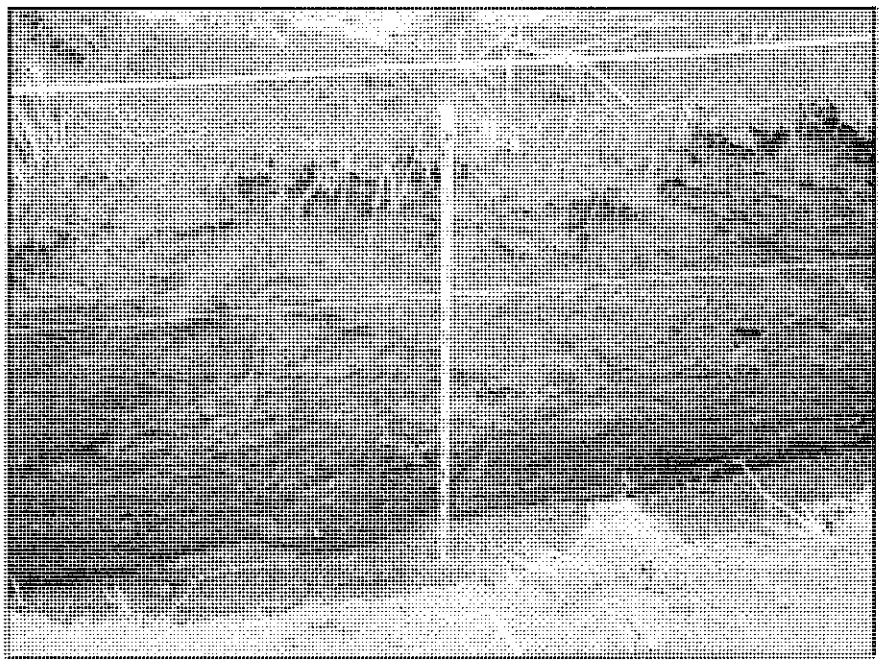

Figure 43. BT-2, profile type section, west wall

4.2.2.2 Backhoe Trench 5 (BT-5)

Backhoe Trench 5 was located perpendicular to an unimproved former pineapple field road and measured 13m (42') long by 1m (3') wide generally oriented in a north-south direction (Figure 44, see also Figure 33). Excavation of this trench reached a maximum of 160 cmbs (5') and terminated well into C Horizon soils. A total of two stratigraphic layers were observed within the soil profile and showed a well-defined Ap horizon overlying a uniform C Horizon. Black plastic mulch associated with commercial sugar cultivation was identified throughout

Stratum I and, other than the ubiquitous presence of the black plastic, no historically significant cultural materials or cultural layers were observed within the soil profile.

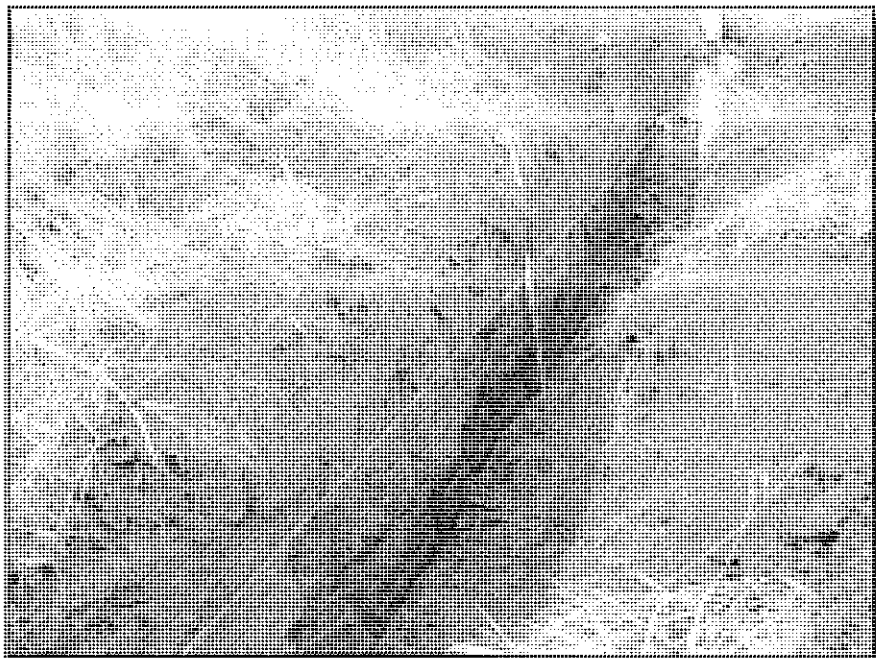

Figure 44. BT-5,1.5m scale view to northwest

Soil Description for Backhoe Trench 5 (Figure 45 and Figure 46)

Stratum I (0-35 cmbs)	Ap Horizon; 5 YR 3/2, dark reddish brown clay; strong, fine, blocky structure; very hard dry consistency; very plastic; strong cementation; clear wavy lower boundary.
Stratum II (35-160 cmbs)	Uniform C Horizon; 3 YR 3/3, dark reddish brown; clay loam; weak, fine, blocky structure; friable moist consistency; plastic; no cementation; lower boundary unknown.

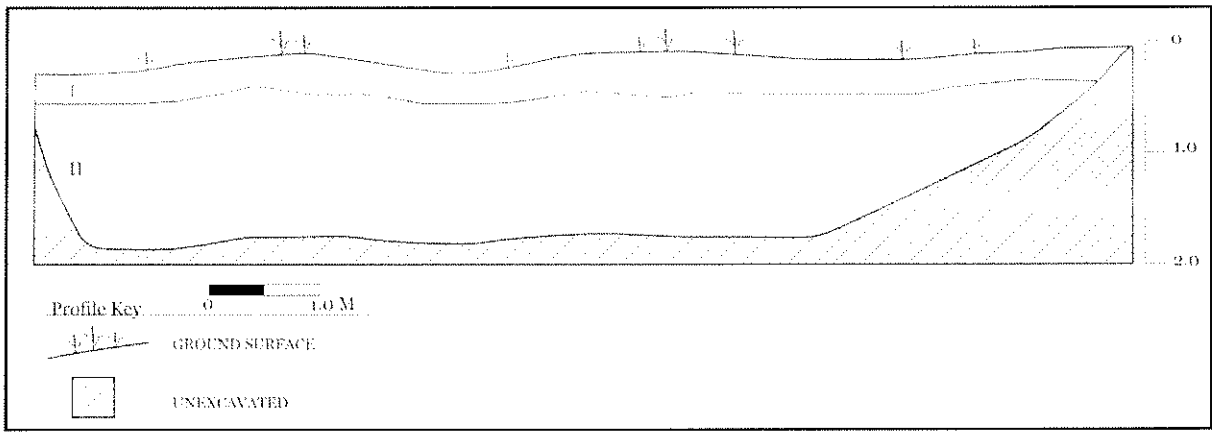

Figure 45. Soil profile for BT-5, west wall.

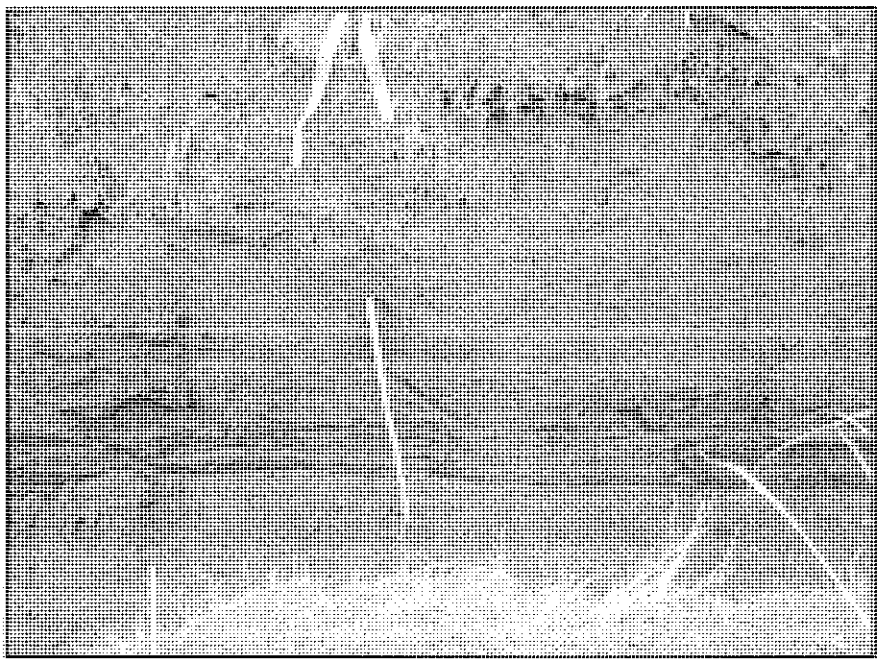

Figure 46. BT-5, profile type section, west wall.

Section 5 Summary and Interpretation

A review of the historic documentation indicates that the thick soils of the central plateau lands of Lāna'i were once traditionally used for dryland agriculture (see also Section 3.1.1.3). This use, although fading following Western contact, continued into the mid 1850s and is reflected in the *kuleana* testimony for Kamoku and adjacent *ahupua'a* that mention cultivation of sugar cane, sweet potatoes and gourds. It is not coincidental that all of the Land Commission Awards in Kamoku, Kalulu and Kaunolū are within the upper elevations where rainfall would have been adequate to support dryland crops. Traditional use of the *mauka* lands and central plateau may have been represented in the archaeological record by surface structures and cultural material deposits consistent with permanent and recurring habitation, as well as, dryland terraces used in *kula* agriculture. Physical remnants of this type of settlement along the wetter elevations were identified during Emory's island-wide survey (1924) where house sites were found along the base of Lānaihale, the ridge crest of Lāna'i Island, *mauka* of the current project area.

During the mid-to late-1800s the plateau was transformed to open grassland as grazing of goats and later sheep became a dominant land use (see Section 3.1.3). Then, in the late 1920s, after successful experimental planting, the entire plateau area of Lāna'i was eventually plowed over for large-scale commercial pineapple cultivation. To support the growing labor force, Lāna'i City was constructed in the 1920s as an entirely new residential area, specific to the Dole Pineapple Plantation (see Section 3.1.4).

With respect to the current project area, evidence of pre-contact habitation and agricultural use were absent. For the proposed affordable housing parcel and previously cultivated portion of the Ninth Street access corridor, the paucity of pre-contact historic properties can likely be attributed to the fact that the lands in and surrounding the current project area have undergone heavy modifications by commercial pineapple cultivation and the development of Lāna'i City. Such landscape alteration would have effectively eliminated surface archaeological structures and cultural materials and significantly altered subsurface indications of pre-contact historic properties. In the previously uncultivated portion of the Ninth Street access corridor, significant subsurface cultural layers associated with pre-contact habitation were also absent. This scarcity of subsurface indications of pre-contact habitation and agricultural use in an area where the soil stratigraphy indicates fairly little ground alteration, may be attributed to either of two alternatives: the traditional Hawaiian population was both sparse and highly mobile, relative to the other major islands (see Section 3.1.1.3 Traditional Hawaiian Habitation and Subsistence of the Lāna'i Central Plateau) and therefore left little or no archaeological evidence within the current project area of potential effect (APE), or this specific area was not suited for habitation or agriculture because of seemingly shallow and/or underdeveloped B-Horizon soils and accelerated downslope erosion. While community consultation associated with the development of a Cultural Impact Assessment for this project has revealed that lithic artifacts (e.g. *'ulu maika*, *imu* stones, and slingstones) have been found following the tilling of the pineapple fields, there is no apparent recollection or living memory of exact origins of these items or how they may relate to the traditional settlement pattern of the central plateau (Medeiros-Dagan et al. 2009). Lack of pre-contact Hawaiian historic properties notwithstanding, the current inventory survey has documented historic-era infrastucture and architecture related to the early development of the Dole Pineapple Plantation, Lāna'i City and the Kō'ele School Complex.

One historic property was identified within the northeastern portion of the Ninth Street access corridor while two historic era structures were identified in close proximity to the current project area and directly adjacent to the southern boundary of the Ninth Street access corridor (see Figure 19). SIHP 50-40-98-6649 is a historic era culvert headwall likely associated with the expansion of Lāna'i City and development of the drainage system (see also Section 4.1.2.1). According to the heavy equipment operator who ran the backhoe for the subsurface testing phase of this study, an identical headwall was once located parallel to this feature along the southern edge of Ninth Street as it enters the current project area. At some point in recent history, the southern headwall was removed following the abandonment of this particular utility. Similar historic era culvert headwalls are found elsewhere within Lāna'i City along Lanai Avenue across from the Courts Affordable Housing Subdivision (Lee-Grieg and Hammatt 2005, Figure 47) and near the Lodge at Kō'ele.

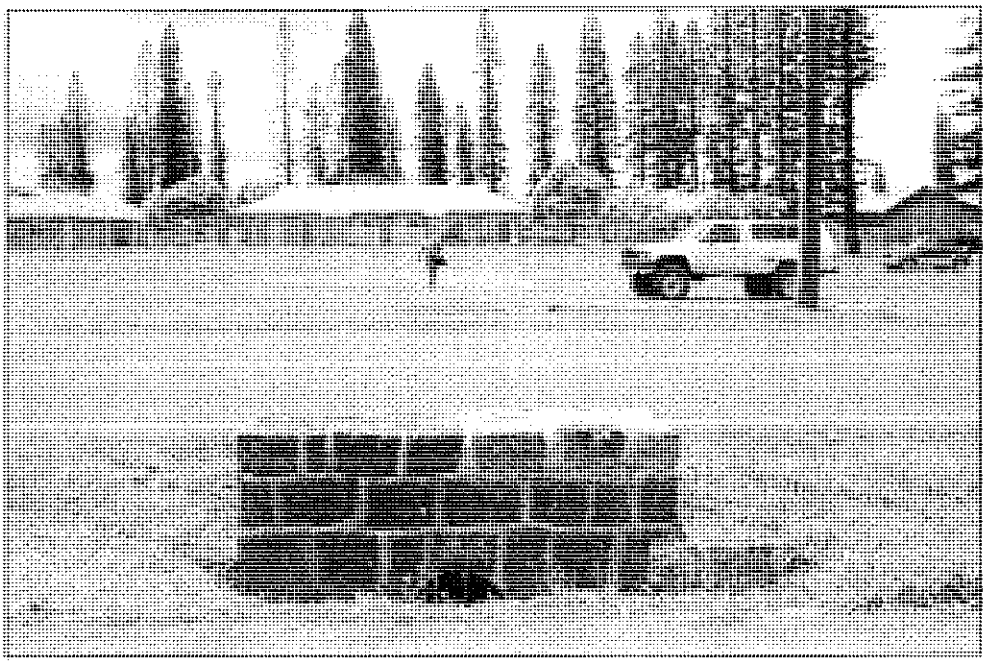

Figure 47. Example of a historic culvert headwall similar to SIHP 50-40-98-6499 located off of Lanai Avenue and across from a former open field and current location of the Courts Affordable Housing Subdvision, view to west (June 1, 2005).

CSH-1 and CSH-2 consists of two of the three buildings that once comprised the Kō'ele School Complex (see also Sections 4.1.2.2 and 4.1.2.3). Built during the ranching era and originally comprised of a single room school house (CSH-3), the Kō'ele School expanded sometime around the mid 1920s to include two additional buildings (CSH-2 and the former Kindergarten room currently used as a custodial shed for Lāna'i High and Elementary School [Mrs. Martha Evans – Vice-Principal, Lāna'i High and Elementary School, personal communication July 27, 2009]). As the name implies, the old school complex was originally located at Kō'ele and subsequently vacated when the Lāna'i High and Elementary School was established at its present location off of Frasier Avenue in 1937. Around 1985-1986, and through the efforts of Lanaians for Sensible Growth, Hui Malama Pono o Lāna'i, and the community of Lāna'i, two of the three former structures of the Kō'ele School Complex were relocated to the

bottom of Ninth Street and intended for preservation, restoration, and incorporation into the landscape of Kō'ele as a part of a heritage program through an agreement with Castle & Cooke Resorts, LLC (Mr. Kepa Maly – Executive Director of the Lāna'i Cultural Heritage Center, personal communication July 27, 2009 and Representative Hermina Morita – Hawai'i State Legislature 14th District Representative and Lāna'i Island *kama'aina*, personal communication July 29, 2009). Unfortunately, continued neglect has impacted the integrity of the structures that are directly adjacent to the Ninth Street access corridor and current project area leaving them in an extensive state of disrepair.

Section 6 Assessment of Archaeological Significance

Assessment of archaeological significance has been made in accordance with the State Department of Land and Natural Resources (DLNR) Chapter 13-284, Hawai'i Administrative Rules (HAR), entitled "Rules Governing Procedures for Historic Preservation Review to Comment on Section 6E-42, Hawai'i Revised Statutes (HRS), Projects"; Chapter 13-284-6 entitled "Evaluation of Significance", states:

a. Once a historic property is identified, then an assessment of significance shall occur. The agency shall make this initial assessment, or delegate this assessment, in writing, to the SHPD. This information shall be submitted concurrently with the survey report, if historic properties are found in the survey.

b. To be significant, a historic property shall possess integrity of location, design, setting, materials, workmanship, feeling, and association and shall meet one or more of the following criteria:

    a. Sites that are associated with events that have made a significant contribution to broad patterns of our history; or

    b. Sites that are associated with the lives of persons significant in our past; or

    c. Sites that embody the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant or distinguishable entity, whose components may lack individual distinction; or

    d. Sites which have yielded, or may be likely to yield, information important in prehistory or history; or

    e. Sites which have an important value to the native Hawaiian people or to another ethnic group of the State due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events, or oral accounts- these associations being important to the groups' history and cultural identity.

SIHP 50-40-98-6649 is considered significant under Criterion D because of the potential to yield information important for understanding the history of the region. Because CSH-2 and CSH-3 are located outside of the current project APE, significance assessments for these properties are beyond the scope of this study.

Section 7 Project Effect and Mitigation Recommendations

7.1 Project Effect

Under Hawai'i state historic preservation legislation, the only two possible effect determinations for a given project under historic preservation review are "no historic properties affected" and "effect, with proposed mitigation commitments" (HAR Chapter 13-284-7). In the circumstance of the current project area, one historic property consisting of a historic era culvert headwall (SIHP 50-40-98-6649) was documented within the area of potential effect (APE) for the proposed project. This historic property is recommended as significant for informational content only. We believe that the current inventory survey investigation has adequately recorded the information for SIHP -6649, through location documentation, written descriptions, and photographs.

Because we believe that the information that makes SIHP 50-40-98-6649 historically significant has been well documented and additional historic preservation mitigation would not add to the body of information concerning this historic property, CSH recommends a project specific effect determination of "no historic properties affected." This is believed to be appropriate, despite the potential removal of this feature by the proposed project as the information that makes this historic property significant has been adequately recorded.

7.2 Mitigation Recommendations

Based on the above evaluation of effect, CSH recommends no further historic preservation work for SIHP 50-40-98-6649. While the pedestrian survey did not identify any significant surface historic properties during the course of this study and limited subsurface testing of the eastern portion of the Ninth Street access corridor resulted in negative findings, it should be noted that poor ground visibility throughout the majority of the project area made difficult the identification of low density surface artifact scatters and pre-empted an intensive subsurface testing program. Community consultation has revealed that formal indigenous artifacts, although out of context, have been found within former pineapple fields following tilling after harvest (see also Section 5) thus presenting some possibility for encountering historically significant materials both on the surface and in a subsurface context. Therefore, it is recommended that precautionary archaeological monitoring of the initial grubbing and grading activities associated with the proposed project be implemented as a means to thoroughly evaluate the current project area for historic properties. Continuation and/or termination of the monitoring program following early preparation of the project site should be re-evaluated with SHPD based on the initial monitoring findings.

7.3 Disposition of Materials

All of the data gathered and generated during the course of this inventory survey are currently being curated and housed at the Maui Office of Cultural Surveys Hawai'i, Inc., 1993 Main Street, Wailuku, HI 96793 with copies on file at the main office of Cultural Surveys Hawai'i, Inc. at 41-1537 Kalanianaole Hwy # 200, Waimanalo, HI 96795-1185.

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APPENDIX E.

Cultural Impact Assessment

Cultural Impact Assessment

For the Lānaʻi City Affordable Housing Project, Kamoku Ahupuaʻa, Lahaina District, Island of Maui

TMK: (2) 4-9-002: 058 (por.) and portions of (2) 4-9-014:001, 009, and 011

DRAFT

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Management Summary

Reference	Cultural Impact Assessment for the Lāna'i City Affordable Housing Project, Kamoku Ahupua'a, Lahaina District, Lāna'i Island, TMK: (2) 4-9-002: 058 (por.) and portions of (2) 4-9-014:001, 009, and 011.
Date	August 2009 Draft
Project Number (s)	CSH Job Code: Kamoku 6
Project Location	The subject project site is located in Lāna'i City south of the Department of Hawaiian Home Lands parcel. It is currently part of a 115 acre parcel owned by the County of Maui that is in the process of being subdivided into two parcels. Lot A-1 is the proposed 73 acre affordable housing parcel.
Land Jurisdiction	County of Maui Castle & Cooke Resorts, LLC.
Project Description	The County of Maui is proposing to convert 73-acres of former pineapple lands into an affordable housing project that will preliminarily consist of approximately 12-acres of multi-family dwellings and 29-acres of single family dwellings. In addition to the residential area, eight acres is proposed for public-quasi-public use, while three acres will be used for park development and a drainage retention basin. Access to the proposed development is anticipated to extend off of both Fifth Avenue and from Ninth Avenue through currently undeveloped property.
Project Acreage	Residential and Multi-Purpose Parcel: 73 acres **Access Corridors:** The acreage for Fifth Avenue access route is included in the calculation above. Access off of Ninth Avenue consists of an approximate 250-foot wide corridor extending from the southwest terminus of Ninth Street that tapers to a 150-foot wide corridor along the proposed Lāna'i High and Elementary School Expansion Parcel. In all, the acreage encompassed by the Ninth Street access corridor consists of approximately 20 acres.
Region of Influence (ROI) also referred to as "study area"	When assessing the presence or absence of direct, indirect, and cumulative effects of the project on the traditional cultural practices of this region we would look at the ROI for this project which is defined as the geographical area encompassing the Ahupua'a of Kamoku .
Regulatory Context	This cultural impact assessment was conducted per the requirements of the Hawaii State Office of Environmental Quality Control.
Consultation Results	There are no traditional or cultural practices that will be adversely impacted by the development of the affordable housing project.

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Section 1 Introduction

1.1 Project Background

At the request of Munekiyo & Hiraga, Inc., on behalf of the County of Maui, Cultural Surveys Hawai'i, Inc. (CSH) conducted an cultural impact assessment for affordable housing development. The current study area includes the *ahupua'a* of Kamoku, Lāhainā District, Lāna'i Island (TMK [2] 4-9-002:058 and portions of [2] 4-9-014:001, 009, 011) (Figure 1, Figure 2 and Figure 3). The proposed residential parcel is located to the southwest of the 50-acre Department of Hawaiian Home Lands (DHHL) parcel and is surrounded by undeveloped, fallow pineapple fields while the Ninth Street access corridor extends off of the southern end of Ninth Street and across fallow pineapple fields.

The County of Maui is proposing to convert 73 acres of former pineapple lands into an affordable housing project that will preliminarily consist of approximately 14.46 acres of multi-family dwellings (173 housing units) and 27.5 acres of single family dwellings (239 housing units). In addition to the residential units, the master plan calls for a 4.94 acre area set aside for public-quasi-public use, as well as two (2) park sites consisting of 2.83 acres and 2.08 acres and a 4.0 acre drainage detention pond. Access to the proposed development is anticipated to extend off of both Fifth Avenue and from Ninth Avenue through currently undeveloped property. The specific project site, as described above, will hereafter be referred to as the project area.

1.2 Scope of Work

The suggested scope for the cultural impact assessment is summarized as follows:

1. Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plants, animal and other resources or agricultural pursuits as may be indicated in the historic record.
2. A review of the existing archaeological information pertaining to archaeological sited within the study area to reconstruct traditional land use activities and to identify and describe the cultural resources, practices, and beliefs associated with the parcel and identify present uses, if appropriate.
3. Interviews with persons knowledgeable about the past and present cultural practices in the project area and its surrounding area. We anticipate both formal and informal interviews.
4. Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report will assess the impact of the proposed undertaking on the cultural practices and features identified.

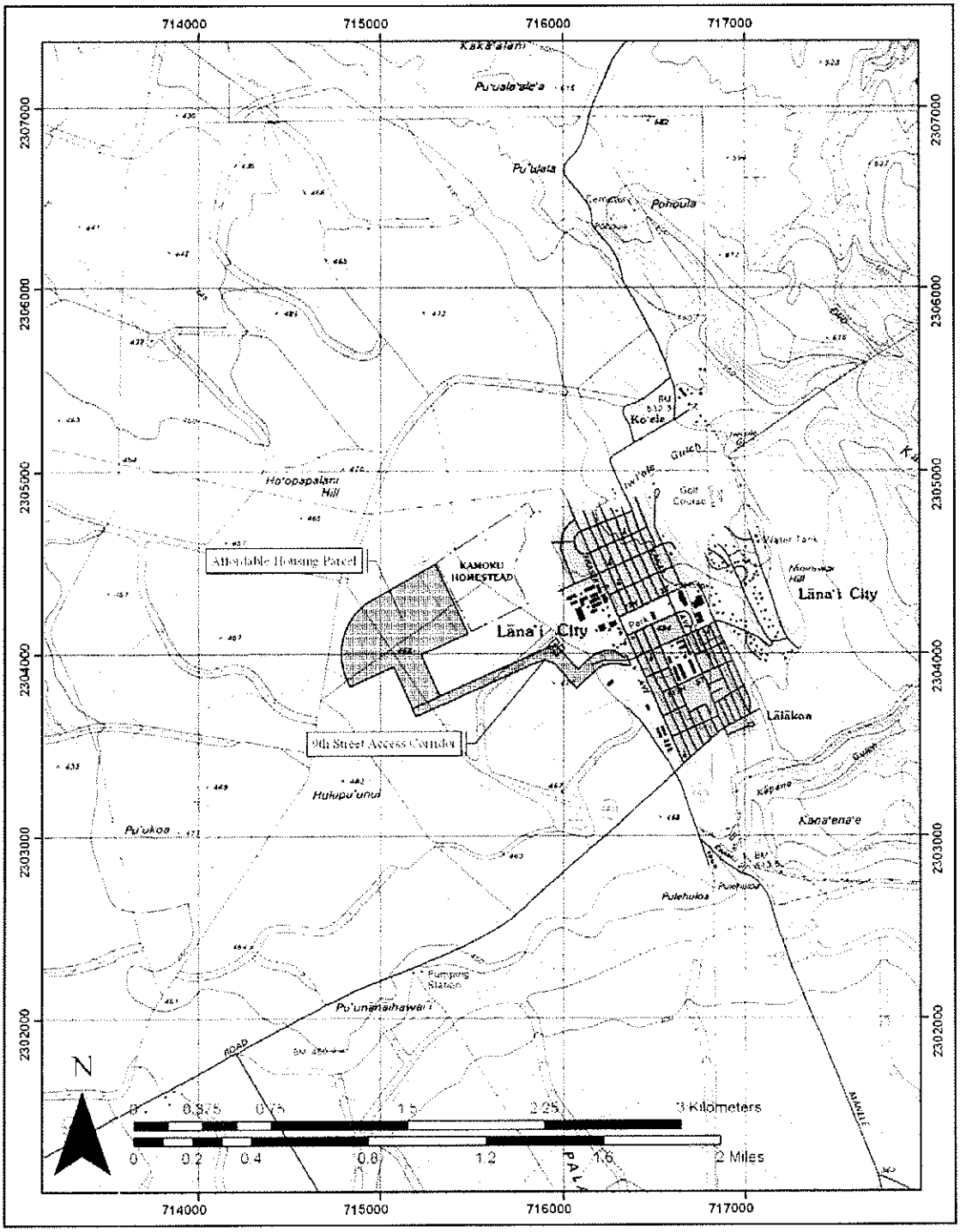

Figure 1. A portion of the 1998 South Lāna'i United States Geological Survey (U.S.G.S.) 7.5 minute topographic quadrangle showing the location of the current project area (shaded in black)

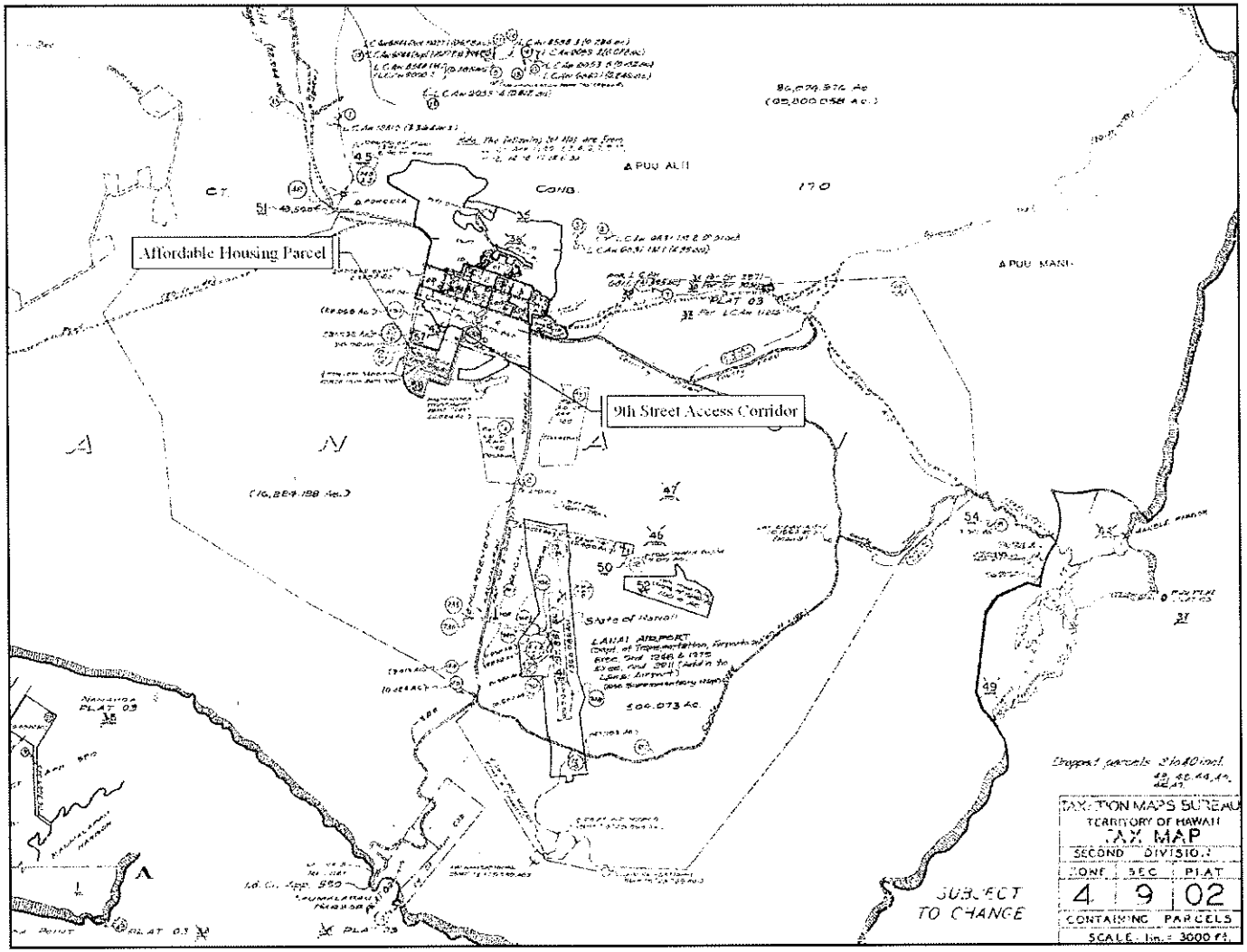

Figure 2. A portion of TMK 4-09-02 showing location of project area (shaded in red).

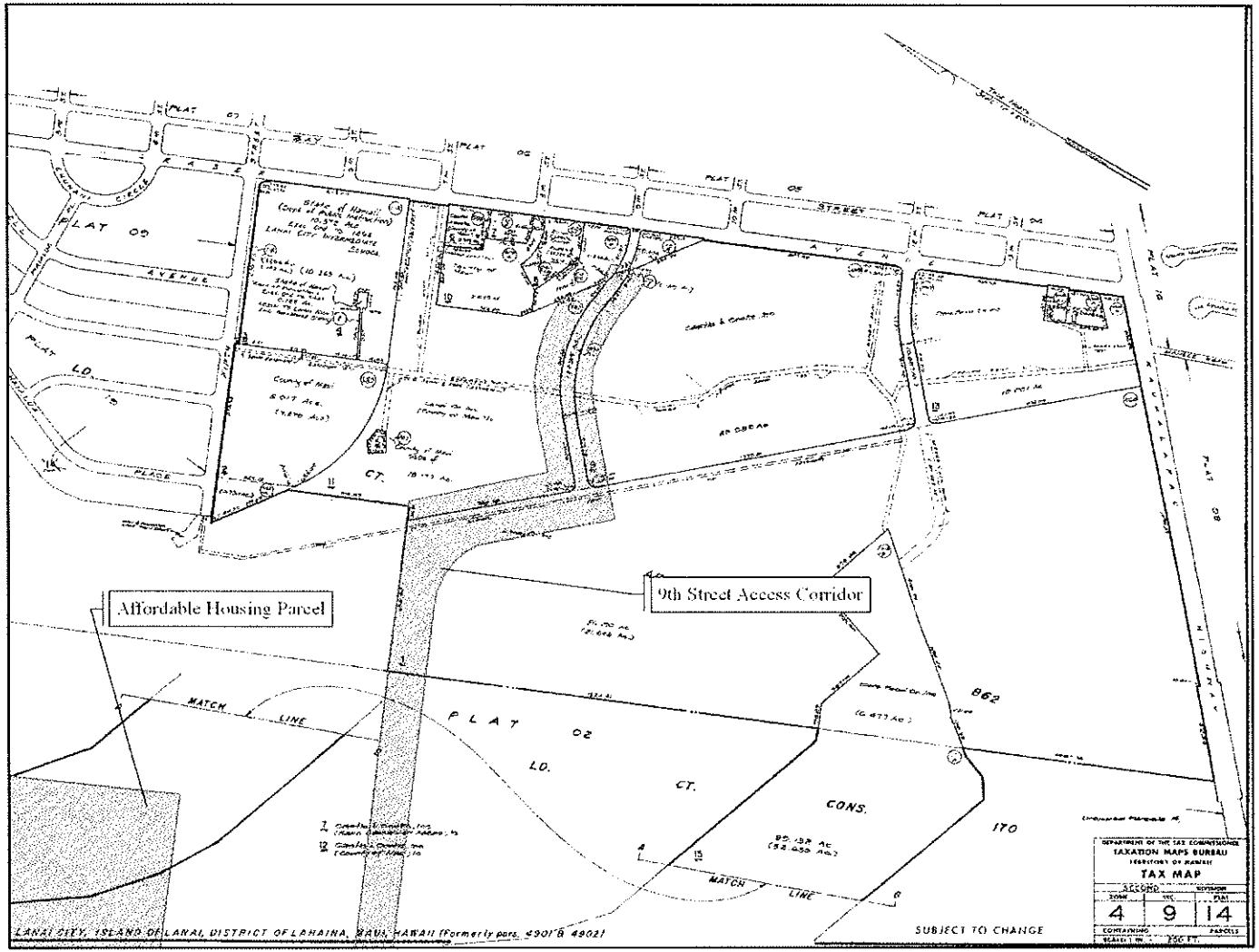

Figure 3. A portion of TMK 4-09-14 showing location of project area (shaded in red).

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is situated within the upper plateau region of Lāna'i island, just to the west of Lāna'i City. Elevation ranges between 460 to 480 feet above mean sea level (amsl). Temperatures in this upland region range between 60° and 80° F. The average annual rainfall in the area ranges from 25-35 inches (699-800 mm) with the heaviest rains in January and the lightest in June. The entire island lies in the dry rain shadow of the West Maui Mountains on Maui, leaving it without a wet windward side. Winds are consistent northeasterly trades.

The sediments of the area are of the Waihuna and Lahaina soil series. These series consists of well drained and moderately well drained soils on alluvial fans and in depressions in the former and upland environments in the latter. More specifically, the sediments within the project area are Waihuna clay (WoA), Lahaina silty clay with three to seven percent slopes (LaB), Lahaina silty clay with zero to three percent slopes (LaA), and Lahaina silty clay with seven to 15 percent slopes (LaC). WoA soils, the most extensive soil in the series and within the current project area is represented by a surface layer that is about 34 cm thick and underlain by relatively soft, weathered pebbles and stones. This soil is strongly acid in the surface layer due to pineapple cultivation (Foote et al. 1972:129).

LaB soils are found on smooth uplands where cobblestones are common on the surface, permeability is moderate, runoff is slow, and the erosion hazard is slight (Foote et al. 1972:78). A representative profile shows that the first 15 inches consist of a reddish-brown, silty clay followed by a 45 inch thick subsoil of dusky-red and dark reddish brown subangular block silty clay and silty clay loam overlying soft, weathered basic igneous rock (Foote et al. 1972:78). LaB soils were used primarily for sugarcane and pineapple with small acreage used for truck crops, pasture, and home sites (Foote et al. 1972:79).

Vegetation within Lāna'i City is dominated by plantings of Cook pine trees (*Araucaria columnaris)* and Norfolk Island pine trees (*Araucaria heterophylla*). These trees were introduced in the 1920's by naturalist George Munro, when the Pālāwai Basin began to be cultivated in pineapple and the master plan for housing the pineapple plantation laborers involved the layout for Lāna'i City (Taylor 1976). Most all other vegetation in the region of Lāna'i City is imported landscape and ornamental, with various non-native plant species, such as *ti* (*Cordyline fruticosa*) evident in the yards of most retail establishments and residences. The dominant plant species within the previously cultivated pineapple field of the project area consist of a dense growth of Lantana (*Lantana camara*) and low-growing or "scrubby" Christmas Berry (*Schinus terebinthifolius*) trees. Also present within the project area are Guinea grass, Balloon plant (*Asclepias physocarpus*), 'Uhaloa (*Waltheria indica uhaloa*), Milk Thistle (*Silybum marianum*), and sourgrass (*Digitaria inslularis*).

The landscape of the project area has been heavily modified by intensive agricultural practices. Aside from the city-wide plantings of pine trees, the northern slopes leading toward Kō'ele are also planted in introduced eucalyptus (*Eucalyptus robusta* being dominant), silver oak (*Grevillea robusta*), and various fruit trees, such as mango (*Mangifera indica*) and papaya (*Carica papaya*) (H.E.A.R. 2008). Small stands of native *kukui* (*Aleurites moluccana*) are

present.

1.3.2 Built Environment

Overall development surrounding the project area is nominal as the majority of the area is fallow pineapple fields. The primary feature of the built environment near the residential parcel consists entirely of the Hawaiian Homestead turn-key lots to the northeast, while the upper portion of the Ninth Street Access route borders Lāna'i City off of Fraser Avenue and extends into former pineapple fields to the south and west.

Section 2 Methods

This section details the methods used by CSH personnel during the fieldwork and preparation of this cultural impact assessment. Interviews and consultation were conducted by lead researcher Colleen Medeiros Dagan, B.S., and contributing researchers Anna Cordova, B.A. and Tanya L. Lee-Greig, M.A., under the overall guidance of Hallett H. Hammatt, Ph.D. Formal interviews and community consultations were accomplished over a three month period from March 2009 to June 2009. Document research was conducted by the researchers named above with contributions from Robert H. Hill, B.A.

2.1 Document Review and Research

Numerous published and unpublished accounts, surveys, reports, maps and photographs found in public and private collections pertaining to Lāna'i City and the study area were investigated by Cultural Surveys Hawai'i Inc. English language historical documents, maps, and archaeological studies were researched at the DLNR/SHPD library, the Survey Office of the Department of Accounting and General Services (DAGS), the Maui County Planning Department, and the Cultural Surveys Hawai'i (CSH) library, in addition to private collections held by others in the community. Research regarding the history of the Hawaiian Pineapple Company was conducted using the services of the Bailey House Museum, in Wailuku, Maui. Online research regarding the past and present cultural landscape of Lāna'i Island by Kepā Maly and the online resources of the Lāna'i Culture and Heritage Center (Maly 2009) were utilized for current information regarding the traditional history of the island. In addition, all relevant Land Commission Awards (LCA) and Royal Patents were researched using resources associated with the Waihona 'Aina online database (Waihona 'Aina Corp. 2002) and the Lāna'i Culture and Heritage Center website (Maly 2009).

2.2 Scoping and Community Outreach

2.2.1 Government Agencies, Advisory Councils and Local Community Organizations

In order to identify individuals with knowledge of the traditional cultural practices in the study area for the proposed project, CSH initiated contact with government agencies, advisory councils, and local community organizations (Section 5). Letters and project area maps showing the location of the Lāna'i Affordable Housing Project were mailed out with the following accompanying text:

> At the request of Planner Munekiyo & Hiraga, Inc., Cultural Surveys Hawai'i Inc. (CSH), a Hawai'i-based archaeological company, is conducting a Cultural Impact Assessment (CIA) for the Lāna'i City Affordable Housing Project. The subject project site is located in Lāna'i City south of the Department of Hawaiian Home Lands parcel. It is currently part of a 115 acre parcel owned by the County of Maui that is in the process of being subdivided into two parcels. The proposed Lot A-1 is the 73 acre parcel that has been donated by the County for the affordable housing project. The remaining 42 acres, proposed Lot A-2, has been donated by the County to the Department of Education (DOE) for the expansion of the Lāna'i

High School and Elementary School. The master plan for the 42 acres that have been donated to the DOE is being developed independently of the 73 acre affordable housing project.

The 73 acre affordable housing site is bounded on the northeast by the Department of Hawaiian Home Lands parcel and on the south by fallow pineapple lands. The proposed lot A-2 is located east of the subject parcel. Two proposed road extensions will also be constructed as part of the project, one extension from Fifth Avenue and another from Ninth Avenue. These roadway extensions would provide access to the subject property.

The preliminary master plan designates approximately 12 acres for multi-family use and 29 acres for single family use. A total of 387 estimated housing units would be provided, 144 utilized for multi-family type residences and 243 units for single family use. Also included in this project is an eight acre area for public-quasi-public use, as well as a three acre park and drainage retention basin. (It is noted that a community input process is being developed which may yield a planning spatial layout different from that shown in.

The region of influence (ROI), hereafter referred to as the "study area", will include the *ahupua'a* of Kamoku which incorporates the proposed 73-acre Lāna'i City Affordable Housing Project site. If, throughout the course of research, CSH identifies traditional cultural practices significant to the study area that are outside the above described boundaries, CSH will include research of those areas.

The purpose of the cultural impact assessment is to identify and evaluate any potential impacts to traditional cultural practices occurring within the ROI that may result from the proposed project.

We are seeking your *kōkua* or help and guidance regarding the following aspects of our study:

General history and present and past land use of the study area.

Knowledge of cultural resources within the project area which may be impacted, including traditional plant gathering sites, historic sites, archaeological sites, and burials.

Knowledge of traditional gathering practices in the area – both past and ongoing.

Cultural associations of the project area, such as legends and traditional uses.

Referrals of *kūpuna* or elders who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua'a* lands.

Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of Lāna'i City or the greater Kamoku Ahupua'a.

I invite you to contact me, Colleen Medeiros Dagan B.S., at 1-808-242-9882. You may also contact me by e-mail at edagan@culturalsurveys.com if you have any information or *mana'o* that you are willing to share.

Mahalo,

Colleen Medeiros Dagan, Archaeologist

Section 3 Background Research

The division of Lāna'i's lands into political districts may have occurred under the direction of the chiefs of Maui, as Lāna'i historically appeared to be "subject or tributary to Maui" during the times of Kamalalawalu (about 1550-1600 AD) (Fornander 1919 Part I: 206-8). The island was apportioned into the following thirteen *ahupua'a* land divisions that were established during traditional times: Ka'ā, Kamoku, Kalulu, Kaunolū, Keāliakapu, Keāliaaupuni, Pālāwai, Kāma'o, Ka'ohai, Pawili, Maunalei, Mahana, and Paoma'i. Unlike *ahupua'a* divisions of the other seven major islands of the Hawaiian chain, three of the thirteen *ahupua'a* divisions on Lāna'i Island have the unique characteristic of traversing across the island from one coastline to the other (Hawai'i Department of Survey 1903:66; Figure 4). The current project area is located along the upper plateau of Kamoku Ahupua'a within the *mokupuni* of Lāna'i (Moffat and Fitzpatrick 1995:23).

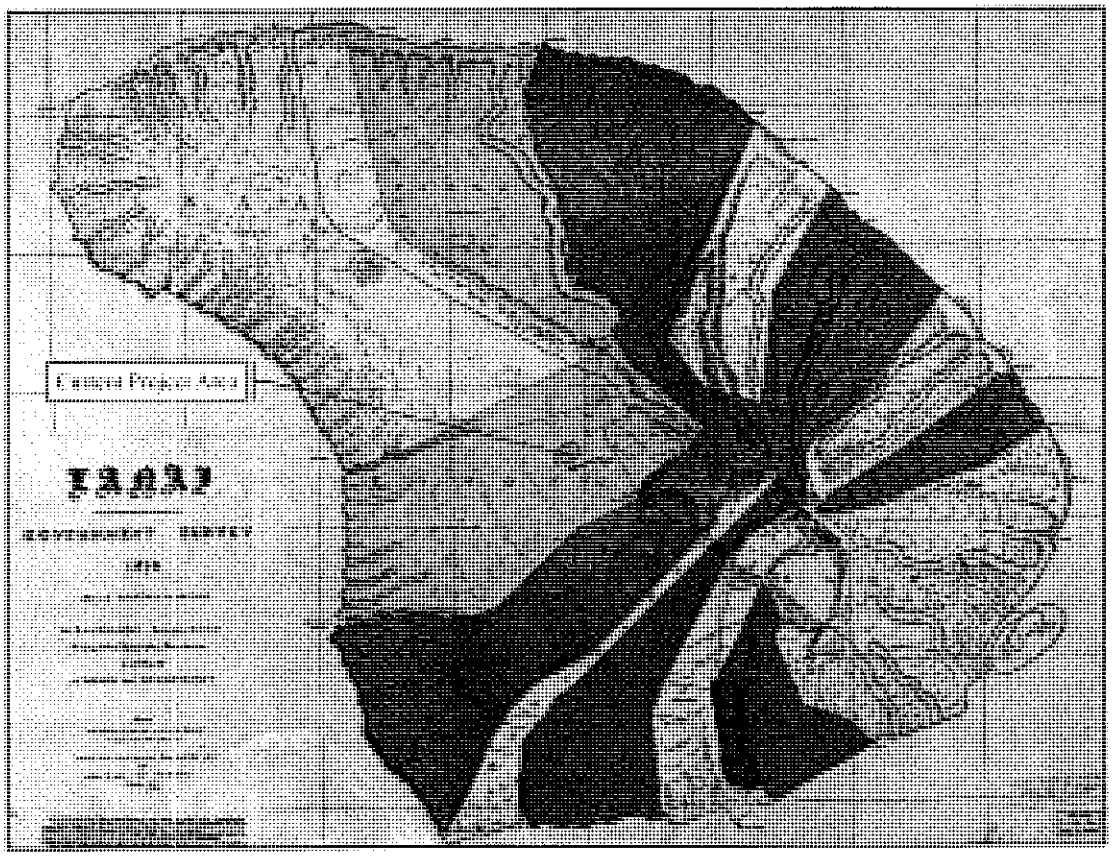

Figure 4. The J. F. Brown and M. D. Monsarrat map (1878) showing Kamoku Ahupua'a as a traditional land division of the island of Lāna'i (crown land in yellow, government lands in green).

The *ahupua'a* of Kamoku is representative of the traditional *ahupua'a* formation from ocean to mountain and includes 8,291 acres of the western portion of Lāna'i from the shoreline upslope to the base of the high northwest to southeast trending ridge crest of the island. The following

description of Kamoku Ahupua'a was presented to the U.S. Government in Part 3 of the *Hawaiian Investigation* to the U.S. Senate Committee on Pacific Islands and Porto Rico [sic] (1903:1340):

> The ahupua'a of Kamoku on this island is a large and valuable tract extending from the sea to the top of the mountain ridge where a good supply of drinking water from a spring is obtained not far from the Gibson homestead. The government road crosses the land a short distance below the homestead. From this point commences a beautiful stretch of country extending for miles around. The soil is very rich and is capable of producing large crops of corn and potatoes.

3.1 Traditional and Historical Background

The most comprehensive summary of traditional accounts pertaining to the "formation of Lāna'i, first habitation, general traditions, early history and place names" appears in Kenneth P. Emory's *The Island of Lāna'i: A Survey of Native Culture* (1924). Emory suggests through "genealogies and traditions" that Lāna'i "began to be populated by important numbers about 1400 A.D." (Emory 1924:123). Based on the number of house sites he observed and approximately five persons per household (Figure 5), Emory estimated the pre-1778 population of the island at 3,150 (1924:122). The traditional life style focused on subsistence farming and fishing within the context of the *ahupua'a* or traditional land unit that extended from the coastal reaches to the upland resources.

3.1.1 Mythological and Traditional Accounts

3.1.1.1 The Story of the 'Ōhelo

The "Story of the *'Ōhelo*", as translated from the original Hawaiian by Abraham Fornander (1919), describes the origin of the sacred offering of *'ōhelo* to the goddess Pele, and the importance of Lāna'i Island in the telling of the story. According to Fornander, the many sisters of Pele followed her east from Tahiti across the Pacific Ocean. As Malulani, Kaohelo, Hi'iaka, and Pele arrived at the Hawaiian Islands, Malulani choose Lāna'i to dwell on, while Pele, Kaohelo, and her younger sisters traveled on to the island of Hawai'i.

Kaohelo had a son named Kiha, who was given instructions by Kaohelo as she neared death where she should be buried. "Take my body to the very navel of your grandmother, right on top of Kīlauea; then bury me there." This her son did. The flesh of Kaohelo became the creeping vine and her bones became the bush-plant of the *'ōhelo*. Her head was treasured by Pele as the smoldering fire of Kīlauea. The remainder of her body brought volcanic fire to Haleakalā on Maui, Keālia on Oahu, and also to Kaua'i.

When Malulani, living on Lāna'i, heard of the death of their youngest sister, she went to Hawai'i to retrieve her body, but found that small pieces of her body were strewn across the landscape sprouting into vines and bushes of the *'ōhelo*. She gathered as much of her sister's remains as she could, but upon returning to Lāna'i, was surprised to find the pieces of Kaohelo's body had been strung as leis and worn as adornment. Saddened by this, Malulani died.

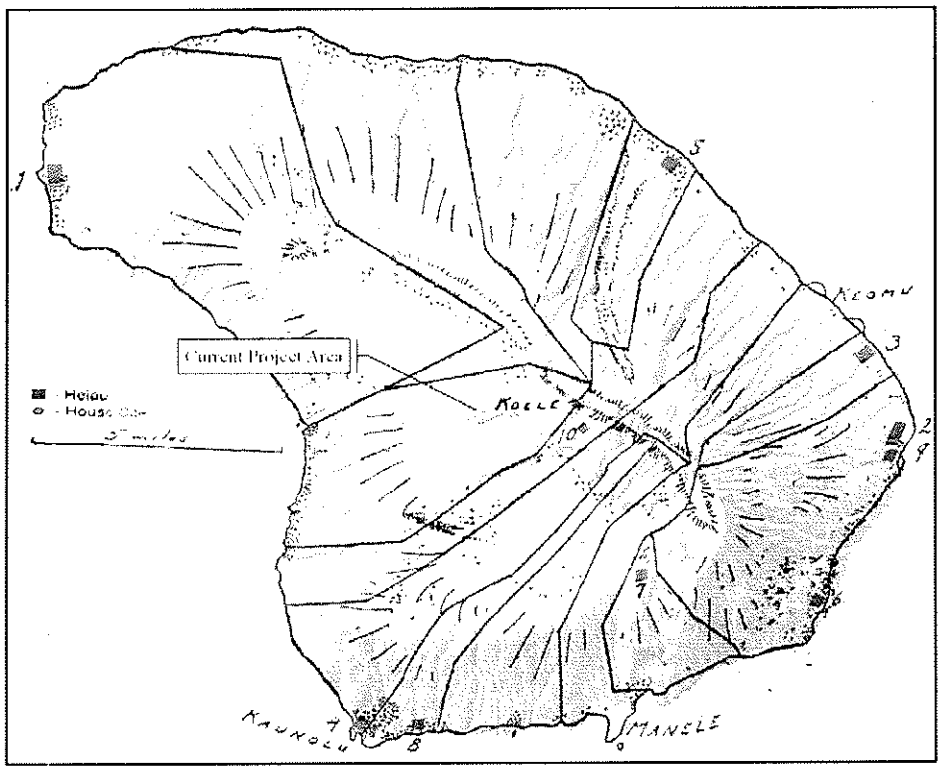

Figure 5. Map of Lāna'i showing *ahupua'a* and the distribution of house sites and *heiau* known to Kenneth Emory in 1921 in relation to the current project area (green dots represent visible house sites, rectangles correspond to *heiau* locations, and the numeric reference ranks the *heiau* [brown rectangles] according to size). (Emory 1924:49)

Hi'iaka then came to Lāna'i to recover the body of Malulani, whereupon small bundles containing her remains were scattered across the island of Hawai'i, causing small hills and islets to remain to this day. In this way, the island of Lāna'i is part of the legend of how the *'ōhelo* came to be spread across the islands of Hawai'i, and why the *'ōhelo* is the special sacred offering to Pele (Fornander 1919, V, III: 576-580).

3.1.1.2 The Ghosts of Lāna'i

The northern coastal place name of Laewahie refers to the point on Lāna'i where Kaululā'au built a signal fire to the people of Lahaina. Fornander (1918:542) recorded the story of Kaka'alaneo, the chief of all of West Maui. His son, Kaululā'au, grew up as a boy involved in great mischief. Because he uprooted the sacred breadfruit grove of Lahaina, his father had no choice but to banish his son to the uninhabited island of Lāna'i. At that time, Lāna'i was the abode of ghosts, and Kaululā'au was sent there to be killed by them. Tabrah (1976) notes the many tricks the ghosts tried to use to murder Kaululā'au, and her account identifies Naha, located in the *ahupua'a* of Kaohai, as the location of the signal fire to the people of Lahaina after he had defeated all of the ghosts of the island (the literal translation of Kaohai is "firebrand.") Kalākaua (1888:212, 230) records the legend of Kaululā'au conquering the ghosts of Lāna'i in two separate stories, one of which details his fight with the *Mo'oaleo*, a lizard god of the island

as the most difficult of the ghosts to overcome. He does not give the location of the signal fire used by Kaululā'au. (There is a village named Kaululā'au on the coast of Pawili Ahupua'a.) The legend ends with Kaululā'au being reunited with his father, mending his mischievous ways, and opening the island of Lāna'i for settlement

3.1.1.3 Traditional Hawaiian Habitation and Subsistence of the Lāna'i Central Plateau

In terms of place names and people that may be related to mythological and traditional accounts for Lāna'i, Tomonari-Tuggle and others (2000:23) note that there are no known royal genealogies that are preserved and only a few of the names of Lāna'i chiefs are mentioned in the traditions that are available in translation. Literal translations of several of the place names for land areas near to the project area are listed below (see alsoFigure 6). Most all translations are taken from Emory (1924) and supplemented by Pukui and others (1974) where appropriate:

Table 1. Place Names Near the Proposed Affordable Housing Project

Hokuao	Morning star (Emory 1924:29)
Hulupu'uniu	Whirling feather hill (Emory 1924:30)
Iwiole	*Lit.,* fang bone. Type of adze (Pukui and Elbert 1986). Emory (1924a) notes the name of the upper valley of Iwiole is called Kaiholena. Iwiole is located just east of Lāna'i City.
Kaiholena	The *iholena* banana (Emory 1924:31)
Kamoku	*Lit.,* the district or the cut-off portion (Pukui et al. 1976:82); the piece cut off (Emory 1924:31)/
Kaumaikahoku	The stars are out (Emory 1924:32)
Keaaku	The standing root (Emory 1924:32)
Kihamānienie (Kihamāniania)	According to Emory (1924a), the site of the protestant church, built in 1851. Emory stated that the "smooth hill covered in *maniania* grass" was the origin of the place name. According to Pukui and Elbert (1986), *mānienie 'ula* (golden beardgrass, or *Chrysopogon aciculatus*), is the upland grass found in the region of the church.
Kō'ele	*Lit.,* dark sugar cane (Pukui et al. 1976:114); Place seized by a chief (Emory 1924:33)
Makapaia	Enclosed eyes (Emory 1924:34)
Nininiwai Hill	*Lit.,* pour water (Pukui et al 1976). The region of northeastern Lāna'i City, according to Emory 1924a), and site of a reservoir.
Pu'ukoa	*Lit.,* koa tree hill (Pukui et al. 1976). Emory (1924a) shows this hill in the plateau of Kamoku.

Pu'u Nana o Hawai'i	Hill to view Hawai'i (Emory 1924:36)
Pu'u Nēnē	Land section of Lāna'i. *Lit.*, goose hill (Pukui et al. 1976). Emory (1924a) cites two locations, one just above Kō'ele in Kamoku Ahupua'a, and one on a promontory in Ka'ōhai Ahupua'a
Pulehuloa (Pu'ulehuloa)	Big roasting (Emory 1924:36)

Hawaiian place names typically tell the story or significance of an area. Three place names near the project area may give some insight as to how this place was utilized in traditional times. These place names include Hōkūau, Kaumaikahōkū, Pu'u nānā i Hawai'i.

Hōkūau is located east of the proposed affordable housing project location. Hōkūau translated means "morning star" and is located on plateau lands (Emory 1924: 29). It is further described as the name given to Venus when seen in the morning (Elbert and Pukui 1986:76). Possibly, this was a good spot from which to view Venus just before dawn. Kaumaikahōkū is located approximately one half mile south of Lāna'i City. Its name means "The stars are out". Emory notes that this name describes the normally cloudless skies above this place (1924: 32). Approximately two miles west of Kaumaikahōkū, is Pu'u nānā i Hawai'i. This would be the "Hill to view Hawai'i (Emory 1924:36). From this place, it appears that one might have a view of Hawai'i to the southeast. These three place names seem to indicate that these specific upland areas were excellent viewing vantage points.

The above place names, together with the environmental data, suggest that the lands of the central plateau basin were productive agriculturally and of great traditional significance. Prior to Polynesian settlement, the current project area was probably below the fringe of the native Hawaiian forest. Even in the early 1900s, vestiges of this forest could still be seen. "Most of the lands along the upper portion of the island were those above the 1,000 ft. elevation, as evidenced by the presence of dead tree skeletons along this elevation and above" (Gay, 1965:51). Clearing of this forest was undoubtedly initiated by traditional Polynesian agriculturists. In Emory's 1920 survey of Lāna'i, he did not observe any house sites within the project area but noted that the upper plateau lands were utilized intensively for agriculture (see also Figure 5).

In this region of Lāna'i, gulches, ridges, hilltops and other terrestrial landmarks were given descriptive names, some referring to heroic characters of Hawaiian mythology, and others suggestive of actions which could be accomplished (i.e., the sighting of the island of Hawai'i) from its' promontory. The upland plateau region was likely of great importance, both in terms of habitation and subsistence during the traditional or pre-contact time period, as well as an area somewhat sheltered from coastal raiding parties from other islands.

Emory (1924a: 122) estimated the aboriginal population of Lāna'i as about 3,150 prior to 1778. He stated that the inhabitants of Lāna'i survived by collecting dew on "oiled *tapas* or whipped from heavy shrubbery." Water that accumulated in natural depressions was husbanded carefully, and a few wells were dug along the coast and were "plastered on the seaward side with mud and straw" to stop the infiltration of sea water. Emory stated that the water derived from these wells was brackish, but usable by the Hawaiians because they had become accustomed to

the salinity. He further postulated that survival along the leeward coastline also depended on Hawaiians visiting small springs in the distant hills, and carrying water in gourds back to the coast.

Early historical accounts of Lāna'i attest to the general barrenness and small population (Ellis 1963, Menzies 1920). However, in 1779 Capt. King of the Cook expedition related that Lāna'i "appeared to be well inhabited" and "that it abounds in roots such as yams, sweet potatoes and tarrow" (Emory 1924:6). Emory deduced that the differences in these early descriptions were probably due to the devastating raid on Lāna'i and Kaho'olawe by Kalani'ōpu'u. The *ahupua'a* of Kamoku figures prominently in the recollections of this raid. S.M. Kamakau writes:

> During Kalani'ōpu'u's occupancy of Lāna'i, the food ran out, and the men had to eat the root of a wild plant called *kūpala*, this had a loosening effect upon the bowels when eaten in quantity. The war is therefore called "The-land-of-loose-bowels (Kamoku-Hī)" and it is a war still talked of [circa 1866] among the descendants on Lāna'i (Kamakau 1992:91).

Kamoku refers to the *ahupua'a* where the *kūpala* grew thick, and *Hī* refers to a form of dysentery/diarrhea that could result from eating too much *kūpala*. "*Kūpala*" may refer to a variety of famine foods such as an endemic cucurbit (*Sicyos pachycarpus*), and a wild sweet potato or morning glory (Pukui and Elbert 1984:170).

Another explanation of the name of the district "Kamoku - the piece cut off" suggested to Emory that the etymology and history of a similarly named *ahupua'a* in the Hamakua district of the Big Island. In Hamakua C.J. Lyons (Emory 1969:31) recorded an *ahupua'a* named Kamoku that was once cut off from a number of *ahupua'a* for the use of the whole district, hence its name.

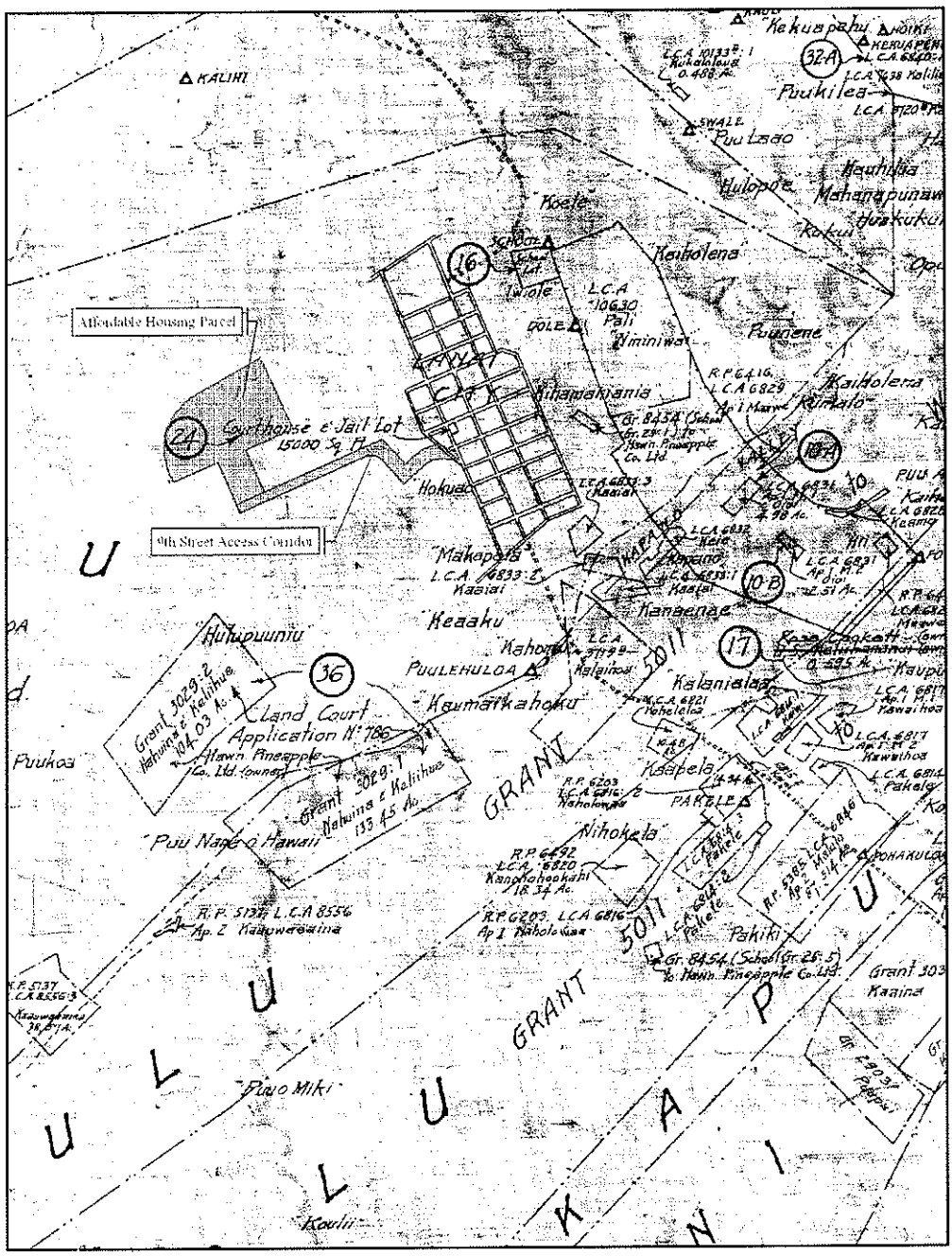

Figure 6. Hawaiian Pineapple Company, Ltd. (1929) survey map showing, place names, areas of Land Commission Awards, and development of Lāna'i City relative to the current project area.

3.1.2 Early Historic Period

Specific events for this time period within the project vicinity are difficult to pinpoint but several significant events for the island as a whole are noteworthy. Lāna'i was first seen by Captain James Cook during his voyage to the Sandwich Islands in January and February of 1779. The expedition had returned to the Hawaiian Islands in order to resupply following many months of mapping the west coast of America (Ellis 1963). William Ellis, Assistant Surgeon to the expedition, noted the first time that the ships *HMS Resolution* and *Discovery* sighted "*Aranni*" [Lāna'i], as the ships made their way past "Kaaowr'vee [Kaho'olawe] nearly adjoining to Mow'whee" in 1779. It was during this voyage that Ellis went on to describe Lāna'i as an island under the dominion of the king of Maui (Ellis 1969: Vol. 2, 187). Kamehameha conquered O'ahu and Maui in 1795 and soon unified all of the Hawaiian Islands. In 1798, he returned to Lāna'i to make a summer residence at Kaunolū. The sandalwood trade began in 1810 and by the early to mid 1800s there was an increased reliance on western technology, supplies, and commerce which had a dramatic economic impact across the islands. With the death of Kamehameha in 1819 and the arrival of western missionaries in 1820, Hawai'i experienced dramatic changes. Western influence brought increased ship traffic to Lāna'i and in 1826, the American ship "London" was wrecked on Lāna'i but was rescued by an American military schooner (Ashford 1974:18). Between 1830 and 1842 there was a women's penal colony established on Lāna'i at Kaena and a male penal colony was established on Kaho'olawe.

Table 2 provides census data adapted from Emory (1924) and Schmitt (1973) for different time periods. While, population stability is suggested during 1832 and 1836, the trend shows a steady population decline for Lāna'i that follows similar trends on the other Hawaiian Islands.

Table 2. Population Estimates for Lāna'i from Various Time Periods

Emory estimate (pre-1778)	Missionary estimate (1823)	Missionary census (1832)	Missionary census (1836)	Official census (1850)
3,000	**2500**	**1600**	**1200**	**604**

It is perhaps noteworthy that during the early Historic Period, there appear to be some discrepancies in historical accounts of the physical descriptions of Lāna'i. Captain King's description previously presented indicates that the island had every appearance of being agriculturally productive and well populated. However, by 1792, Archibald Menzies, who was the surgeon attached to the Vancouver Expedition, described Lāna'i as follows:

> ...observing the state and naked appearance of the island which seemed thinly covered with shriveled grass in a scorched state. No hamlets or plantations were to be seen, no trees or bushes adorned the face of the country, which swelled out gradually to a moderate height, so that we have reason to think that the island is but very thinly inhabited (Menzies 1920).

Emory (1924) suggested that the dramatic differences portrayed in these descriptions may be attributed to the effects of Kalani'ōpu'u's raid. Fornander (1996:156) states that

Kalani'ōpu'u "ravaged the island thoroughly." Kamakau's account of Kalani'ōpu'u's men having to resort to eating *kūpala* would seem to support this theory.

3.1.3 Mid- to late-1800s

In 1848, the Mahele initiated extreme social, economic, and political changes within traditional Hawaiian culture on all of the islands. The Mahele resulted in the division of lands according to a system of private ownership based on Western legal concepts. In the first phase of this process, Kamehameha III subdivided his lands among the highest *ali'i* (royalty) *konohiki* (chiefs), and some favored *haole* (foreigners). This process of redistribution severed the political and social relationships of the traditional system of land use (Moffatt and Fitzpatrick 1995:11). Following this change, *maka'āinana* (commoners) were then permitted to pursue legal title to and ownership of land they had cultivated and inhabited through a Land Commission Award, in addition to the outright purchase of other government lands. At the end of the Mahele, naturalized foreign citizens were given the right to purchase land in Hawai'i. The ultimate result of this decision placed more land in the hands of non-Hawaiians than native Hawaiians between the years of 1850 and 1865 (Moffat and Fitzpatrick 1995:51). In many cases, the purchases or leases to non-Hawaiians included entire *'ili* (a subdivision of an *ahupua'a*) or *ahupua'a* (land division usually extending from mountain to sea).

An additional aspect of the Mahele was the sale of land to naturalized foreigners. These changes in land tenure had a significant impact across the Hawaiian Islands. On Lāna'i, by the mid-1800s much of the upper plateau lands of Kamoku and adjacent *ahupua'a* had been become open *pili* grasslands. This is indicated in the native and foreign testimonies given during the mid-1800s as part of the Mahele and Kuleana Acts. The *ahupua'a* of Kamoku, in which the project area lies, was "omitted" (Interior Department Memos 1860-70s) at the time of the Mahele (1848) and was subsequently leased as government lands (ca. 1860) (Hammatt, et al. 1988:20).

Based on tax map keys, historic maps, a search of the Waihona 'Aina database (Waihona Aina 2000), and consultation with Mr. Kepa Maly of the Lāna'i Culture and Heritage Center and the Lāna'i Representative to the Maui County Cultural Resource Commission, there are few Land Commission Award records for lands within the uplands of Kamoku Ahupua'a near the current project area (Table 3). This scarcity is a possible result of the omission of the *ahupua'a* during the original division of lands. Examination of the Land Court Map of Lāna'i commissioned by Hawaiian Pineapple Company (1929; see also Figure 6) shows four Land Commission Awards (LCAs) in the upland area of Kamoku Ahupua'a, some of which have boundaries that cross into the *ahupua'a* of Kalulu. One of the awards went to Noa Pali, LCA# 10630 located *mauka* and northeast of the Lāna'i City and the current project area, who was the *konohiki* (headman) and school superintendent of Kamoku. In 1856, Noa Pali corresponded with the Minister of the Interior (under Kamehameha IV) requesting that Kamoku be sold to him because he had been living there since Kamehameha III had granted him the lands in 1841. At this time, there appears to have been confusion as to who owned the *ahupua'a* of Kamoku; however, by 1858 it appeared on a list of Crown Lands and Royal Domain of the Hawaiian Kingdom (Kingdom of Hawaii Legislative Assembly 1890:158). It is apparent that at the time of the Mahele, Pali was cultivating lands "all over" (Waihona 'Aina 2000) and was wanting to consolidate is holdings within a 112.25-acre area.

Table 3. Summary of Land Commission Awards (LCAs) identified within the upland areas of Kamoku Ahupua'a (Maly 2009).

LCA #	Claimant	Ahupua'a	Land Use
1063	Pali	Kamoku	Houselot=1; Sweet Potatoes=1; Bitter Melon/Gourd=1; Various Other Plants
03719B	Kalaihoa	Kamoku and Kalulu	Apana=1 (no description of land use provided)
6833:1-3	Kaaiai	Kamoku and Kalulu	Parcel 1 and 2 = Pili grass areas; Parcel 3=Houselot
85563:3	Kaauwaeaina	Kamoku and Kalulu, *ili* of Pueo	Planting section (*pauku* land)=1

In the 1860s Ahsee, a Chinese immigrant, procured a lease for lands within Kamoku to raise goats. Concurrently, Walter Murray Gibson arrived at the Pālāwai Basin Mormon Commune and ultimately gained control, through government leases, over most of Lāna'i, becoming Hawai'i's "Premier of Everything". During the 1880s, Gibson's Lanai Ranch eventually had up to 18,000 goats and 12,000 sheep that were permitted to forage freely, virtually denuding the island of vegetation and causing severe erosion problems.

In 1888, Gibson left the islands for California after a series of troubles as Prime Minister of Hawai'i. His interests in Lāna'i were left to his daughter Talula and her husband, Fredrick Hayselden, and from 1888 to 1902, the Hayseldens were essentially in charge of Lāna'i. At this time, Kō'ele was the sheep ranch center for the island. Tabrah (1976:79) noted that in 1898 there were 174 people on the island and approximately 50,000 sheep. In an effort to control erosion, eucalyptus, and Norfolk pine were planted at Kō'ele and thousands of acres across the island were planted in Bermuda grass (also see Maui County Council 1998).

Charles Gay bought up the Gibson holdings in 1902. The Gay family eventually bought virtually the entire island in fee simple. The ranch center was still at Kō'ele, the location where Gibson's headquarters had been moved in the 1870s. The Gays also successfully cultivated pineapples on Lāna'i, both at Keōmuku and Lālākoa. The Gay family went into considerable debt to get the island converted to fee simple ownership, and was unable to retain the vast holdings. The family was forced to liquidate all holdings, except some 600 acres.

3.1.4 1900s to Modern Era

The period from 1910 to 1922 represents a shift from primarily sheep to cattle ranching. From 1910 to 1917, the Lanai Company Ltd. downsized its sheep operations and eventually sold all of their holdings to Harry and Frank Baldwin. At this point in time, they successfully converted the island into a cattle ranching operation. At the height of this operation, the ranching center at Kō'ele had approximately thirty buildings that included: the ranch manager house, an office, a store, a bachelor's quarters, a blacksmith shop, additional residences, and stables (Maui County Council 1998).

Botanist J. M. Lydgate, visiting Lāna'i with an expedition to obtain rare specimens of trees and flowering plants, reported that 40 continuous years of livestock grazing had, "pretty well denuded [Lāna'i] of its forest cover; only on the summit of the island ridge was there a

somewhat moth-eaten mantle of it left, and only on the slopes of the higher ravines and the steep hillsides was that mantle really intact and undisturbed" (Lydgate 1920). Lydgate also reported the extinction of plant species observed on Lāna'i only four years prior: plants that had been documented by fellow botanist Horace Mann of Harvard University. Lydgate (1920) commented that, "the ravages of cattle, sheep and goats, as well as forest diseases, hastened the decadence of the indigenous forest [of Lāna'i]."

In 1922, the Baldwins sold their holdings on Lāna'i Island to the Hawaiian Pineapple Company (Figure 7) in order to finance a real estate transaction on the island of Maui (Maui County Council, Lāna'i Community Plan 1998:28). The construction of office buildings, warehouses, shops and dwellings for 250 workers and their families began immediately. By 1927, three thousand acres of the Pālāwai Basin had been planted in pineapple, the first construction phase to establish Lāna'i City had been finished (Figure 8), and a roadway linking the new piers at Kaumālapa'u with Lāna'i City had been paved (Freeman 1927). With the exception of the upper portion of the Ninth Street access corridor, the 1929 aerial photograph depicts the project area and surrounding lands heavily cultivated in commercial pineapple agriculture (Figure 9). The cultivation of pineapple on Lāna'i had become integral in Hawai'i supplying more than 90 percent of the world output of canned pineapple.

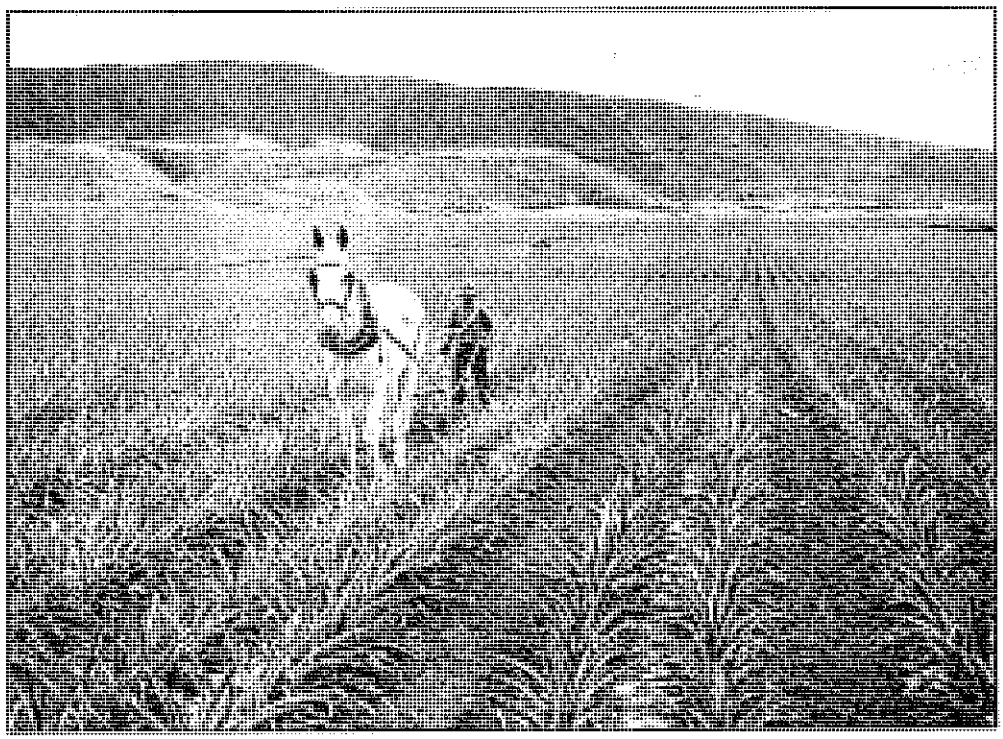

Figure 7. The plateau region of Lāna'i is visible in this early photo of pineapple cultivation on the island (*Paradise of the Pacific*, December 1936, Vol. 48, No. 12).

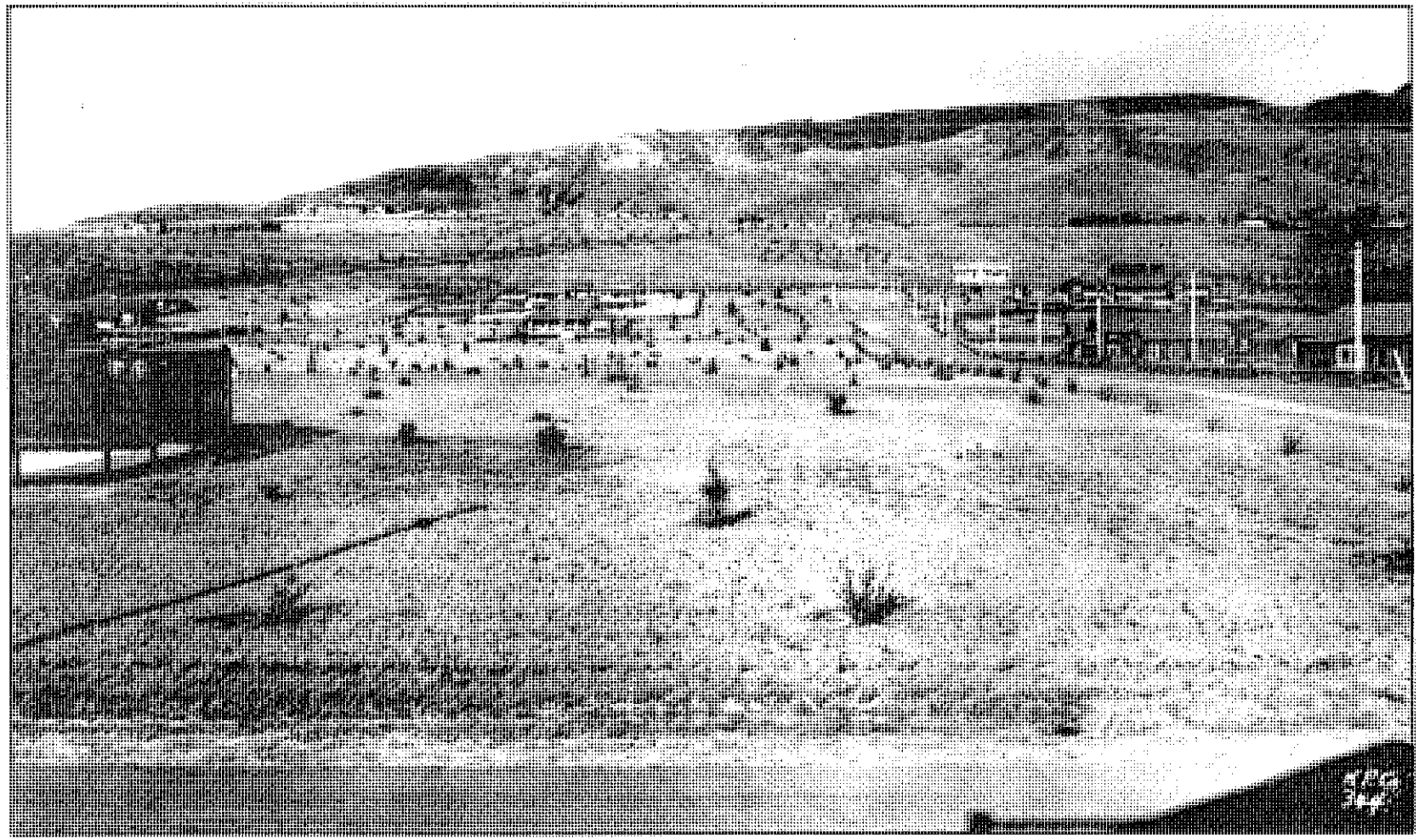

Figure 8. Dole Park circa 1923, following the acquisition of the island of Lāna'i by the Hawaiian Pineapple Company, and the subsequent construction of laborer and management housing. (Hawaiian Pineapple Company photo courtesy of Castle & Cooke Resorts LLC).

Figure 9. An aerial photograph of Lāna'i City dated 1929 the locations of Ninth Street and Fraser Avenue for reference, project area approximately located to the upper left of frame(aerial courtesy of Castle and Cooke Resorts, LLC.)

Harold T. Stearns traversed the island of Lāna'i between June and August of 1936, conducting studies of the geology and ground-water resources. He was assisted by personnel from the U.S. Geological Survey, completing hydrographic maps for the study. His work highlighted the explorations for ground water in Maunalei and at Kō'ele, to improve sources of drinking water, and for irrigation of the expanding fields of pineapple cultivated on the island (Stearns 1940). He reported that the westernmost slopes of the Pālāwai Basin of Lāna'i "[are] not sheltered by other islands on the southerly side, [and] *kona* storms are unobstructed. Heavy downpours during a single *kona* [southern exposure] storm commonly account for a considerable

part of the annual rainfall, and in some of the arid sections a single rain storm a single rain may contribute as much as 80 percent of the annual total" (Stearns 1940:65).

By 1939, the population of Lāna'i was reported at four thousand, with virtually all of the residents working to maintain the fifteen thousand acres of pineapple fields. The expansion of the market to accommodate Hawaiian pineapples occurred so rapidly, with so much success, that new machinery was quickly developed to take advantage of the gentle topography of Lāna'i (Mackie 1939). The long, flat fields could accommodate mechanical harvesters, which operated by straddling rows of pineapple plants, and moving slowly behind men who broke the ripe fruit off their stalks. Once aboard the harvester, pineapples had their crowns removed, were sorted for size, and crated. Pineapples picked in the morning on Lāna'i, about sixty miles from Honolulu, were barged to Honolulu, canned and ready for shipment by nightfall the same day (McClellan 1939).

In 1961, James D. Dole's pineapple land on Lāna'i was merged with the assets of Castle & Cooke, a prominent Hawai'i-based corporation. World-wide prices for pineapple continued to drop throughout the 1970's as competing countries supplied the market with cheaper pineapple. While pineapple cultivation continued on Lāna'i through the 1970s it is clear that some of the fields were starting to transition into fallow agricultural lands (Figure 10) and during the 1980's, Castle & Cooke began a long-term program to phase the island out of pineapple cultivation and expand tourism. In 1988, David Murdock, Chairman of Castle & Cooke, Inc., opened a resort hotel and companion championship golf course at Mānele Bay. A second resort hotel and golf course in the uplands of Kō'ele was opened in 1990. The final pineapple harvest and phasing out of all pineapple operations in 1993 (Boyd 1996) marked the end of an era for Lāna'i Island leaving much of the lands that were once in pineapple, including the current project area, open and fallow.

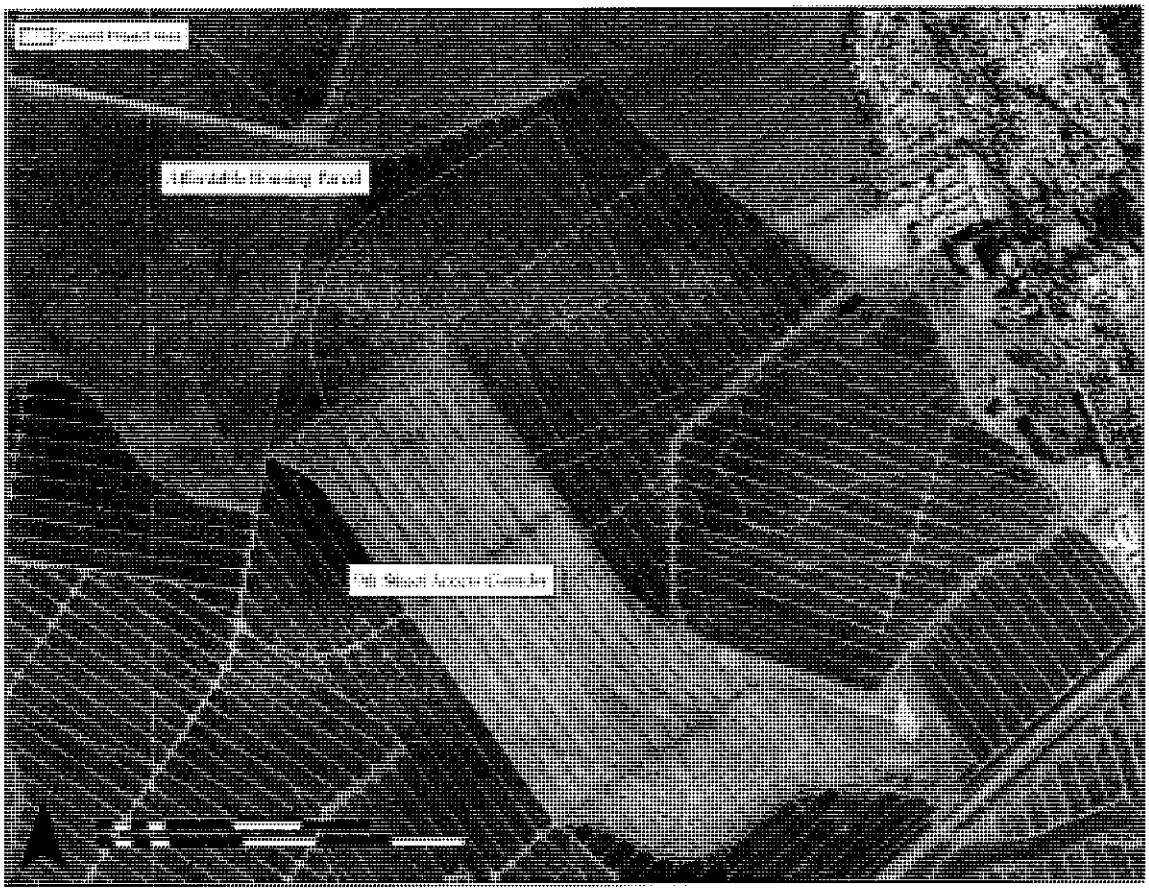

Figure 10. A portion of the 1979 USGS Orthophotoquad, Lanai City Quadrangle 7.5' Series showing the current project area (shaded in red) in relation to Fraser Avenue, Ninth Street, and lands being transitioned to fallow to the north and southwest.

Section 4 Archaeological Research

Archaeological studies that address the general history of Lāna'i, with specific mentions of the *ahupua'a* of Kamoku include: Emory (1924), the statewide survey of Lāna'i Island, Hommon (1974), Ahlo (1985), Nagata (1987), Walker and Haun (1987), Hammatt and others (1988), Hammatt and Borthwick (1988, 1989 and 1993), Hommon (1974), Borthwick and Hammatt (1989 and 1992), Borthwick and others (1990), Hammatt and others (1990), Hammatt and Chiogioji (1991), Colin and Hammatt (1996), Creed and others (2000), Raymond (2003), Hammatt and Schideler (2004), Dockall and others(2004), and Lee-Greig and Hammatt (2005).

Previous archaeological studies specific to upper plateau of Kamoku Ahupua'a are listed in Table 4 according to year and depicted on Figure 11 with an expanded explanation of studies conducted in the immediate vicinity of the current project area immediately following.

Table 4. Archaeological Studies within, and adjacent to, the outer limits of Lāna'i City.

Reference	Year	Location	Description
Emory	1924a	Island-Wide	Archaeological Reconnaissance: Island-wide survey that recorded house sites to the north of Kamoku Ahupua'a.
Hommon	1974	Island-Wide	Archaeological Inventory Survey: Kō'ele nominated as a historic district and assigned SIHP number 50-40-1004 which included three houses and one church.
Hammatt and Borthwick	1988	Lālākoa III Subdivision	Archaeological Inventory Survey: A scatter of various materials was observed and documented in a fallow pineapple field; historic era artifacts were observed but not collected; coarse-grained basalt fragments collected and determined to come from recently introduced road gravel; numerous fine-grained basalt flakes and basalt artifacts (one finished adze fragment, eight adze performs, a core, and thirteen retouched flakes) collected and determined to have been imported with road gravel from the Ko'i Adze quarry.
Hammatt et al.	1988	Kō'ele	Archaeological Data Recovery: Excavation and analysis of recovered ranch era historic material from two trash pits correlated with events during ranching era.
Borthwick and Hammatt	1989	Iwi'ole Dorms	Archaeological Reconnaissance: Observed basalt and volcanic flake scatters in a disturbed context within fallow pineapple fields.
Hammatt and Borthwick	1989	1) Kō'ele Golf Course; 2) Kō'ele Single Family Housing; 3) Queens Multi-Family Housing; 4) Waialua Annex Subdivision (Olopua Woods Subdivision)	Archaeological Reconnaissance: Reconnaissance of multiple areas: 1) Four historic ranching era features (three associated with the water system and a historic scatter from the Gay's Homestead), a volcanic glass source, and a lithic concentration were recorded. In addition, 28 lithic artifacts collected within the former pineapple fields in association with road gravel; 2) No historic properties identified; 3) A few basalt flakes encountered in a concentration of road gravel 4) A scatter of basalt flakes mixed with road gravel and modern cultural materials was observed on a fallow pineapple field dirt road and presumed to have been "mechanically transported".

Reference	Year	Location	Description
Hammatt and Borthwick	1990	Kō'ele Golf Course	Archaeological Inventory Survey: Survey of 100-acres behind the Kō'ele golf course. No historic properties identified.
Borthwick and Hammatt	1992	Proposed Kō'ele Reservoir	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Chiogioji	1992	Waialua Annex Subdivision	Archaeological Investigation and Monitoring: Previously recorded scatter was not relocated during sewer line installation likely due to grubbing activities.
Hammatt and Borthwick	1993	Sewerline from Kō'ele to Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Creed et al.	2000	DHHL Lots, Lāna'i City	Archaeological Inventory Survey: Encountered debris from firs Lāna'i Airport. No significant historic properties identified.
Raymond	2003	Lāna'ihale	Cultural Resource Investigations: Reconnaissance of the summit fenceline. No historic properties identified within the project APE.
Dockall et al.	2004	Behind Kō'ele Golf Course Clubhouse	Archaeological Inventory Survey: No historic properties identified.
Hammatt and Shideler	2004	Lower west slope of Niniwai Hill	Archaeological Inventory Survey: Documentation of Kihamanienie Church (Site 50-50-98-1946) and associated graveyard
Conley-Kapoi and Hammatt	2005	Lāna'i City	Archaeological Inventory Survey: No historic properties identified.
Lee-Greig and Hammatt	2005	Courts Affordable Multifamily Housing Development, Central Lāna'i City	Archaeological Field Inspection with Subsurface Testing: No historic properties identified.
Lee-Greig and Hammatt	2009 (in progress)	Lāna'i High and Elementary School Expansion	Archaeological Assessment: No historic properties identified.

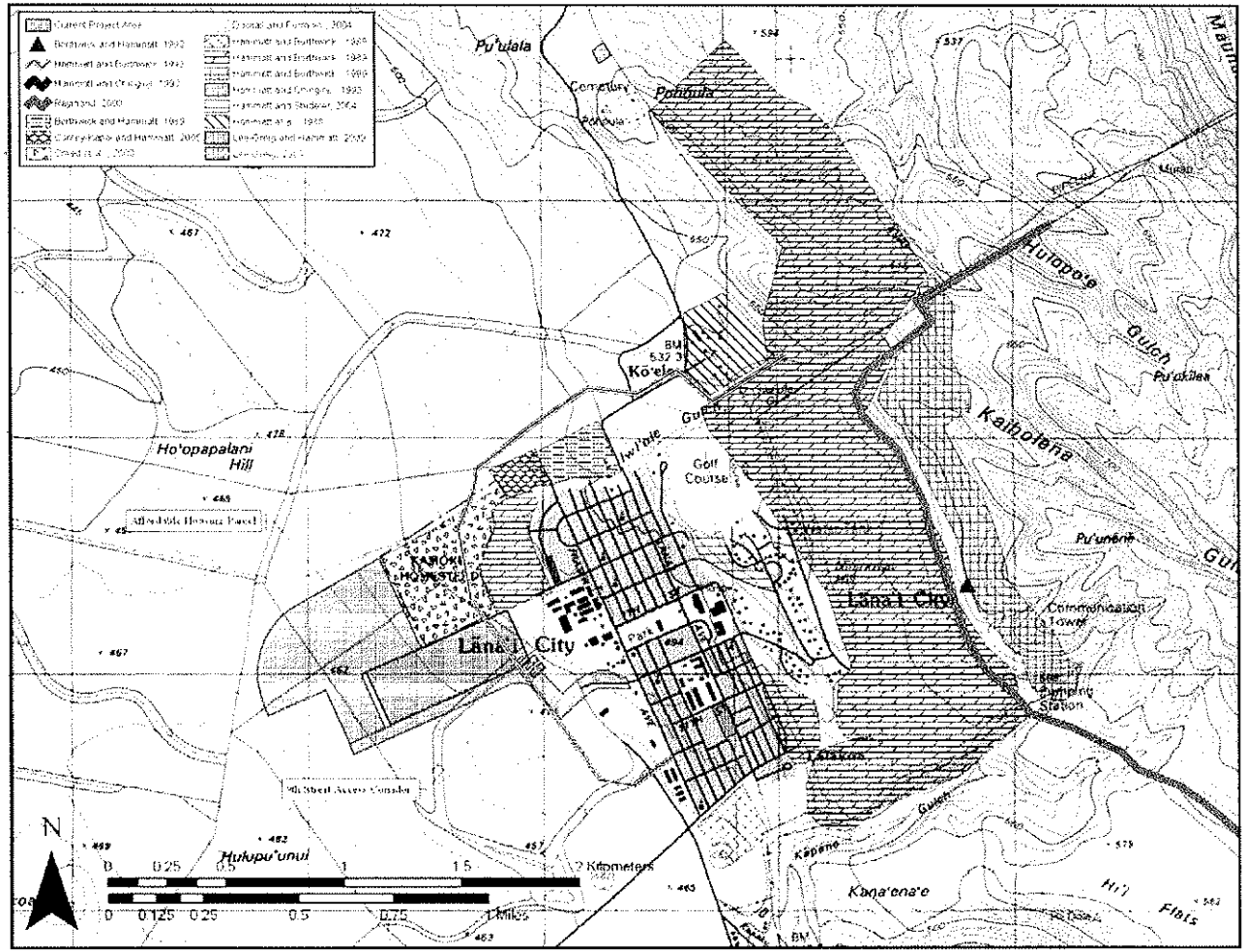

Figure 11. Portion of the South Lāna'i 7.5-minute U.S.G.S. topographic quadrangle showing the locations of previous archaeological investigations inrelation to the current project area.

Of the studies summarized in Table 4 above, four archaeological studies were carried out within and directly adjacent to the current project area. An archaeological reconnaissance was conducted of three areas consisting of the Kō'ele Golf Course; the Kō'ele Single Family Housing; the Queens Multi-Family; and the Waialua Annex Subdivision (currently known as the Olopua Woods Subdivision) (Hammatt and Borthwick 1989). Pertinent to this study is the reconnaissance of the planned 30-acre Waialua Annex Subdivision (Hammatt and Borthwick 1989:27). The pedestrian reconnaissance identified a single concentrated surface scatter of road gravels, modern trash (bottle glass and spent gun cartridges) intermixed with basalt flakes (Hammatt and Borthwick 1989:28). The presence of the scatter on the surface and mixed nature of the materials indicated that the scatter was a secondary deposit likely transported through mechanical means with the roadbed gravels (Hammatt and Borthwick 1989:28). Observations of the nearby Iwiole Gulch embankments clearly showed the pineapple plow zone ranging from 30-70 cm thick with black plastic fragments (Hammatt and Borthwick 1989:28). This range for the plow zone is consistent with soils documented during backhoe testing conducted for the expansion of the Kanepu'u Subdivision (Conley-Kapoi and Hammatt 2005; see also Figure 11).

In 1992, CSH conducted an investigation and archaeological monitoring of a short length of sewer line within the Waialua Annex Subdivision following the completion of the above reconnaissance (Hammatt and Chiogioji 1992). An inspection of the surface following initial grubbing resulted in no significant findings. During this project site inspection, the material scatter identified during the reconnaissance was not relocated likely due to the ongoing grubbing activities at that time (Hammatt and Chiogioji 1992). Inspection of soil stratigraphy of the sewer line trenches also confirmed the observations made during the reconnaissance survey that the upper stratum (0-75 cm) represented the highly disturbed plow zone consisting of material associated with commercial pineapple cultivation (Hammatt and Chiogioji 1992:5-8). No historically significant cultural materials were identified during the inspection of the sewer line trench sidewalls (Hammatt and Chiogioji 1992:8).

Hammat and Borthwick (1993) conducted an archaeological inventory survey approximately 13,000 feet of sewer line west of the current survey area, for the proposed Kō'ele Waste Water Treatment Project. While special attention was given to locating flake or midden scatters in the former pineapple fields, no evidence of pre-contact activity was identified within the project corridor (Hammatt and Borthwick 1993:16).

An inventory survey of a fifty-acre Department of the Hawaiian Home Lands parcel (Creed et al. 2000) in former pineapple lands in northwest Lāna'i City was conducted by CSH. With the exception of some historic debris associated with Lāna'i's first airport and modern trash (car parts, PVC pipe fragments, and other trash) the inventory survey found nothing of significance (Creed et al. 2000:18).

Finally, CSH conducted an archaeological inventory survey of an approximate 42-acre area within former pineapple lands. With the excepton of a modern era fenceline, the archaeological inventory survey did not identify any significant historic properties (Lee-Greig and Hammatt 2009).

Section 5 Community Consultations

Cultural Surveys Hawai'i Inc. contacted the following individuals and Hawaiian organizations requesting their *kōkua* and guidance regarding knowledge of traditional cultural practices and cultural resources of the study area. The following table represents all community consultations conducted with *kama'āina*, Hawaiian cultural advisors and Hawaiian organizations. Individuals who expressed personal knowledge of the study area and gave their consent to share their *mana'o* for this study, both formally and informally, are presented in Section 6 Summaries of Kama'āina Interviews. Formal letters of response to the scoping letter sent out by CSH have been appended to this study as Appendix C

Table 5. Community Contacts

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
Mrs. Yvonne Alboro	Lāna'i Senior Center Employee	Y	S	Mrs. Alboro helped CSH organize *kūpuna* interviews.
Mr. Duane and Mrs. Shelia Black	Retired Plantation Administrator	Y	Y	Shared insight to the Lāna'i community.
Ms. Phyllis "Coochie" Cayan	DLNR-State Historic Preservation Division, History and Culture Branch Chief (Former Lāna'i resident)	Y	S	CSH sent letter of inquiry. Mrs. Cayan suggested contacting Mr. Kepa Maly and utilizing the research he has compiled, Mr. Albert Morita, Aunty Irene Perry as well as Kūpuna at the Senior Center. She recommended including the *mo'olelo* and mythology of Lāna'i.
Mrs. Maggie Masicampo	Lāna'i Senior Center Manager	Y	S	Mrs. Masicampo helped organize *kūpuna* interviews and referred CSH to numerous contacts.
Mrs. Alberta Morita deJetley	Commercial Farmer/Editor/Owner of *Lana'i Today*	Y	Y	See 6.1.2 below.
Anonymous *Kama'āina*	*Kama'āina*	Y	Y	See 6.1.8 below.

[1] Key:

Y=Yes
N=No
A=Attempted (at least 3 attempts were made to contact individual, with no response)
S=Some knowledge of project area
DC=Declined to comment
DP=Declined to participate
U=Unable to contact, i.e., no phone or forwarding address, phone number unknown

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
Mrs. Martha Evans	Lanaians for Sensible Growth	Y	Y	CSH sent letter of inquiry. Mrs. Evans made referrals to several individuals she thought might like to share. They include: Mr. Kepa Maly, Mr. Sol Kaopuiki, Mr. Pierce Myers, Mr. Bob Saiki, Mrs. Vivian Eskaran, Mrs. Sugar Gima and her son Mr. Reynold Butch Gima, Mr. Howard and Mrs. Molly Sakamoto, Mr. Larry Kawasaki, Mr. Dennis Hokama, Aunty Irene Perry, Aunty Lei Kanipai, Mrs. Jane Gavriel, and Mrs. Leila Tamashiro. Mrs. Evans also shared her own recollections, see 6.1.1 below.
Mrs. Sugar (Minami) Gima	*Kama'āina*	Y	N	Mrs. Gima was present during the interview at the Senior Center but did not participate.
Mr. Reynold Butch Gima	*Kama'āina*, mother's family ran the Minami Gardens in the 1930's located at the site of the Lāna'i High and Elementary School adjacent to the affordable housing project.	Y	S	Recommended contacting his mother, Sugar Gima, and his Aunt Susan Miyamoto and interviewing them.
Mr. Robert Hera	Held several positions with Dole Company over thirty plus year career, including the title of Superintendent of the company.	Y	Y	CSH sent letter of inquiry.. See 6.1.5 below.
Aunty Lei Kanipae	*Kupuna*	A	--	
Mr. Solomon Kaopuiki	*Kupuna*	Y	Y	CSH sent letter of inquiry.
Ms. Mona Kapaku	Department of Hawaiian Homelands – Maui District Supervisor	Y	N	CSH mailed letter of inquiry.Ms. Kapaku had no concerns regarding cultural impacts. Referrals were made to Uncle Sol Kaho'ohalahala and *ohana*, Mrs. Woolsey, Mrs. Kewenaole and her

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
				daughter.
Mr. Kepa Maly	Executive Director, Lāna'i Culture and Heritage Center	Y	Y	CSH mailed letter of inquiry. Mr. Maly made referrals to the following individuals: Ms. Magge Masicampo, Mr. Noboru "Squeaky" Oyama, Ms. Kay Okamoto, Mrs. Susan Miyamoto, Sugar Gima, Mr. Butch Gima and Mr. Shigeto Minami.
Mrs. Susan (Minami) Miyamoto	Mrs. Myiamoto is from the Minami family; Sugar Gima's sister.	Y	Y	See 6.1.7 below.
Mr. Albert Morita	*Kupuna*, retired from DLNR, Division of Forestry and Wildlife	Y	Y	See 6.1.3 below. CSH mailed letter of inquiry.
Mr. Clyde Namu'o	OHA-Administrator, Native Hawaiian Historic Preservation Council	Y	S	CSH sent letter of inquiry. OHA recommended that CSH contact Mr. Kepa Maly, Mr. Sol Kaho'ohalahala and Mrs. Martha Evans. OHA also suggested CSH consult the Lāna'i community on all three cultural impact assessment projects (Lāna'i High and Elementary School, Senior Center Demolition and Construction of New Facility and the Affordable Housing Project) simultaneously.
Mr. Gary Onuma	*Kupuna*, Castle & Cooke Game Manager, *Kama'āina*	Y	Y	See 6.1.4. CSH sent letter of inquiry.
Mr. Noboru "Squeaky" Oyama	*Kupuna*	Y	Y	See 6.3.2 below.
Ms. Pua Paoa	Maui/ Lāna'i Islands Burial Council, Lāna'i Island Representative	Y	S	CSH sent letter of inquiry. Referred CSH to Uncle Sol Kaopuiki and Aunty Lei Kanipae
Aunty Irene Perry	*Kupuna*	Y	Y	See 6.3.1 below.
Ms. Sandra Ropa	Hui Malama Pono O Lāna'i	Y	S	CSH sent letter of inquiry. See 6.1.9 below.
Mr. Glenn Richardson	Former member, Maui/ Lāna'i Islands Burial Council, Lāna'i Island Representative, *Kama'āina*	A	--	CSH sent letter of inquiry.

Name	Affiliation	Contacted[1]	Personal Knowledge (Y/N/S)	Comments
Mr. Bob Saiki	School Principal in 1960's	A	--	
Mr. Howard Sakamoto	School Principal in 1970's	A	--	
Mrs. Molly Sakamoto	Mr. Howard Sakamoto's wife and *kama'āina* of Lāna'i	A	--	
Maui County Cultural Resources Commission		Y	Y	See 6.2. below.
Mrs. Momi Suzuki	*Kama'āina*, Mrs. Suzuki is the daughter of Aunty Irene Perry.	Y	S	CSH sent letter of inquiry. Ms. Suzuki explained that although she does not have much knowledge regarding traditional practices of the area, she believes the affordable housing project is necessary. Mrs. Suzuki made a referral to Mr. Squeaky Oyama.
Mrs. Jackie Woolsley	Hui Malama O Lāna'i	A	--	CSH sent letter of inquiry.

Section 6 Summaries of Kama'āina Interviews

6.1 Informal Interviews and Consultation

The following are summaries of informal interviews conducted over the phone and in person between March and June 2009. Individuals were informed that they may remain anonymous throughout any portion of the consultation process.

6.1.1 Mrs. Martha Evans

Mrs. Martha Evans is the Vice Principal of Lāna'i High and Elementary School. She has been a resident of Lāna'i since the 1970's when she moved there to work as a teacher. A person of Hawaiian ancestry, Mrs. Evans is also a member of the grass-roots organization, Lanaians for Sensible Growth, and is the Chair of the Lāna'i Archaeology Committee. Mrs. Evans submitted her *mana'o* via e-mail on March 15, 2009. Mrs. Evans recalled stories regarding night marchers and culturally significant *pohaku* or stone, near the teacher cottages located adjacent to the school:

> I do remember hearing a story about the night marchers when I first moved into the teacher cottages adjacent to the school. (It's been awhile since I have thought about this so my recollection may be rather fuzzy.) There were 7 or 8 cottages on the school parcel back in the 70's. The first cottage was large -- it was moved in the late 90's or early 00's and is now located at the beginning of Lanai Ave, *makai* side as a private residence/bed-and-breakfast. The second was a duplex unit (2-units), the third was a smaller cottage, followed by two dormitory-style houses with 4-bedrooms each. Those were followed by two smaller cottages of 2-bedrooms each. Anyway, it is said the trail came from the area above Lanai Avenue, cutting through the yard at the *mauka* corner of Lanai and Sixth St. It came down through several properties and then cut through the school and along Cottage Row, passing in front of the last cottage. At times people would hear things and talk would also go to the night marchers. There was a rock located outside of the last cottage that had some kind of significance although I can't remember what it was.

Mrs. Evans also mentioned a farm and piggery that Mr. Bob Sakai ran located in the lower portion of the school parcel.

6.1.2 Mrs. Alberta (Morita) deJetley

Mrs. Alberta deJetley has lived on Lāna'i or in Hana, Maui since 1961. She currently operates Bennie's Farm and the monthly newspaper publication, *Lana'i Today*. Mrs. deJetley's concerns are focused largely on the future of Lāna'i's economy, sustainability and overall viability as a community. Mrs. deJetley runs the community paper because she thinks it is a critical part of supporting small business and the community interests on Lāna'i. She feels she has a vested interest in the well being and economy of Lāna'i, and wants to see the island do well. She believes that stopping growth on Lāna'i will have a negative effect on the community's future

and feels that the community needs to be "pro-business" if it wants to have a viable economy. She states, "we should be working on ways to promote the community".

Regarding the lands surrounding the proposed project area, Mrs. deJetley remembers this area being in pineapple cultivation. Mrs. deJetley recalls Kō'ele as having been the center of the islands population before the pineapple plantation built Lāna'i City. Mrs. de Jetely is familiar with the state hunting lands located further *makai* of the project area but she does not consider the hunting of large game mammals and game birds in these areas a traditional Hawaiian activity.

6.1.3 Mr. Albert Morita

Mr. Albert Morita is *kama'āina* of Lāna'i, a retired Department of Land and Natural Resources (DLNR), Division of Conservation and Resources Enforcement (DOCARE) officer, he currently sits on the board of directors for the Lāna'i Culture and Heritage Center (LCHC). His familiarity with the study area comes from growing up on Lāna'i and working in the field for 30 years as a DOCARE officer.

Mr. Morita explained that the project area has been in pineapple cultivation as long as he can remember. He explains that when he was a child, stone artifacts were often found during the plowing of the pineapple fields. He remembers mainly *ulu maika*, and fire pits (*imu*), and therefore believes there is a likelihood that these things may be uncovered during grading and grubbing of the project area.

The lower elevations west of the city, from the sea cliffs (*pali*) to the edge of the pineapple fields were territorial hunting grounds since the 50's and remain today under the State DLNR as hunting grounds. These lands were used as ranchlands before hunting. In addition, Hunting Unit 3 has been included in the hunting area. One can hunt large game; axis deer, dall sheep, and bird game turkey, pheasant, gray Franklyn, chucker, and doves (lace necked and barred) in this area.

Regarding more traditional practices, Mr. Morita recalls individuals collecting verbena (*ha'uōwī*) to make a poultice for bruises on themselves or their horses, in lands on the outskirts of town. He also recalls individuals harvesting *'uhaloa (Waltheria indica)*, which grows wild in the same areas, for medicinal purposes.

Mr. Morita draws attention to the area of Hōkūau. He explains that according to Robert Hobdy's map in the book titled "The Story of Lāna'i " by George C. Munro, this area is located east of the project area. Its meaning is Morning Star. Mr. Morita suggested researching this area more thoroughly due to its proximity to the project area. He also suggested Kenneth P. Emory's work. Mr. Morita comments on the above-mentioned map and book noting their accuracy and intimate knowledge of Lāna'i and is grateful this family got together to write it. It is a very important historical document.

Overall, Mr. Morita does not see the affordable housing project impacting hunting practices or sporadic plant collection. He said that some deer may be displaced but that they are resilient when it comes to finding new habitat. He explained that Lāna'i is in need of affordable housing.

6.1.4 Mr. Gary Onuma

Mr. Gary Onuma worked as a Game Manager for Castle & Cooke and grew up near the project area, therefore, he is intimately familiar with the area. As a child Mr. Onuma recalls finding stone artifacts, but explains that the area has been heavily cultivated since the 1930's and archaeological feature remnants would be scarce today. He also explains that there is a hunting area just below town, where axis deer can be found. He explains that some axis deer live in the proposed project area and will be displaced by construction, but insists that axis deer find new habitat easily. Mr. Onuma mentions the sewage treatment plant nearby and states that it may be a cause of bad odor.

6.1.5 Mr. Robert Hera

Mr. Robert Hera moved to Lāna'i with his family from Kona in 1936. His family had been working on the coffee farms. They came to Lāna'i on the S.S. Humuula, a steam freight ship. Both he and his parents worked for Dole Company upon arrival in Lāna'i. Throughout his thirty-year career with Dole, Mr. Hera held a variety of positions outside of actual pineapple field work, they included positions in agriculture and engineering, water systems and utilities departments. In addition to the utilities maintenance, Mr. Hera helped with the general upkeep of the city, eventually becoming a superintendent with the company.

Mr. Hera explained that the proposed project area has been in pineapple cultivation for as long as he can remember. He does not think that the housing project will impact any cultural activities and that there is nothing there now.

Mr. Hera spoke of the teachers cottages, located near the adjacent school property, and described how pilots during WWII used to fly over and drop letters for the teachers. He said he also used to entertain at the teacher cottages, playing Hawaiian music. He spoke of an airstrip that was once in the area. It was destroyed: trenches were dug through the airstrip after Pearl Harbor was bombed to avoid the possibility of enemy planes landing there. Sikorsky aircraft used to land there as well.

6.1.6 Mr. Shigeto Minami

Mr. Shigeto Minami's family ran Minami Gardens. Minami Gardens was located at the present-day site of the Lāna'i High and Elementary School, near the proposed project area. Mr. Minami was born in 1929 and is 80 years old. His father was Jusaku (Nakao) Minami and his mother was Fujiyo Minami. He explains that his family took his mother's last name because there were no boys in her family to carry it on, a Japanese tradition under such circumstances. His sisters are Yasuko "Sugar" Gima and Susan Miyamoto who currently live on Lāna'i.

Mr. Minami said that his father was the *luna* of a womens "gang". He supervised this work group whose field duties included such activities as *ho hana* (weeding) and picking pineapple. His father worked in their garden after work and on the weekends.

Mr. Minami said his grandmother, Nami, worked in the garden every day, with one other individual who was employed full time. The hired person also boarded with them. Mr. Minami's clearest recollection regarding the gardens was loading their truck with vegetables and driving through the "Camp" (Lāna'i City) to sell their goods. He said he remembers ringing a bell to let

people know they were in town. Most people had their own gardens so he believes that the majority of the Minamis' produce was bought by the single men.

Mr. Minami referred to the style of gardening as "truck farming". He said they grew potatoes, carrots, lettuce, cabbage, "all the normal things". He thinks they probably sold the produce in town once a week. He said they must have leased the farm from the plantation because when it was decided to move the school from Kō'ele to the garden location, they had to move the garden down by the Protestant church, about a mile away.

Mr. Minami does not know what was at this location before his family's garden. Nor does he remember finding Hawaiian stone artifacts while gardening. He said that he doesn't remember there being very many Hawaiians living in town. Mr. Minami graduated in 1947; his class had 31 students. He, like all the other school kids, walked to school at Kō'ele before it was moved into town.

He remembers the garden being his playground when he was in the first grade. They had chickens, and a big tree in which his father built a play house. He recalls a tall hedge bounding what would be the Fraser Avenue side of the farm; he recalls it being sisal. He estimates that the garden was about three acres. Sometimes after school and on weekends he worked in the garden and during the summer he worked in the pineapple fields, after he was 12 yrs old.

6.1.7 Mrs. Susan (Minami) Miyamoto

Mrs. Susan Miyamoto moved to Lāna'i from Paia, Maui in 1924. She was five years old at the time. Her family ran the Minami Gardens, the above mentioned truck garden. The Minami Gardens was in operation at the current day school location from 1924 until 1937. When it was decided that the school would be relocated from Kō'ele to their garden site, they moved the garden about a mile away, near the site of the Protestant church.

Mrs. Miyamoto recalls her family's garden as being very big, she guesses about three acres. She remembers a tall hedge that grew along the end that now boarders Fraser Avenue. She said they grew cabbage, won bok and head cabbage as well as *araimo*, or Japanese taro/potatoes. She describes "thinning" lettuce to properly space it, packaging potatoes and bundling cabbage. Mrs. Miyamoto explains that she and her siblings did not work in the garden all day; they attended school up at Kō'ele and only worked after school and sometimes on the weekends. She said that her father and her grandmother did most the gardening and during the summers, she and her siblings worked in the pineapple fields.

She speaks of her father and his job as a *luna* for a "*wahine* gang" or women's work group, for the plantation. It wasn't until after finishing his plantation work did he tend his garden. They sold vegetables after *pauhana* time out of what Mrs. Miyamoto describes as "not a truck, but an old car" about two times a week. She said they also grew and sold bananas.

The Minami family lived across the street, in one of the original plantation homes behind the current Senior Center. When asked what the lands north and west of their garden looked like, Mrs. Miyamoto states, there was "nothing" there. She explained that pineapple cultivation did not extend into those areas, she described the pineapple fields as being "much further down". To the south, near the current day gym location was Mr. Okamoto's house. When asked if she remembers finding Hawaiian artifacts while working in the garden, she says she did not. Neither does she recall individuals utilizing the area in traditional ways for plant gathering or

ceremonies. She does remember the Hawaiian families though, and she states, "not like *hapa*, but pure Hawaiians".

Mrs. Miyamoto was in the last class to graduate from the school while it was still at its Kō'ele location. She graduated in 1935, when the school only went to tenth grade.

6.1.8 Kamā'aina

An individual, who wishes to remain anonymous, familiar with the lands of proposed project area does not foresee any adverse impacts the project will have on hunting practices west of project area. There are axis deer that now live in the pineapple fields near Lāna'i City, but this individual explains that although they will be displaced they are a hardy breed and will not have difficulties finding new habitat. This person explained that the nearest state-leased hunting lands are near the airport, 5 to 15 minutes out of town. The state leases 30,000 acres from Castle & Cooke for use as hunting lands. It is believed that these hunting lands comprise the most popular game mammal hunting area in the State of Hawai'i and that the hunting season contributes significantly to Lāna'i's economy. Sport hunting in these areas began in the 1950's when the then territory of Hawai'i originally acquired the lease to these lands.

Typically, hunting seasons work around the animals breeding seasons. The axis deer season is from late February to mid-May, the mouflon sheep season is from late July to late October and the game bird season is in the fall from November to January. Some of the game birds that can be found on the state-leased lands west of the project area include ring-necked pheasant (*kolohala*), wild turkey, Grey Francolin, Gambles Quail and the Erckel Francolin.

6.1.9 Mrs. Sandra (Kamipae) Ropa

Mrs. Sandra Ropa is a member of Hui Malama Pono O Lāna'i Archaeological Committee and is the daughter of Aunty Lei (Kaopuiki) Kamipae. She was born in 1943 and grew up on Lāna'i. Although it was her mother's generation that lived on the island before the pineapple plantation began, she recalls some of her knowledge and experiences growing up.

Mrs. Ropa explained that her grandfather was a Christian minister who forbade all things Hawaiian, yet he spoke and preached only in Hawaiian. Mrs. Ropa's mother, Aunty Lei, grew up with a thorough understanding of the Hawaiian language but was not allowed to speak Hawaiian at school, the result being that she could understand Hawaiian yet could not speak it very well. Mrs. Ropa described finding *ulu maika* in the pineapple fields as a common occurrence. When she was a child, she explained, her grandfather would not let her keep these items or bring them into the house.

Mrs. Ropa recalls her grandparents having a garden down at Kaumālapa'u where they grew foods that could tolerate the brackish water located there. Her grandparents grew cabbage, corn and string beans. She said she grew up eating deer and fish as well. She recalls her grandparents bartering their vegetables for fish. She also recalls an abundance of wild tomatoes that grew in the pineapple fields; she said the wild turkeys have eaten them all. Mrs. Ropa recalls the time when a few Hawaiian families lived at Kō'ele and worked for the Ranch. She explains that as a teenager she didn't pay much attention to these things.

Regarding the affordable housing project, Mrs. Ropa explained that before the economic crisis, the housing project was needed. She expresses some uncertainty regarding the future of the community in the current economic situation.

6.2 Maui County Cultural Resource Commission (CCRC), June 4, 2009

Mrs. Colleen Medeiros Dagan and Mrs. Tanya Lee-Grieg of Cultural Surveys Hawai'i attended this meeting to gather information on traditional and cultural practices in the upland areas of Kamoku. Commissioners in attendance included Mr. Eric Fredericksen, Mr. Raymond Hutaff, Mrs. Veronica Marquez, Mr. Kalei Moikeha and Mrs. Nani Watanabe.

Mr. Kepa Maly shared some of his knowledge about the area in a written statement which includes land claim awards for Kamoku as well as the land survey metes-and-bounds description *ahupua'a* boundaries. Mr. Raymond Hutaff stated his feelings regarding the ahupua'a name and the purpose of the ahupua'a itself as being a significant cultural land tradition.

Mr. Steve Bumbar, Vice President of Castle & Cooke Resorts LLC, explained that his company has produced a DVD of *kūpuna* interviews called "Aka Aina". He explained that interviews were of *kūpuna* of various ethnicities. Mr. Bumbar also spoke of a walled-off section of Kaiholena Gulch behind the 17th hole of the golf course, The Experience at Kō'ele. Mrs. Watanabe makes reference to another set of *kūpuna* interviews available called "Reflections of Lāna'i".

Mrs. Watanabe confirmed that the water from the reservoir behind the Lodge at Kō'ele was utilized as drinking water in historic times. When asked specifically about the existence of a spring at Kō'ele, Mrs. Watanabe said that she did not know of any spring, only the reservoir which she remembered being dry when she played in it as a child.

The commissioners discussed discoveries of stone artifacts such as *ulu maika* and sling stones in pineapple fields in the Kamoku and Kalulu ahupua'a. Mr. Eric Fredericksen and former Lāna'i resident, Mrs. Watanabe, were both familiar with these discoveries. Mr. Fredericksen explained that it is understood that these finds have all been taken out of context due to pineapple cultivation. It was explained to the commissioners that there were no known cultural or archaeological sites within the proposed affordable housing project area.

Mrs. JoAnn Ridao, Director of the County Department of Housing and Human Concerns, attended this meeting and explained that housing will likely be built in phases at prices determined to be affordable for the area. She also explained that although preference cannot be given to Lāna'i residents exclusively, they are strongly encouraged to apply for this housing. Mrs. Watanabe said that the Lāna'i community has been waiting for such a housing project and strongly supports it.

6.3 Formal Interviews

Formal Interviews were conducted on March 27 and April 9, 2009. Formal interviews were conducted using an Olympus Digital Voice Recorder and transcribed using Sony Digital Voice Editor by Ms. Noelani Hessler, B.A. Mrs. Sarah Wilkinson B.A. and Mrs. Colleen Dagan B.S. between March and May 2009.

6.3.1 Aunty Irene (Cockett) Perry

Aunty Irene Perry was born in Keōmoku in 1917. Her father was Robert Cockett from Maui. Aunty Irene said that she lived on Maui briefly before returning to Keōmoku. Sometime around 1928 her family moved up to Kō'ele and her father worked for the ranch. They lived in a house next to the main ranch house. She spent her childhood playing, fishing and traveling via horseback to her tutu's (Keli'ihananui's) home at Palawai Basin.

As a child living in Keōmoku, Aunty Irene used to ride on horseback up to Lāna'i City. From Keōmoku, she explained, they traveled up through Lāna'ihale to get to Kō'ele, "all over and through the mountain and down." Aunty Irene describes growing up at Keōmoku, fishing and preparing dried fish, turtle and *he'e*. They remember carrying these dried snacks as well as *kālua* pig to school in their shirt pocket.

Aunty Irene attended school at Kō'ele. Driving around Kō'ele, Aunty Irene pointed to the hill where the original school was located She also pointed to the location of the old slaughter house and a pasture that was utilized for grazing after the company gave up pineapple.

When asked what her knowledge regarding the high occurrence of Hawaiian stone artifacts said to have been found during plowing of the pineapple fields was, she said she was aware of all the stone artifacts but did not know exactly how the area was utilized by Hawaiians in traditional times.

6.3.2 Mr. Noboru "Squeaky" Oyama and Mr. Takeo Yamato

Mr. Noboro Oyama, known as Squeaky, was interviewed at the Senior Center on March 27, 2009. Mr. Oyama moved to Lāna'i with his family in 1925. He was born in Wailuku, Maui. His father worked with horses in Kahului, with the Kahului Raching Association and moved to Lāna'i to work as the plantation's stable man. In 1925 the plantation utilized horses and plows for the agricultural work. Mr. Oyama said his father was in charge of all the stables and also worked in the capacity of a veterinarian. Also participating in the interview was Mr. Takeo Yamato, a long-time Lāna'i resident.

Looking at a map of Lāna'i City, Mr. Oyama explained that when pineapple cultivation first began the fields did not touch the edges of the city as they do now but began further downslope, west of the city. They gradually extended up to the former Minami Garden which was located where the high and elementary school is now. He referred to Minami Gardens as a "truck garden" and said that the Minami family grew vegetables there. He described the area located behind the current day gym, adjacent to the school, as being the place where the ladies would "trim the crown".

Mr. Takeo Yamato recalls finding *ulu maika* in the pineapple fields and Mr. Oyama confirmed that *ulu maika* were "...all over the place." Mr. Yamato and Mr. Oyama talk about hiking *mauka* of the city as kids and picking *lilikoi* and guava. Mr. Yamato explains that up until about ten years ago, he would access *mauka* regions from Lāna'i City to collect *pepeiao* an edible fungus. He said that one could find *pepeiao* growing on *kukui* nut trees. Mr. Yamato and Mr. Oyama agree that *pepeiao* added to chop suey is delicious! Mr. Yamato goes on to explain that *pepeiao* can be easily dried and keeps for years. By soaking the dried fungus in water, it

easily freshens up and is ready to cook. He stated that he has also collected bamboo shoots annually until recently, due to the construction of a fence that has blocked his access.

Mr. Oyama expressed a sense of uncertainty regarding the current need for additional housing on Lāna'i due to the slow economy. What he hears about these days is the high rate of unemployment on Lāna'i and nationwide.

6.3.3 Senior Center *Kūpuna*

In a recorded interview on April 9, 2009, a group of seven ladies were recorded "talking story" at the Lāna'i Senior Center. Of the seven ladies, five of them -- Mrs. Suzanne Kincaid, Mrs. Margret Hubin, Mrs. Helen "Cookie" Hashimoto, Mrs. Alfansa Lopez and Aunty Irene Perry -- shared stories about growing up on Lāna'i. Mrs. Sugar Gima and Mrs. Chitose Oshiro were present, but did not add to the conversation.

The ladies shared stories about participation in school and community sports events and dances. Mrs. Cookie Hashimoto said that there were several softball teams in the community. Mrs. Hashimoto recalls three women's teams: the Federation team (Filipino Federation of America), the Lāna'i High School team and the Office team, which she played on. Mrs. Lopez recalls the time the Globe Trotters came to Lāna'i and put on an exhibition game with the high school basketball team.

They speak of school dances as well but also of "public dances". In the 1940's, during the war, clubs would sponsor these public dances. There was live music and food and the women describe attending these events with a bunch of their girlfriends or "stag". The following is a portion of their conversation:

> Mrs. Cookie Hashimoto (CH): Right, right, right. During the wartime we used to have a social dances in the streets, people used to sponsor, yep, and we used to play and go to social dance.
>
> Mrs. Colleen Dagan (CD): What were those like?
>
> CH: Well, you know, a lot of fun, because you go stag and get a lot of girlfriends [Everybody laughs]. Stag, a bunch of girls stag--
>
> Mrs. Alfansa Lopez (AL): No more one particular partner eh--
>
> CD: How old were you guys when those were happening?
>
> CH: A teenager.
>
> Mrs. Suzanne Kincaid (SK): There was no restriction [wartime curfew] on going to dances yeah.
>
> CH: Yeah, they tried, but usually they had about 11:00 [pm], 10:30-11:00.

AL: There's no curfew, but well, some mothers don't trust yeah, so the mothers waiting outside, waiting for us 'til the dance pau!

SK: That was your mother, my mother never came [Laughs, several exchanges at once].

AL: My mother had one flashlight [Laughs]. My mother came, I could see the reflection of her glasses [Laughs].

At the public dances Hawaiian music as well as popular American music was played. The women describe dancing, being asked to dance and talk about learning to dance in the basement of the gym:

CH: Well, Hawaiian music, what's that dance ...not like today kine, they had ah, jitterbug and that but not that like today.

SK: Remember the Filipino man he says, "Do you wanna dance?" some of us he asked and I says, "I don't jitterbug" and he says "I never asked you to jitterbug" and I says, "I don't dance."

AL: And then those days, they don't come and ask you, "May I have this dance?" They go like this [pointing motions, laughing],

CH: Yeah, reserve dance already, reserve danee! Because I guess you know, they know that people around yeah. Cause, then, well some of them say, "May I have this dance?"

AL: The proper way ah--

CH: Cause then they ask you, oh--

SK: Only had this way when they stared turning out, may I have this dance.

AL: They teach you how to,

CH: 'Cause you know why- they used to have the student body dances. Oh, yeah, when I was seventh grade, we used go under, you know the gym, the basement, yeah, we used to go there to learn.

CD: To learn to dance?

CH: To dance.

CD: The basement of the gym?

CH: Yeah, but those are the school days, that we have our seventh, eighth grade yeah, that was the school days, that's where we learned to dance all different steps.

CD: Different steps, like what?

CH: Fox trot, what that, waltz, and another one, what was it now? Three major dance, fox trot, waltz and what the other one, there were three major dance. Yeah.

CD: So were those the major social things, the dances?

CH: Yeah, those were the, those days used to go to school, a student body, used to have a dance for them, for the classes,

These ladies also talk about heading *mauka* and gathering *lilikoi* and guava.

Section 7 Traditional Cultural Practices

The identification of traditional cultural practices for a cultural impact assessment takes into account, past, current and potential future cultural practices. Traditional cultural practices include those practices of any ethnic group who has influenced the culture of the study area, subsistence hunting practices as well as traditional Hawaiian gathering practices.

7.1 Gathering for Plant Resources

7.1.1 Medicinal Plant Gathering

Gathering of plant resources in the upland portion of the study area consists of the collection of *ha'uōwī* (*Verbena litoralis*) and *'uhaloa* (*Waltheria indica*). The leaves, stems and roots of *'uhaloa* were grinded and strained and made to gargle to soothe a sore throat (Abbott 1992: 101). Mr. Morita recalls *ha'uōwī* being used as a poultice for bruises on individuals and horses. He remembers individuals collecting these medicinal plants from around Lāna'i City, in areas of fallow pineapple fields.

7.1.2 Subsistence Plant Gathering

Mr. Yamato explains that he used to hike into the forest *mauka* of Lāna'i City to collect *pepeiao akua*, commonly referred to as *pepeiao* (*Auricularia auricula*), a tree fungus that both Mr. Yamato and Mr. Oyama agreed is excellent in chop suey. Mr. Yamato said it often grew on *kukui* nut trees (*Aleurites molucana*). Mr. Yamato also explained that *pepeiao,* when dried, could be stored for years and freshens up nicely by soaking in water when ready to use. Mr. Yamato said that he continued to collect *pepeiao* until about ten years ago.

Mr. Yamato also describes traveling *mauka* to collect bamboo shoots. He said that he continued to collect bamboo shoots about once a year until a fence was recently constructed blocking his access. Guava (*Psidium guajava*) and *Lilikoi* or passion fruit (*Passiflora edulis*) are two other fruits that Mr. Yamato, Mr. Oyama, Aunty Irene Perry and several of the ladies at the senior center remember collecting.

7.2 Trails and Traditional Access Routes

No traditional Hawaiian trails within the present study area were mentioned during the consultation process. However, several individuals consulted described accessing the upland areas *mauka* of Lāna'i City for recreation and to gather edible foods such as *lilikoi*, guava, bamboo shoots and *pepeiao*. It is unclear as to what routes they utilized; nonetheless, it was noted that one access point had recently been fenced and access blocked.

7.3 Traditional Hawaiian Stone Tool and Craft Manufacture

Native Hawaiians utilized *pohaku*, stones of various qualities, for a variety of purposes. The *ulu maika* stone was designed as a sort of bowling disk used to play a game called *Maika*. *Maika* was a common traditional game played during the *Makahiki* season, the time of peace. To play this game, two stakes would be set in the ground about six inches apart. The player would then stand a distance from the stakes, further being more challenging, and attempt to roll the *ulu*

maika between the stakes. Slingstones or *pohaku ma'a* were used as a weapon in warfare, hunting, and also as sport.

Throughout the consultation process, it was revealed that Hawaiian stone artifacts including *ulu maika*, *pohaku ma'a* and *imu* stones (fire pits) have been discovered and are known to be a common occurrence in the pineapple fields surrounding the current project area and throughout formerly cultivated areas on Lāna'i. Mr. Kepa Maly, in a written statement regarding Hawaiian habitation of this upland area, said, "Kamoku was noted for its upland forest and springs, with areas which the Hawaiians developed into an extensive forested dry land agricultural system, in Kō'ele, Kaiholena and Nininiwai region" (June 4, 2009 Maui County Cultural Resource Commission meeting). Although several individuals had found stone artifacts and surmised that Hawaiians had clearly left these items behind, few consulted were familiar with more detailed knowledge concerning Hawaiian habitation of these areas.

Mr. Albert Morita spoke of finding *ulu maika* and *imu*. He believes there is a strong possibility of uncovering more of these during construction for the affordable housing project. Mr. Gary Onuma also mentions the occurrence of Hawaiian stone artifacts, but explains that the project area has been heavily cultivated since the 1930's and that any archaeological features would likely be scarce today. Mrs. Sandra Ropa recalls finding Hawaiian stone artifacts in the pineapple fields as a child and vividly remembers not being allowed to bring them into the house. Mr. Takeo Yamato also said that he found *ulu maika* in the pineapple fields and Mr. Oyama confirmed that *ulu maika* were, "...all over the place."

7.4 Fresh Water Resources

As mentioned above (7.3), Mr. Maly has stated: "Kamoku was noted for its upland forest and springs, with areas which the Hawaiians developed into an extensive forested dry land agricultural system, in Kō'ele, Kaiholena and Nininiwai region." The mention of freshwater "springs" in these areas prompted further research of these resources. The place names of Nininiwai, meaning pouring water (Emory, 1924; 31) and Kaiholena, the name of the gulch, associated spring and the *iholena* variety of banana (Emory 1924: 31), speaks to the known and relative lushness of these upland areas, Kaiholena being the location of one of the principal springs on the island (Emory 1924: 47).

In his book, *The Story of Lāna'i*, Mr. George C. Munro, the manager of the Lanai Ranch from 1911 to 1930, recalls a large boulder that had been modified to collect water located at Kō'ele. Several holes measuring three inches wide and three inches deep had been made in the surface of this boulder (Munro 2007: 126). This boulder and its whereabouts were not mentioned by any individuals consulted. It was also said that Mr. Frederick Hayselden (Walter Murray Gibson's son-in-law in charge of the ranch in the late 1800's) built eight to ten cement lined cisterns whose purpose was to catch water that dripped off the roofs of buildings at Kō'ele (Munro 2007: 128).

Mr. Munro also described a reservoir dug by Mr. Hayselden as being located behind the ranch manager's house. This reservoir caught storm water from the Kaiholena Gulch and was used to water livestock. This same reservoir exists today as a pond at what is now the Lodge at Koele, a Four Seasons Resort. In an April 2009 article in *The Lāna'i Times*, Aunty Irene Perry speaks of the days when she lived at Kō'ele in a house next to the main ranch managers house. Mr. Kenne

Williams, the author of the article, explains that this same pond was the source of Aunty Irene's drinking water. Aunty Irene is quoted as saying, "Sometimes when it would rain, the pond would overflow and run down the hill" (Lāna'i Times, Williams 2009:10). This statement substantiates that this historic reservoir did, in fact, catch storm waters and shows that it was utilized for the same purpose many years after it was built. Aunty Irene recalls getting supplies of water from Maui as well, carried over on the sampan that the Kaoupuiki family ran between the islands.

This reservoir was also dry for a time. Mrs. Nani Watanabe (6.2) recalls playing in it as a child in the 1940's and explains that it was dry. In a 1988 archaeological study, it was also described as being dry (Hammatt *et al* 1988: 5). It is known that Kaiholena stream was an intermittent stream and did not flow year round, but it is unknown if other activities had caused the stream to flow elsewhere or to not flow at all during the times when the reservoir was dry.

Another reservoir described by Mr. Munro was located "at the lower end of Kaiholena Gulch" and is described as stone-lined, with the capacity to hold 400,000 gallons (Munro 2007:128). It is said that water from up the valley was piped into this reservoir. In addition, Mr. Munro describes a pump and waterline installed to pump water from Maunalei Gulch into Kaiholena reservoir (Munro 2007: 129). At the June 4, 2009 CCRC meeting, Mr. Steve Bumbar made mention of a reservoir located behind the 17th hole at the golf course, the Experience at Koele. Descriptions from these two sources, coupled with research of historic and modern day photos, suggests these are the same reservoir, although it is unknown if any remnant of this reservoir exists today.

Fresh water resources also include brackish wells located in the coastal area at Kaumālapa'u. Mrs. Sandra Ropa recalls her grandparents' home and describes a garden that they grew that could tolerate the brackish water available there. Mr. George Munro also describes brackish wells located at Kaumālapa'u. He noted that these ancient Hawaiian wells were shallow and sealed on the seaward side by a mixture of mud and straw in an effort to minimize salt water seepage. One of these wells was located in Kaumālapa'u Gulch. Mr. Munro describes the water in this wall as being ten feet below the surface (Munro 2007: 125).

7.5 Agricultural Practices

Mr. Munro begins his chapter on agriculture with the following passage:

> Hawaiians are believed to have first colonized Lāna'i about the year 1400. Their first cultivations would likely be along the shore of the east side and in taro patches in Maunalei Gulch. The shore areas got very little rainfall, but water from the mountains soaked them during the wet season. These lowlands and taro patches would not be injured by such work, as yearly freshets bring rich soil from the mountains and deposit it on these lands. They may have found later that the extensive uplands on the west side had more rainfall but were not subject to flooding from freshets. The soil rich with the deposits of centuries from the forest that had covered it, was light enough to be easily handled with their primitive tools. As the population increased, therefore, they took up cultivation in that area (Munro 2007: 47).

The few mid-nineteenth century Land Commission Award (LCA) claims for lands within Kamoku Ahupua'a near the current project area may reflect the long-term effects of

Kalani'ōpu'u's raid on Lāna'i in 1778. It is said that Kalani'ōpu'u's raid was so thorough that virtually all of Lāna'i's inhabitants were killed. His forces then raided their crops leaving nothing left to eat but the famine food of *kupala* (Kamakau 1992: 09-91). Mr. Munro goes on to explain that by killing all who farmed the western uplands, and raiding all the crops, the soils were left exposed. With no one to reestablish cultivation, these soils were blown away, thus leaving portions of the island denuded of its topsoil (Munro 2007: 47).

The four Kamoku LCA grants made at the time of the *Māhele* include LCA 3719 to Kalaihoa, LCA 6833 to Kaaiai, LCA 8556 to Kaauwaeaina and LCA 10630 to the Noa Pali. These claims consisted of *moku mauu* (grass lands or pastures), sweet potato plots and gourd fields. Pali was the *konohiki* of the area and his LCA extended into neighboring Kalulu and Kaunolu ahupua'a. Munro mentions the probable crops in these areas to have been taro, sweet potato and yams (Munro 2007: 47)

Mr. Maly also described the area as having been utilized by Hawaiians in traditional times for dry-land agriculture as well as forest resources. Stone artifacts such as *ulu maika*, sling stones and various lithic tools have been found over the years despite intense cultivation of the pineapple fields.

Historic research and community consultation found that historic gardening practices also occurred in the study area. Not only did individual families typically have their own gardens, but a truck garden called Minami Gardens was located at the school site, adjacent to the proposed affordable housing site, before the school was moved from its Kō'ele location. Mr. Jusaku Minami ran the family garden which may have extended from Fraser Avenue to where the county park is today. Mr. Minami worked at the garden after hours as he maintained a day job with the pineapple company where he worked as a *luna* for a *wahine* gang. His mother, Nami, as well as one other individual worked in the garden full-time. They grew Japanese potatoes or *araimo*, carrots lettuce, cabbage, bananas and *won bok*.

Minami Gardens supplied Lāna'i City with supplemental produce. Family members including daughter, Mrs. Susan Miyamoto and son Mr. Shigeto Minami, would accompany their father in an old car through the camp to sell their produce. Mr. Shigeto Minami recalls ringing a bell to let people know they were there. He explains that most families had their own smaller gardens, but that they provided vegetables to the camp stores and to the single men who had traveled from abroad to work in the pineapple plantation. It is believed that the garden operated at the current school location from about 1924, when the Minamis moved to Lāna'i, until about 1937. Mr. Shigeto Minami explained that when plans were made to move the school from Kō'ele to the garden location, their garden was moved about a mile away, by the Protestant church.

The Minami family lived across the street, behind the current Senior Center, in one of the original plantation homes. Minami family members and *kūpuna* asked about the landscape surrounding the current school location explained that it was not cultivated in pineapple. They explained that the pineapple fields began considerably further *makai* in the 1920's, and that the school location and the ball park located west of it was Minami Gardens. Historic maps and aerial photographs of the area indicate that the county park near the project area might not have been cultivated in pineapples.

7.6 Hunting Practices and Deer Habitat

State of Hawai'i Hunting Units 1 and 3 (public hunting areas) are located approximately two miles northwest and west of the project area. The game mammals and game birds that populate these areas include axis deer, mouflon sheep, *kolohala* or the Chinese ring-necked pheasant, wild turkeys, gray francolin, gambles quail, erckel francolin and doves.

Lāna'i residents, as well as other residents of the state, hunt as a subsistence practice. And this practice has become a strong tradition in some communities. While many Lanaians might agree that hunting is a strong tradition on Lāna'i and individuals such as Mrs. Sandra Ropa explained that food supplied from hunting deer was a significant part of their diet, Mrs. Alberta deJetley notes, however, that sport hunting is not a traditional Hawaiian practice, but rather an introduced recreational sport.

Kamā'aina contacted during consultation explained that the state leases these lands from Castle & Cooke and that sport hunting activities has continued since the 1950's. It is believed that these public hunting areas are the most popular game mammal hunting areas in the state contributing significantly to the Lāna'i lifestyle and economy.

Contacts consulted said that a small population of axis deer have made their home in the fallow pineapple fields adjacent to the project area. Mr. Albert Morita and Mr. Gary Onuma both agree that although these deer will be displaced by the affordable housing project, they are a hearty animal and can easily adjust to new habitat.

7.7 Pursuit of Knowledge – Ka'imi'ike

Originally at Kō'ele, then moved to its present location, Lāna'i High and Elementary School has been the main educational facility on the island since the ranching era. During the consultation process, it was explained that when the Japanese immigrated to the island in the twenties to attain work on Dole's pineapple plantation, they brought with them a strong tradition and love for education. This desire to excel in education was quickly accepted and emulated by all ethnic groups on Lāna'i. Individuals consulted relay a sense of healthy competition; not only did they enjoy school and school activities but they strived to do well, get the best grades and be the best sportsman. This sentiment continues today.

The school was also at the center of community activities: sports, dances and social events. The women interviewed at the Senior Center spoke fondly of their years at teenagers attending dances and playing sports (Section 6.3.3). This was their life: school and school activities. And when they had families of their own, the school became central to their lives again.

It was explained during the consultation process that the Lāna'i community, with their devotion to education, organized themselves in such a way that they secured funding from the legislature for the continued growth and improvement of the school. This funding went towards the construction of one classroom or building every year.

Those parents who worked on the plantation were keenly aware of the physical demands of plantation work and also understood that a good education would enable their children to attend college, with the hopes of eventually carving out a better life for themselves. Lanaians of the plantation era and as well as Lanaians today continue to encouraged their kids to attain a higher

education. As a result, Lāna'i High and Elementary School has one of the highest numbers of graduating seniors going into either four year colleges or vocational schools. During the plantation days it was said that they export two things: pineapples and kids. This speaks to the emphasis placed on education, and that parents encouraged and expected their children to leave Lāna'i to attain a higher education. Today, this mind set continues. With the shift from pineapple to high-end resorts, it is said that more Lāna'i residents are returning after college because they are able to secure competitive jobs in the tourism industry.

7.8 Honoring the *Kūpuna*

The Lāna'i Senior Center, located in Lāna'i City approximately one-half mile from the current project area, is a place where many of the *kūpuna* on Lāna'i congregate daily. They come here to socialize, talk story with friends, have lunch, watch T.V and relax. For those who cannot travel on their own, a Maui Economic Opportunity (MEO) bus shuttles them from their homes to the center and back each day. For seniors who cannot make it to the center, Mrs. Masicampo and Mrs. Alboro deliver hot lunches to them at their homes each day.

The Lāna'i Senior Center acts as a multi-purpose center and individuals consulted refer to the Senior Center as the community Town Hall. Here a variety of classes may take place, from hula and ukulele lessons to hunter education classes. Often times these classes are free of charge. The Senior Center is the most popular location to book for celebrations such as birthdays, reunions, graduation parties and wedding receptions. Nearly all business and community meetings take place at the Senior Center.

Throughout the consultation process individuals described the vital role the Senior Center plays on Lāna'i. Mrs. dejetley said that the community enjoys the warm and homey atmosphere of the Senior Center. Mr. Onuma explained that the Senior Center is heavily utilized by the community as a place where the seniors have lunch, socialize and attend classes and referred to the Senior Center as their "town hall", a place where families throw parties, and groups hold community meetings. Mr. Hera also mentioned that he utilized the Senior Center when teaching hunters education classes. He said the Senior Center serves the community in many ways that reach beyond the actual Senior Center services. Mr. Oyama stated that the Senior Center is constantly being used by different organizations.

During the consultation process individuals continually referred the researcher to the Senior Center and the *kūpuna* there. This simple house which provides services to seniors, and acts as a town hall to the community, also houses the most cherished cultural resource, the *kūpuna* themselves. As stated by Mr. Hutaff of the Maui County Cultural Resource Commissioner, the *kūpuna* are the cultural resource. He explains that the community must see to it that they are properly cared for and that their needs are met. It is possible that the affordable housing project may benefit the growing senior population on Lāna'i.

Section 8 Summary and Recommendation

From mythological times, Lāna'i has always been unique. First inhabited by spirits and eventually made habitable for mortals by the trickster Kaululā'au, Lāna'i today retains a distinctive culture. The islands natural resources, although somewhat limited, have traditionally kept its population small. Regardless, the Hawaiians that populated Lāna'i in ancient times lived well given the resources available. They utilized the forests resources as well as developing dry land agriculture on the western plateau lands near the project area. Their most extensive *lo'i* were located in the Maunalei Gulch and along the northeastern side of the island. Historic literature shows that ancient Lanaians lived with an inseparable connection to Maui and as subjects of the Maui chiefs. But crucial changes would take place beginning with the devastating raid by Kalani'ōpu'u known as Kamokuhī. This was a war that is said to have left a scar on this island in the form of denuded soils and barren lands (Section 3). From the time of the Kamokuhī raid in 1778 until the arrival of the first missionaries, it is said that the *ahupua'a* of Kamoku was left largely uncultivated (Munro 2007; 47). Then, with the *Mahele aina* came the division and privatization of lands on Lāna'i. Vast acreages transferred from Kamehemaha III and the *kanaka maoli* through several different property owners including; Walter Murray Gibson, Charles Gay, W. M. Giffard, James Dole and now David Murdock of Castle & Cooke Resorts. These different owners saw the island through very different phases of its history; from the Mormon colonist settlement at Palawai, to the ranching era of Lanai Ranch. From the Hawaiian Pineapple Company plantation to a five-star resort vacation destination.

Research found Lanains to be a diverse group of people. Throughout history they have adapted to many changes in a relatively short period. Much of their flexibility appears to draw from their proactive attitude which embraces change and shapes those changes into events that support the improvement of their community. This constructive and adaptive outlook was evident throughout the consultation process.

The proposed affordable housing project was viewed by the majority of those consulted as a project that would be beneficial to the community. Some individuals, had concerns regarding the need for housing in the current economic atmosphere. Mrs. JoAnn Ridao, Director of the County Department of Housing and Human Concerns, addressed this, explaining that the department is considering the current economic environment and will be constructing the housing in phases to adjust to the slower economy.

It was found that the traditional and cultural practices found to be taking place in the study area (Section 7) will not be adversely impacted by the affordable housing project. On the contrary, some individuals consulted believe that additional affordable housing units will enhance and benefit the community.

8.1 Recommendations

As a result of the consultation process, it was found that no traditional or cultural resources will be adversely impacted by the proposed affordable housing project.

As noted above, Hawaiian stone artifacts have been found throughout the general area that includes the present project area. It is thus recommended that the project implement the

archaeological monitoring outlined in the companion archaeological study prepared by Cultural Surveys Hawaii, titled "*An Archaeological Inventory Survey Report for the Proposed Lāna'i City Affordable Housing Project Kamoku Ahpua'a, Lāhainā District, Lāna'i Island, TMK (2) 4-9-002:058 and portions of (2) 4-9-014:001, 009, 011*" (Lee-Greig and Hammatt 2009 Draft).

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Appendix A Guidelines for Assessing Cultural Impacts from the State of Hawaii Office of Environmental Quality Control

Guidelines for Assessing Cultural Impacts

Adopted by the Environmental Council, State of Hawaii November 19, 1997

1. INTRODUCTION

It is the policy of the State of Hawaii under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.

Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

Background

Prior to the arrival of westerners and the ideas of private land ownership, Hawaiians freely accessed and gathered resources of the land and seas to fulfill their community responsibilities. During the Mahele of 1848, large tracts of land were divided and control was given to private individuals. When King Kamehameha the III was forced to set up this new system of land ownership, he reserved the right of access to privately owned lands for Native Hawaiian ahupua'a tenants. However, with the later emergence of the western concept of land ownership, many Hawaiians were denied access to previously available traditional resources.

In 1978, the Hawaii constitution was amended to protect and preserve traditional and customary rights of Native Hawaiians. Then in 1995 the Hawaii Supreme Court confirmed that Native Hawaiians have rights to access undeveloped and under-developed private lands. Recently, state lawmakers clarified that government agencies and private developers must assess the impacts of their development on the traditional practices of Native Hawaiians as well as the cultural resources of all people of Hawaii. These Hawaii laws, and the National Historic Preservation Act, clearly mandate federal agencies in Hawaii, including the military, to evaluate the impacts of their actions on traditional practices and cultural resources.

If you own or control undeveloped or under-developed lands in Hawaii, here are some hints as to whether traditional practices are occurring or may have occurred on your lands. If there is a trail on your property, that may be an indication of traditional practices or customary usage. Other clues include streams, caves and native plants. Another important point to remember is that, although traditional practices may have been interrupted for many years, these customary practices cannot be denied in the future.

These traditional practices of Native Hawaiians were primarily for subsistence, medicinal, religious, and cultural purposes. Examples of traditional subsistence practices include fishing, picking opihi and collecting limu or seaweed. The eollection of herbs to cure the sick is an example of a traditional medicinal practice. The underlying purpose for conducting these traditional practices is to fulfill one's community responsibilities, such as feeding people or healing the sick.

As it is the responsibility of Native Hawaiians to conduct these traditional practices, government agencies and private developers also have a responsibility to follow the law and assess the impacts of their actions on traditional and cultural resources.

The State Environmental Council has prepared guidelines for assessing cultural resources and has compiled a directory of cultural consultants who can conduct such studies. The State Historic Preservation Division has drafted guidelines on how to conduct ethnographic inventory surveys. And the Office of Planning has recently completed a case study on traditional gathering rights on Kaua'i.

The most important element of preparing Cultural Impact Assessments is consulting with community groups, especially with expert and responsible cultural practioners within the ahupua'a of the project site. Conducting the appropriate documentary research should then follow the interviews with the experts. Documentary research should include analysis of mahele and land records and review of transcripts of previous ethnographic interviews. Once all the information has been collected, and verified by the community experts, the assessment can then be used to protect and preserve these valuable traditional practices.

Native Hawaiians performed these traditional and customary practices out of a sense of responsibility: to feed their families, cure the sick, nurture the land, and honor their ancestors. As stewards of this sacred land, we too have a responsibility to preserve, protect and restore these cultural resources for future generations.

TEXT OF ACT 50, SLH 2000

A BILL FOR AN ACT RELATING TO ENVIRONMENTAL IMPACT STATEMENTS

UNOFFICIAL VERSION

HOUSE OF REPRESENTATIVES H.B. NO, 2895 H.D.1

TWENTIETH LEGISLATURE, 2000

STATE OF HAWAII

A BILL FOR AN ACT

RELATING TO ENVIRONMENTAL IMPACT STATEMENTS.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The legislature finds that there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawai'i's culture, and traditional and customary rights.

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "aloha spirit' in Hawaii. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and (2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

SECTION 2. Section 343-2, Hawai`i Revised Statutes, is amended by amending the definitions of "environmental impact statement' or "statement" and "significant effect", to read as follows:

"'Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic [and] welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The initial statement filed for public review shall be referred to as the draft statement and shall be distinguished from the final statement which is the document that has incorporated the public's comments and the responses to those comments. The final statement is the document that shall be evaluated for acceptability by the respective accepting authority.

"Significant effect" means the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic [or] welfare, social welfare[.], or cultural practices of the community and State."

SECTION 3. Statutory material to be repealed is bracketed. New statutory material is underscored.

SECTION 4. This Act shall take effect upon its approval.

Approved by the Governor as Act 50 on April 26, 2000

2. CULTURAL IMPACT ASSESSMENT METHODOLOGY

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants, including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access to gathering areas would be included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices.

The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

1. identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua`a;

2. identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;

3. receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;

4. conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;

5. identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

6. assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons

interviewed should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials are likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burials. At times an informant may provide information only on the condition that it remain in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Mahele, land court, census and tax records, including testimonies; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

3. CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§ 11-200-10 and 16 through 18, the portion of the assessment concerning cultural impacts should address, but not necessarily be limited to, the following matters:

1. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.

2. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.

3. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.

4. Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.

5. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.

6. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site.

7. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

8. An explanation of confidential information that has been withheld from public disclosure in the assessment.

9. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.

10. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.

11. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. If you have any questions, please call 586-4185.

Appendix B Authorization and Release Forms

Mrs. Alfansa Lopez

Cultural Surveys Hawai'i Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

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Kaua'i P.O. Box 498
Lawai, HI 96765
Ph: (808) 245-4881

Authorization and Release Form

Cultural Surveys Hawai'i (CSH) is grateful for the generosity of the Kūpuna and Kama'āina who have willingly shared their knowledge and experiences for the preparation of a cultural impact assessment for the proposed Lāna'i Senior Center project, affordable housing project and the Lanai High and Elementary School project.

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

1. You will have the opportunity to review the written transcription of our interview with you. At that time, you may make any additions, deletions, or corrections you wish.
2. You will be given a copy of the interview transcript you have approved for your records.

For our records and yours, we humbly request your confirmation that:

1. You were given the opportunity to review the transcript of the interview.
2. You consent to the use of the interview with any revisions specified by you for historic documentation and academic purposes.
3. You consent to the interview being made available to the public.

I, Alfansa Lopez, agree to the procedures outlined above and by my
(Please print your name)
signature, given my consent and release for this interview to be used for historic documentation and academic purposes.

Additional Comments and Clarifications:

Alfansa Lopez
(Signature)

3-10-09
(Date)

Aunty Irene Perry

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Hallett H. Hammatt, Ph.D., President

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Authorization and Release Form

Cultural Surveys Hawai'i (CSH) is grateful for the generosity of the *Kūpuna* and *Kama'aina* who have willingly shared their knowledge and experiences for the preparation of a cultural impact assessment for the Lāna'i High and Elementary School Expansion, the Senior Center Demolition and New Construction and the Lāna'i City Affordable Housing projects.

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

1. You will have the opportunity to review the written transcription of our interview with you. At that time, you may make any additions, deletions, or corrections you wish.
2. You will be given a copy of the interview transcript you have approved for your records.

For our records and yours, we humbly request your confirmation that:

1. You were given the opportunity to review the transcript of the interview.
2. You consent to the use of the interview with any revisions specified by you for historic documentation and academic purposes.
3. You consent to the interview being made available to the public.

I, Irene Perry, agree to the procedures outlined above and by my
(Please print your name)
signature, given my consent and release for this interview to be used for historic documentation and academic purposes.

Additional Comments and Clarifications:

Irene K Perry
(Signature)

6/12/04
(Date)

Mrs. Margaret Hubin

Cultural Surveys Hawai'i Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

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For our records and yours, we humbly request your confirmation that:

1. You were given the opportunity to review the transcript of the interview.
2. You consent to the use of the interview with any revisions specified by you for historic documentation and academic purposes.
3. You consent to the interview being made available to the public.

I, Margaret Hubin, agree to the procedures outlined above and by my
(Please print your name)
signature, given my consent and release for this interview to be used for historic documentation and academic purposes.

Additional Comments and Clarifications:

Margaret Hubin
(Signature)

5-14-09
(Date)

Mr. Noboru Oyama

Cultural Surveys Hawai'i Inc.
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1. You will have the opportunity to review the written transcription of our interview with you. At that time, you may make any additions, deletions, or corrections you wish.
2. You will be given a copy of the interview transcript you have approved for your records.

For our records and yours, we humbly request your confirmation that:

1. You were given the opportunity to review the transcript of the interview.
2. You consent to the use of the interview with any revisions specified by you for historic documentation and academic purposes.
3. You consent to the interview being made available to the public.

I, Noboru Oyama, agree to the procedures outlined above and by my
(Please print your name)
signature, given my consent and release for this interview to be used for historic documentation and academic purposes.

Additional Comments and Clarifications:

Noboru Oyama
(Signature)

5/12/09
(Date)

Mrs. Setsuku Hashimoto

Cultural Surveys Hawai'i Inc.
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Hallett H. Hammatt, Ph.D., President

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2. You will be given a copy of the interview transcript you have approved for your records.

For our records and yours, we humbly request your confirmation that:

1. You were given the opportunity to review the transcript of the interview
2. You consent to the use of the interview with any revisions specified by you for historic documentation and academic purposes.
3. You consent to the interview being made available to the public.

I, Setsuku Hashimoto "Cookie", agree to the procedures outlined above and by my
(Please print your name)
signature, given my consent and release for this interview to be used for historic documentation and academic purposes.

Additional Comments and Clarifications:

Setsuku Hashimoto
(Signature)

6/2/09
(Date)

Mrs. SusanaKincaid

Cultural Surveys Hawai'i Inc.
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

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2. You will be given a copy of the interview transcript you have approved for your records.

For our records and yours, we humbly request your confirmation that:

1. You were given the opportunity to review the transcript of the interview.
2. You consent to the use of the interview with any revisions specified by you for historic documentation and academic purposes.
3. You consent to the interview being made available to the public.

I, Susana Kincaid, agree to the procedures outlined above and by my
(Please print your name)
signature, given my consent and release for this interview to be used for historic documentation and academic purposes.

Additional Comments and Clarifications:

Susana Kincaid
(Signature)

5-14-09
(Date)

Mrs. Yasuko Gima

Cultural Surveys Hawai'i Inc.
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2. You will be given a copy of the interview transcript you have approved for your records.

For our records and yours, we humbly request your confirmation that:

1. You were given the opportunity to review the transcript of the interview.
2. You consent to the use of the interview with any revisions specified by you for historic documentation and academic purposes.
3. You consent to the interview being made available to the public.

I, Yasuko "Suzie" Gima, agree to the procedures outlined above and by my
(Please print your name)
signature, given my consent and release for this interview to be used for historic documentation and academic purposes.

Additional Comments and Clarifications:

Yasuko Gima
(Signature)

6/14-09
(Date)

Appendix C Formal Letters of Response

Mr. Kepa Maly – Lāna'i Culture and Heritage Center

KAMOKU Ahupua'a (literally, "the district") contains 8,291 acres, and is situated on the *kona* (leeward) side of Lāna'i. It is bounded on the north by Ka'ā Ahupua'a, and on the south by Kalulu Ahupua'a. Kamoku was noted for its upland forests and springs with areas which the Hawaiians developed into an extensive forested dry-land agricultural system, in the Kō'ele, Kaiholena and Nīniniwai region. Temporary and long-term residences, from which the rich fisheries fronting the *ahupua'a* were accessed, spotted the sheltered coves along the shore. Palī was the *Konohiki* of Kamoku under the Kamehamehas, and at the time of the *Māhele*, Kamehameha III retained the *ahupua'a* as a Crown Land. *Uhu* (parrot fish) was the *kapu* fish, and *koko* (*Euphorbia* spp.) was the *kapu* wood. Oleloa, a woman of chiefly lineage, claimed the important spring-watered bay of Kaumālapa'u (an *'ili* of Kamoku), but relinquished it to the government during the *Māhele*.

Native tenants of Kamoku Ahupua'a who filed claims for kuleana (fee-simple property rights) in 1847-1855

L.C.A. Helu	*Claimant*	*Ahupua'a*	*Ili*
6814	Pakele	Kamoku	Haupu, Kuapohaku, Lelehaka
6833	Kaaiai	Kamoku	—
8556	Kaauwaeaina	Kamoku	Pueo
10630	Palī	Kamoku	—

3 719

Kamoku Ahupuaa
District of Lahaina, Island of Lanai
Boundary Commission, Maui,
Volume No. 1, pages 114-115

No. 37–A. Survey of the Crown Land of "Kamoku" Lanai
(See *Figures 3 & 4*)

Commencing at a pile of stones over a cross cut in a large stone on South side of Kaumalapau Harbor on edge of gulch. The boundary runs:

1. N 86° 27' E true 3254 feet along Kalulu up South edge of gulch to a stone marked with a cross on edge of gulch a little above a branch that comes into the main gulch from the South. Thence:
2. N 88° 46' E true 5225.9 feet along Kalulu, up South edge of gulch to a cross cut in a stone on South edge of same. Thence:
3. N 84° 40' E true 2594 feet along Kalulu to head of gulch. Thence:
4. N 72° 43' E true 2080 feet along Kalulu to a cross cut in a stone amongst a lot of stones at the former site of an old *Heiau* called "Ili o Lono." Thence:
5. N 46° 19' E true 10144.4 feet along Kalulu up road to a point a little North of a cactus clump marked by two triangular pits.
6. N 65° 44' E true 4939 feet along Kalulu along North edge of crater to

1

a red wood post on the North wall of the crater at a place called Pulehuloa near Kelihananui's house.

7. Thence along Kalulu down across a small ravine (coming in from the North called Keaaku) to Government Road and up the N.W. edge of the Kapano valley, passing near Kawaonahele's house to a point on ridge marked with four triangular pits and ditch thus ; said point being a little east of Puu Nene and bearing N 44° 53' E true 8052 feet from above mentioned red wood post. Thence:

8. N 45° 49' E true 1067.9 feet along Kalulu across valley passing to the S. E. of a water hole called Kaiholena to a red wood post on ridge that comes down from the central mountain range. Thence:

9. N 62° 37' W true 6742.5 feet along Paomai down above mentioned ridge and across valley into a small ridge and down said ridge to a red wood post at end of same.

10. S 84° 37' W true 1316.8 feet along Paomai to a cross cut in a stone.

11. S 74° 8' W true 6258 feet along Paomai passing to the North of a couple of *Hala* clumps to two Triangular pits at an old house site.

12. S 74° 07' W true 3045 feet along Paomai to a cross cut on a stone at head of gulch.

13. N 86° 6' W true 1368 feet along Paomai down South side of gulch.

14. S 83° 45' W true 1455 feet along Paomai to a cross cut in a stone.

15. S 74° 9' W true 920 feet along Paomai.

16. N 55° 12' W true 898 feet Paomai across gulch to a red wood post a little West of a cactus clump; here ends the Crown land of Paomai. Thence:

17. S 65° 58' W true 1617 feet along Kaa down North side of gulch to a cross on a stone.

18. S 64° 57' W true 2040 feet along Kaa down North side of gulch to a cross on a stone. Thence: [page 114]

19. S 70° 33' W true 3590 feet along Kaa to a point 10 feet East of a large rock with cross cut on it. Thence:

20. S 68° 53' W true 1664 feet along Kaa to Sea Shore. Thence:

21. S 1° 55' W true 13460 feet along sea shore to point of Commencement. Area 0291.09 Acres.

Surveyed by M.D. Monsarrat, Assistant
Hawaiian Government Survey

Lanai. June 1877. [page 115]

2

Mrs. Phyllis Cayan – State Historic Preservation Division

Kamoku 6

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

March 31, 2009

LOG NO: 2009.1622
DOC. NO: 0903PC012

MEMORANDUM

TO: Colleen Medeiros Dagan, Archaeologist
Cultural Surveys Hawai'i, 1993 Main Street, Wailuku, Hawai'i 96793

FROM: Phyllis Coochie Cayan, History and Culture Branch Chief P. Coochie Cayan

Subject: **KAMOKU 6: Cultural Impact Assessment (CIA) Community Contact Letter for the Lana'i Affordable Housing Project, Kamoku Ahupua'a, Lahaina District, Lana'i Island. [TMK: (2) 4-9-002:058 (por.)**

Mahalo for the opportunity to comment on this CIA regarding the Lana'i affordable housing project on the island of Lana'i. The maps you provided are helpful in our comments as follows:

1. The vicinity map is shows the proposed project area which in historic times was heavily in pineapple cultivation and prior to that part of the Ko'ele cattle ranching operations.

2 SHPD notes there are no place names in the current project area that would help indicate land use or traditional cultural practices which does not mean there was no traditional activities there in the pre-contact or early contact days. Mr. Kepa Maly at the Lana'i Cultural and History Center (LCHC) has just completed documentation on all of the ahupua'a of the island that you may find helpful for your research on traditional cultural impacts.

Despite the appearance of the land today and its most recent uses, there is mo'olelo of Lana'i that may illustrate events that happened in mythological times which may be of historical and cultural interest, i.e., battle by invading warriors who ruined the land or stories of spirits and ghosts. Further, you may want to consult George Munro's book that came out last year entitled 'A History of Lana'i' with first hand documentation on the island land use.

SHPD further recommends that you all consult with the following Lana'i folks to hear more Lana'i-based mana'o for your cultural impact assessment report:

1. Mr. Kepa Maly, Executive Director, Lana'i Culture and History Center. Phone: 808-565-7177
2. Mr. Albert Morita, Retired DOCARE officer, LCHC board of director member. amorita@aloha.net
3 Aunty Irene Cockett Perry, Kupuna. Phone: 808-565-6656 (arrange with Kepa to see her)
4. Members of the Hui Malama Pono O Lana'i (see Kepa for contact information).

Any questions, please call me at 808-692-8025 or via email at Phyllis.L.Cayan@hawaii.gov

C: Mr. Hinano Rodrigues, SHPD Maui Cultural Historian

Mr. Clyde Namu'o – Office of Hawaiian Affairs

PHONE (808) 594-1888 FAX (808) 594-1865

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

HRD09/4203B

April 24, 2009

Colleen Medeiros Dagan, Archaeologist
Cultural Surveys Hawai'i
1993 Main Street
Wailuku, Hawai'i 96793

RE: **Cultural Impact Assessment consultation**
Lāna'i Affordable Housing Project
Kamoku Ahupua'a, Lahaina District, Lāna'i Island
Tax Map Key: (2) 4-9-002:058 (por.)

Aloha e Colleen Medeiros Dagan,

The Office of Hawaiian Affairs (OHA) is in receipt of your March 25, 2009 letter initiating consultation and seeking comments ahead of a cultural impact assessment (assessment) for the proposed Lāna'i City Affordable Housing Project. Based on the information contained within your letter, the project area is currently part of a 115-acre parcel under the control of the County of Maui which is currently in the process of being subdivided into two parcels. The County of Maui intends to donate 73 acres of this larger parcel for the subject affordable housing project. The preliminary master plan for this project proposes a total of 387 housing units.

OHA recommends that consultation occur with Kepa Maly, Sol Kaho'ohalahala and Matha Evans who may be willing to share their mana'o with you. Please remember that this list is not all encompassing and we are sure additional individuals will be identified as you move forward with your consultation process.

We are aware that your firm is also conducting separate assessments for the Lāna'i Senior Center and Lāna'i High and Elementary School Expansion projects and suggest that if appropriate, consultation with interested parties for all three assessments occur at the same time so that participants gain an understanding of how all three projects fit within the cultural landscape of the area.

Colleen Medeiros Dagan, Archaeologist
Cultural Surveys Hawai'i
April 24, 2009
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Thank you for initiating consultation at this early stage and we look forward to the opportunity to review the draft assessment and provide additional comments. Should you have any questions, please contact Keola Lindsey, Lead Advocate-Culture at (808) 594-1904 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: OHA Lāna'i CRC office

Appendix D Formal Interview Transcriptions

1 **Senior Center Interview**

File Name(s)	Senior Center Interview.wav
Job Code	Kamoku 8
Recording Date	04/09/2009
Transcription Date	4/23/2009-5/06/2009
Participants	Colleen Dagan (CD), Suzanna Kincaid (SK), Margret Hubin (MH), Cookie Hashimoto (CH), Alfansa Lopez (AL), Aunty Irene Perry (IP), Sugar Gima (SG), Dolce (D).

2 *This interview was conducted at the Lāna'i Senior Center with a group of mainly four women.*
3 *Others added to the interview in passing and some like Ms. Sugar Gima were at an*
4 *adjoining table but did not make any statements. Question marks indicate an unidentified*
5 *speaker. The main focus of this interview was to hear stories about life in Lāna'i City.*

6 *(CD): Ok, I'm here at the Senior Center with a bunch of ladies, so I, first let's get everybody's*
7 *name, what's your name?*

8 (CH): Cookie Hashimoto.

9 (AL): I'm Alfansa Lopez.

10 (MH): Margret Hubin.

11 *(CD): What's your name?*

12 (SG): Sugar.

13 *(CD): Gima?*

14 (SG): Gima.

15 *(CD): And what was your name?*

16 (D): Dolce ?

17 *(CD): Ok, so that's whose here for now and I'm just asking,*

18 (CH): [explaining to another] Do you know some stories?

(CD): Anybody's welcome. I don't know, do you guys have anything you remember about growing up on Lāna'i, About the hotel, the Pagoda, what did she say, about the Pagoda?

(CH): No that's not Pagoda, Banzi, that was run by the Lāna'i, ah, Pineapple Company.

(CD): Which building was that?

(CH): That's the one that , you know where the inaudible,

(AL): Pele's Garden.

(CH): Pele's Garden? Yeah, that used to be Banzi Hotel before.

(CD): When?

(CH): In the 40's. When my mother was working there, I was practicing tennis yeah, so I still remember, "Eh mom, you better not come pregnant" cause I no want (laughs). That was '48, yeah, '48, 1948 so.

(AL): Cousin said Masai going be here, is she inaudible, play with? church ?

(CH): Oh, yeah, yeah she did. She gonna be this way, she talked about Hanamastu, yeah, but then they change the (inaudible).

(AL): They would know more, she did more.

(CH): She did, she did,

(SK): Facts than we did, they did, you know she would know more of,

(CD): Did you guys come here later?

(AL): No, we weren't here, but you know

(CH): I'm born and raised here. My mother came 19..., my mother came 1920...1924 to over here, my dad came 1923 I think, came over,

(CD): Oh, you were born here.

(CH): Yeah, I'm born and raised here.

42 *(CD): Where are you guys from?*

43 (MH): Born on Maui and came to Lāna'i. Worked here, when I was twelve,

44 *(CD) When you were twelve?*

45 (MH): Inaudible

46 (CH): You was born and raised here then (laughs)

47 (AL): You was born, Miki side, Miki Camp?

48 (MH): Down here, we were in that tall inaudible, you know that Hajiroki used to stay skate?

49 (AL): Over here?

50 (MH): Yeah, yeah.

51 (AL): Oh, yeah, yeah.

52 (MH): You know had the house had two inaudible

53 (AL): Oshiro. Yeah, yeah, I know.

54 (CH): That's where dad used to stay.

55 *(CD): And where are you from*

56 (AL): I'm from Maui too, I came, we came over when I was three years old, I grew up here.

57 *(CD): So what did you guys do, what were the social activities to do growing up.*

58 (AL): Raising kids!

59 (Speaking to each other) When growing up, what kind of activities,

60 (SK): You mean childhood?

61 *(CD): Whatever, childhood, teenager,*

(SK): Well when I was younger I used to do the marble bit, until my mother found out.

(Laughs)

(CD): Marble?

(SK): Marble, I had a whole can until my mother find out, she threatened to boil it.

(AL): Yes! Make soup!

(CH): Yes! (Laughs)

(AL): She said, Cause we wouldn't come in, when it's time to take a bath nobody wanted to come in, playing marbles, so said, get marbles put them together, make soup.

(CH): Yes, that's right.

(CD): What kind of game?

(CH): Used to play, on our road, used to play, what that, Pee Wee, you now with that broom stick? One side, short end, one side, take it off, inaudible, we used to play with the boys, but today the kids they don't do that. Marbles, we used to do that, and we used to play hide and seek. Hide and seek.

(SK): We used to go hiking.

(CD): Where did you go hiking?

(SK): All over, up the inaudible by the pig pen, the golf course.

(CD): The pig pen? Where was the pig pen?

(CH): You know where the Lapco is now? The Lapco division...

(AL): Where Momi live.

(CD): Yeah.

(SK): In the Back,

(CH): The back portion there piggery, before used to own private.

(SK): Used to go pick guavas over there.

(MH): Or used to go bowling.

(CD): Bowling?

(CH): All day, when the company had all day?

(MH): Baseball.

(CH): I used to play softball.

(SK): Used to have a nice team there was more than three teams, yeah,

(AL): Oh yeah!

(SK): The high school,

(CH): Have high school, Have Federation, used to get, um I used to be with Office team, had several in the community, community softball, the women.

(AL): Go pick up all the, in the rubbish, when we were kids look for toys in the rubbish, "oh, this is good" (laughs). Bum-by, Take 'em home!

(CH): Used to pick, what, guavas and used to go pick, wild, what you call that, wild...

(SK): Poha

(CH): Poha yeah and ...

(CD): Poha berries?

(CH): And the cherries,

(CD): What kind of cherries?

(AL): Plum, plum,

(CH): yeah, plum cherries. The wild ones.

106 (AL): The wild plum cherries.

107 *(CD): Where did you guys pick those?*

108 (CH): Right down there, um Lalakea, um Lalakea, around there

109 *(CD): Was the bowling...*

110 (CH): Bowling is right down here (points to Dole Park).

111 (SK): Bowling alley is right in the middle of the park.

112 (CH): ...community center.

113 (SK): That big building, what is it?

114 (AL): Community Center.

115 *(CD): Was that kind of the social, what was the social scene...*

116 (SK): They had boxing, remember.

117 (AL): Oh yeah.

118 (CH): Yeah.

119 (SK): My parents used to take me to the gym, right down here, and then we had...

120 *(CD): Who would box?*

121 (AL): Local boys. And we had carnival, I remember

122 ...annual,

123 (AL): Right down here, yeah,

124 (SK): EK Fernandez carnival.

125 *(CD): In that field?*

No right down here,

Across the street.

Do you remember!

They even had wrestling,

(SK): They even had the mound where they'd wrestle

Japanese wrestling

(CD): They built it?

Yes, there's more things before, for us to do community wise, than there is now, now it's like there's a lot of meeting now (laughs). But it was family oriented. Because even the dances, you could go, take your children.

(CD): What kind of dances were there?

(SK): Social and whatever.

(MH): Do the meals and everything inaudible

(AL): Social work, social dancing, the mothers waiting for their children.

(CH): Right, right, right. The wartime we used to have a social dances in the streets, people used to sponsor, yep, and we used to play and go to social dance.

(CD): What were those like?

(CH): Well, you know, a lot of fun, because you go stag and get a lot of girlfriends (everybody laughs). Stag, a bunch of girls stag,

(AL): No more one particular partner eh,

(CD): How old were you guys when those were happening?

(CH): A teenager.

(SK): There was no restriction on going to dances yeah.

149 (CH): yeah, they tried, but usually they had about 11:00 [pm], 10:30, 11:00.

150 (AL): There's no curfew, but well, some mothers don't trust yeah, so the mothers waiting
151 outside, waiting for us til the dance pau!

152 (SK): That was your mother, my mother never came (laughs, several exchanges at once).

153 (CH): My mother had one flashlight (laughs)

154 (AL): My mother came, I could see the reflection of her glasses (laughs).

155 Yeah, really

156 (lots of laughing and several exchanges at once, inaudible)

157 (SK): But we weren't embarrassed yeah.

158 No.

159 You don't feel,

160 Inaudible

161 *(CD): So did anybody meet their husbands at these dances?*

162 Inaudible

163 (CH): Regular school dance…I used to go with my husband, they used to go public dance

164 *(CD): Public Dance?*

165 (CH): Yeah, they used to go "public dance", '46, about '45, '46, '47 inaudible we used to go
166 public dance, but then sometime somebody get group of people, you know clubs sponsor
167 inaudible, so they usually have a live, band.

168 (Inaudible, multiple conversations)

169 *(CD): What kind of music?*

170 (CH): Well, Hawaiian music, what's that dance (inaudible) not like today kind, they had ah,
171 jitterbug and that but not that like today.

(SK): Remember the Filipino man he says, "do you wanna dance?" some of us he asked and I says, "I don't jitterbug" and he says "I never asked you to jitterbug" and I says, "I don't dance",

(AL): And then those days, they don't come and ask you "may I have this dance" they go like this (pointing motions, laughing),

(CH): Yeah, reserve dance already, reserve dance! Because I guess you know, they know that people around yeah. Cause, then, well some of them say "may I have this dance",

(AL): The proper way ah,

(CH): Cause then they ask you, oh,

(MH): only had this way when they stared turning out, may I have this dance.

(AL): They teach you how to,

(CH): Cause you know why, they used to have the student body dances, Oh, yeah, when I was seventh grade, we used go under, you know the gym, the basement, yeah, we used to go there to learn.

(CD): To learn to dance?

(CH): To dance.

(CD): The basement of the gym?

(CH): Yeah, but those are the school days, that we have our seventh eighth grade 12.21, that's where we learned to dance all different steps.

(CD): Different steps, like what?

(CH): Fox trot, what that, waltz, and another one, what was it now? Three major dance, fox trot, waltz and what the other one, there were three major dance. Yeah.

(CD): So were those the major social things, the dances?

(CH): Yeah, those were the, those days used to go to school, a student body, used to have a dance for them, for the classes,

(CD): So there were school dances and public dances?

(CH): School dances, yeah public dances,

Inaudible 13.23

(CD): Pubic dances, so that's when parents would come also, like you would go with your husband,

(SK): They'd come look for us (laughs),

(CD): You'd go without your husband.

(CH): But those days was, I used to go to public dances inaudible 13.39, after I graduated, about what, '45, '46, '47 inaudible 13.45, yeah, I'm out of school already inaudible 13/48,

(SK): What sort of entertainment, we had movies, Japanese movies,

(CH): inaudible 13.55 they have all type of movies going on,

Ten cents

Ten cents

(CD): What was that?

(CH): Ten cents.

(CD): That's how much it costs?

(CH): Yeah, to go to the movies.

(CD): Did you guys have your favorite seats at the movie theatre?

(AL): Oh, yeah. We'd sit by the benches, by when we became teenagers went up there (everybody laughs) we all had boyfriends. Way up where nobody could see you. (everybody laughs) Unless the lights went on! Watch out now, everybody would turn around, the lights went on, everybody would turn, because all the ones get under? They all inaudible.

(CH): But then those days, the theatre run by the Company,

(CD): What was that?

(CH): The theatre was run by the Company, my dad used to be the operator,

(CD): Your dad was the operator of the theatre?

(CH): Yeah, after inaudible.

(CD): Oh, what was his name?

(CH): Iwao Koshigi, 70, inaudible my dad used to work there.

(CD): Oh, wow!

(CH): inaudible

(CD): Do you guys remember any, I don't know what to call it anymore, these days they call it "urban myths", like superstitions around town, like things you were scared of or places you were scared to go or told not to go, or maybe like the night marchers,

(SK): The white lady.

(AL): The white lady.

(SK): Dog man.

(CD): Dog man?

(SK): Who was the lady, I got a book, she has the, a book written by Patsy Saiki, not Pat Saiki,

(CH): Not the one, the one,

(SK): Obake

(CH): Obake

(SK): yeah

(CH): inaudible 16.08 Fuji...something about Lāna'i ghost stories.

(CD): Oh yeah, what were the stories about?

(CH): About Lāna'i.

(CD): Do you guys remember some?

(CH): Oh well, I don't know if that's true or what but they have lots of stories going. Yeah.

(CD): That's ok, doesn't matter if it's true or not.

(CH): Yeah, right, (laughs) the Fujii one she said, you know, like her she inaudible like people have seen, you know I mean,

(CD): Seen who?

(CH): Whatever, ghosts or whatever they have seen,

(AL): You know Filipinos used to say, what, they take the, the, yeah, and you put um over here, I don't know, (gesturing to her eyes)

(CD): Your maka piapia?

(AL): Yeah, yeah, take,

(CD): And put it where?

(AL): On your, and you can see, that's what our, the Filipino's tell us, you know when we were kids,

(CH): Oh, when we were kids,

Inaudible

(AL): You take,

Put in on your eye,

(AL): Yeah, you take, then you can see

(CD): See what?

Ghosts,

(CH): Ghosts or whatever.

(CD): Oh.

(AL): That's what this is,

(CD): That's a Filipino superstition?

(AL): Yeah.

(SK): inaudible (laughs).

(CD): And what was the white lady?

(CH): The white lady is what? She was walking ah, you know where the, engineers shop is yeah? You know engineers shop, right there,

Used to be the power plant before it, that's where they said they used to see her,

(AL): I remember my father-in-law, used to, was watering the plants, was getting,

(CH): little dark out,

(AL): Yeah, he said had this lady walking down, down, and told my father inaudible you know, she like water, so my father-in-law, give em, and then, when she came out with the water, the lady no was. Inaudible, the lady no was. And what kind, how she was dressed, you know get long hair, and not fair, dark, who that lady? We think of who that lady was?

(CH): Was she Hawaiian,

(AL): And then a few days later that's when the volcano erupted, I told myself, maybe it was Pele, because she comes in different forms,

(CH): Pele, maybe, anyplace, right

(AL): inaudible (laughs)

(CH): Things like that do happen.

(AL): Yeah,

(CD): Were there night marcher stories about around town,

(SK): Oh, that was at the beach, nightriders,

(CD): At the beach?

(SK): When I was a brownie we used to go down to the beach and have overnight,

(CD): At Manele?

(SK): Yep, and our camping gear consisted of a, blanket. That was it. And they said that at night you could hear the Ali'i's and I going, "that's it!" I never went camping there again.

(CH): inaudible...sleeping, so that they don't hear anything.

(CD): That was the ghost stories?

(CH): Ghost stories, yeah.

(SK): But she was good, Mrs. Caldwell, she was good at Hawaiian tales because she came from the Vontemples, she was part of the Vontemples from Kauai and they were living here for a long time.

(CH): Yes she inaudible

(SK): So she know all those stories, so every time we went camping she told us stories like that, I can't go camping anymore (laughs).

(CH): Girl scout eh, Girl scout camp. Brownies, that Brownies yeah.

(CD): Was it fun, you guys enjoyed growing up here?

(SK): We didn't know how the other kids lived on the other islands, we just lived our own, inaudible, there was no crime, you didn't have the cops coming, unless you moved to block 35 (laughs).

(CH): Yeah!

(Everyone laughs)

(CD): Block 35? What was block 35?

(AL): That's why I said our streets was, was called blocks.

(CH): Not today yeah,

(AL): Not like today streets.

(CD): I see.

(SK): It was block 50, block 55, block 35, inaudible, what's that street now? Its... Fraser... and what's the street? You know the crossing by Frank, in front Frank's house? By Alfred's house?

(AL): Oh, I don't know, Lāna'i Avenue?

(CH and AL): Lāna'i Avenue, Gay, Lāna'i and Gay?

(SK): Aunty Irene should know about the stories.

(CD): Which stories?

(Laughing)

(SK): Your on tape.

(CH): But really Lāna'i used to be, you know I mean, a small community, but you know with all different ethnic group we can get along, you know we used have, separate, village camps, Japanese Camp, Filipino Camp,

(CD): Did you say Federation Camp?

(CH): Yeah, used to be right camp, you know where the Federation people used to be,

(CD): Federation,

(CH): You didn't hear about that today.

(SK): Until two years ago Mona didn't know what Federation was either.

(CH): Yeah you don't hear about it today but you know those days,

(SK): inaudible, back conversation

(CH): They go by block.

(CD): What was that block 35 that you...

(CH): That why the company...

(SK): That's where the people with lots of kids lived (laughs).

(CH): That's how the Company, you know when they first built our community, started by blocks certain places, block something, you know, that's how.

(CD): So block 35, that wasn't like the bad part of town? (Everybody laughs)

(CH): No, no...

Inaudible

(SK): No, it was just; there was a lot of boys, more boys on that block than girls,

(AL): Filipinos used to be one group, and ah, Japanese, Korean, they have their block, yeah.

(AL): Like Koreans, the Koreans had one upside,

(SK): And the kanakas was Kō'ele,

(CH): the Hawaiians up that side, and the Japanese...inaudible, block 16 and what, up Stable Camp, used to go, inaudible, but used to be a Stable Camp for the Company, the Company used to have their, what's it called, stables there where they used to keep horses and that's the one they drag, go out in the field,

(CD): Pull the plows.

(CH): Pull the plows, inaudible... on that wagon, used to keep all the horses there the mules, yeah,

(CD): Yeah.

(CH): That's the one that today is, you know where inaudible is? The maintenance shop is? Inaudible service station, that's our inaudible inaudible they used to call the Stable Camp. It's just the stable camp, and they say that all the Japanese group, and the Filipino group.

(AL): What, they use to have buses in there, the stable camp?

(CH): Yeah, yeah that's the quarter? yeah it use to be stable yeah, over there.

(AL): The Oshiro, the LCS,

(CH): Yeah, yeah, the LCS,

(AL): Get service station now...

(CH): And the maintenance shop there too, eh. Yeah, yeah used to be all there. That's where all the horses used to be.

(CD): Oh no, no I'm fine. I'm still full. I had a huge breakfast.

(CH): Did you come last night?

(CD): No, I came this morning, early this morning.

(CH): From Maui?

(CD): Yeah, from Maui. The first ferry this time, so I wouldn't miss you guys.

(AL): Was it rough coming over?

(CD): No, it was not rough. Do you want sit down here?

Aunty Irene Perry (IP): No, I rather stand, if I sit down I cannot get up.

(IP): My knees are bad.

(CD): Where was up-camp?

(CH): Up-camp, they called up-camp, was what? Ah...where all the haoles stay, what you call that was? Snob Hill.

(CD): Oh, that's the same place.

(AL): That would be Snob Hill. Up-camp is,

(SK): From the theater up, is up-camp.

(AL): And then, from this street down is down-camp,

(SK): depends on where you were living (laughs). Down there up-camp was there, inaudible.

(CH): Yeah, yeah

(Lots of laughter)

(IP): I use to live up, up camp (laughs, referring to Kō'ele).

(SK): That's why, Kepa was talking when he came to the MEO meeting and he was talking about Market Street and Church Street. I go "hello" Kepa, when we were kids there was not Market or Church, it was, you know where the bank is? Oh, the place by Richards, where Richard's is, it wasn't, you know Market Street,

(CH): But they used to call it though,

(SK): Yeah, but now they have a name, and then it's still blo...hey, we're it still block 35.

(CH): Yeah

(CD): By Richard's Market?

(SK): They called it Market Street.

(CD): Where you lived? But it has a different street name now?

(CH): Yeah, that's right,

(SK): Market street,

(CH): Way down,

(IP): It use to be Kō'ele, when they first named the streets, it used to be Kō'ele, right my place, and when I went away to work and then I came home different,

(AL): You mean the backside?

(Inaudible)

400 (CH): Kō'ele eh?

401 (IP): No...

402 (CH): The road from way up here.

403 (SK): Part of it is Kō'ele.

404 (CH): Part of it, oh yeah, part of it is Kō'ele, oh...

405 (IP): But my place not, when I come back I look and its (inaudible) I look and I say "eh, it's not
406 Kō'ele", it's Koali.

407 (CH): Koali,

408 (AL): Who named that Koali?

409 (SK): Who named the streets?

410 *(CD): Yeah, who named the streets around here?*

411 (SK): Who did the street names?

412 (IP): This is ahh...7th, yeah, 7th street.

413 (CH): Yeah, this is 7th yeah,

414 *(CD): But all the streets that aren't numbers, who named the, like Jacaranda?*

415 (SK): Oh, I think Jacaranda, that's afterwards.

416 (CH): Yeah, that's afterwards yeah,

417 (SK): Yeah, Jacaranda, cause my son lives there.

418 (IP): I guess the people of the company.

419 (IP): That was the people from the company must have named them.

420 (AL): You know um, you know Suzie in front your house, Mana street, Mana used to be

(SK): Uh-huh.

(AL): So what is it now, still Mana?

(CH): Yep,

(AL): Manalei.

(CH): No, Mana is still there yeah?

(SK): You mean what, where I live,

(AL): Your house. I mean your house over there,

(SK): The other street.

(IP): You live down that side, or you live up here?

(SK): Two doors down from the Hongwanji, that's where my par...mother lived, cause my mother got a divorce and she grew up there.

(IP): (inaudible)

(SK): We lived up here when we first moved to Lāna'i. And then we went to block 35, and then my parents divorced so, my mother, mama lived two doors down from the Hongwanji church on Fraser. See, I'm trying to remember the names, which is Fraser, which is Lāna'i, you know,

(CH): But they always change yeah,

(SK): And uh, there's a papaya lady. (calling out to someone)

(CD): Were there any, like, annual events that took place, that was like, I don't know, the Japanese parade, or the Filipino something-or-other?

(AL, CH): On thanksgiving, the company would have a thanksgiving, annual, luncheon, and all the people, all the community,

(SK): Is that when we went down the beach?

(CH): No, down to the park,

444 (SK): Oh the park, oh we had park ? had train tracks, I mean um,

445 (CH): That's the Company used to have,

446 (SK): Yeah, cause my uncles use to race.

447 *(CD): They had races, like car races,*

448 (SK): Track, track,

449 (AL): And they had softball,

450 (IP): Was better than now yeah,

451 (AL): Yep,

452 (IP): They had baseball players,

453 (AL): Yeah, they had baseball,

454 (IP): They had baseball teams, then the army team came over to play baseball.

455 *(CD): The Army team?*

456 (IP): Army team, and made a strike, went over the building and couldn't get the ball.

457 *(CD): And that was all for the Thanksgiving luncheon?*

458 (AL): Yeah, use to have all kine games.

459 (SK): It was a fun day, sort of . All kinds of games. They had food, hot dogs, soda, they had, and
460 fourth of July they was a parade.

461 *(CD): Oh the, they had a fourth of July parade? Do they still have a fourth of July parade here?*

462 (CH): No not anymore (everyone laughs).

463 (AL): They forgot my birthday.

464 *(CD): They forgot your birthday? Did you say a bon dance?*

(CH): Oh, yeah, that is a tradition for the Buddhist.

(CD): Do they still have it?

(CH): Oh yeah.

(All talking at once, inaudible).

(CD): What about now?

(SK): They still have the dances.

(CH): They still do.

(CD): Do you go to it, does everybody go?

(Inaudible)

(SK): Well, I didn't have a car, at night it's hard for me to maneuver around on grass or something.

(CD): So the bon dance and that's,

(SK): It's at a different place remember.

(MH): They have Rizal Day,

(SK): Rizal Day all day,

(MH): Filipinos,

(SK): Fourth a July too yeah, that was the fourth of July.

(IP): Rizal day falls on the Sunday yeah,

?: Saturday,

?: No it didn't,

(SK): That's when the Filipinos got pissed off cause (inaudible). You know after the war, they changed, they got mad at the Americans so they changed Independence day to Resolves Day instead of fourth of July.

(CH): Oh, Lāna'i (inaudible) Filipino (inaudible)

(SK): That's what I mean, but when it comes to December did they have any?

(AL): The thirty-first or the thirtieth?

(SK): Thirtieth. But after that, it wasn't, it kinda died down, yeah, died down or whatever,

(AL): But now they have the new, um, (inaudible)

(SK): Now they coming up,

(CH): The club get,

(SK): The younger kids

(Inaudible)

(AL): Traditional again.

(SK): Like John Degamma them?

(AL, CH): Yep.

(CD): Is one still called Rizal day, how do you spell it?

(AL): R-I-Z-A-L.

(CH): It's the what?

(SK): The Filipino patriot.

(CH): He's the Filipino patriot.

(IP): We had more before than we do now yeah.

(CD): Is that, why is that?

(IP): I don't know, now ah,

(CD): ...company?

(IP): Well I think the Company don't have any, any person to direct the um,

(CD): Community events?

(IP): Community events. Before that Mr. Cattleman was remember, used to be the one that, we had all kinds, (inaudible) before that Mr. Cataman was, remember, he use to run the parade. 32.58

(Simultaneous conversation) (SK): All the girls, and (inaudible) used to run for queen. The queen. (Motions to Alfansa).

(CD): You were the queen of something?

(SK): She ran for queen.

(AL): Ever since the union came in yeah, pau already, yeah. The ILW whatever.

(CH): The labor union yeah, from '49 yeah.

(CD): So were you, what kind of queen were you running for?

(IP): Who ran for Queen?

(CH): You forgot, you, Church Day

(SK): Ben-ing, ben-ing what?

(Laughing) and (inaudible).

(SK): Ben-ing, ben-ing beibika, no.

(AL): We use to sell ribbons or tickets or whatever, the more you, like how now, (inaudible)

(IP): Here

(All talking at once)

534 (SK): The one who sold the more tickets, yeah, would be queen.

535 (CH): The more tickets you sell then you…

536 (AL): Get to go in the parade,

537 (IP): You're the winner.

538 (SK): We had parades, yeah aunty? We had parades yeah?

539 (IP): And we had lots of entertainment. And everyone come in and hula troops and something
540 come in and musicians and some,

541 (AL): We use to have all kinds stuff.

542 (IP): No more now.

543 (AL): Use to have Yeah?

544 (IP): Yeah. Use to go in and we would pay so much yeah, and then get really good, but not now,
545 dead.

546 (AL): Even, even sometimes the globetrotters came yeah.

547 (CH): Oh yeah, yeah

548 (SK): That was after I left

549 (CH): They came and did some, ah, exhibition game, with the high school you know, basketball
550 players and, the community, and they were good, even once they had this gym. The other one
551 they had down, the down, what's that ah, (inaudible) troop, twice they came.

552 (SK): You know who they were?

553 *(CD): Yeah, yeah, I remember them.* 35.23

554 (Laughing)

555 (CH): So (inaudible)

556 (SK): No, I'm serious,

557 *(CD): No, I know.*

558 (SK): Cause, two weeks ago, the bus, I went shopping in the senior bus out by Pine Isle, I shop
559 there, the kids were having a sale for the bake goods, so I say "oh I want the blueberry
560 cheesecake", you know, two. And I say okay, I said "dollar and a half" and she looks at me
561 strange, dollar and a half and dollar and a half is three dollars right and she says "yeah", I say
562 okay I'm giving you five dollars instead of three. I don't want the change I'm donating it to your
563 girls club. She didn't know what the dollar-half was.

564 (CH): No wonder, dollar half,

565 (SK): Dollar fifty cents I should have said,

566 (CH): Dollar fifty cents, yeah, yeah,

567 (SK): I say dollar and a half. She didn't know what that was, she was only 13 or 14. I go "ah
568 poor thing".

569 (CH): I guess you know,

570 (AL): They no use, (inaudible, all speaking at once) well before what, we used to tell ah two-bits,

571 (CH): yeah, two-bits, that was quarter,

572 (AL): that was quarter,

573 *(CD): I didn't know that.*

574 (Everyone Laughs).

575 (CH): You're too young to know (laughs).

576 (SK): You know, that's why I explained to her what I was doing, that's a dollar and a half.

577 (CH): Half the time, they no, yeah, I think,

578 (AL): Used to tell, dollar-half,

579 (CH): Yeah, dollar-half, (inaudible, everyone talking at once)

(SK): She had no idea what she was talking about. I know what blank is like. (Laughs) I looked at her and blank, she didn't know what I was (inaudible).

(SK): Dollar-half...

(CH): Dollar-half...

(CD): Is there anything, are there any specifics that you guys would like to see in the new Senior Center building?

(SK): In the what?

(CD): Is there anything, um, anything you really want the new Senior Center to have?

(SK): A new building (laughs). Not so cold when its rainy weather.

(CD): (Noting) Not so cold. Any choice of flooring?

(AL): Something warm,

(SK, AL): Something easy for clean.

(Final two minutes cut upon interviewee request)

Mr. Noboru Oyama

File Name(s)	SqueakyOyama.wav
Job Code	Kamoku 4, Kamoku 6, Kamoku 8
Recording Date	March 27, 2009
Transcription Date	April 3, 2009 through April 16, 2009
Participants	Noboru "Squeaky" Oyama (SO); Takeo Yamato (TY); Colleen Dagan (CD), Maggie Masicampo (MM)

Mr. Noboru "Squeaky" Oyama Moved to Lāna'i in 1925 with his family. He was born in Wailuku, Maui. His father worked with horsed in Kahului and after moving to Lāna'i he became the plantation's stable man. Mr. Takeo Yamato, also a long time Lāna'i resident was present for a short portion of the interview.

Colleen Dagan (CD): Alright. I'm sitting here with Mr. Squeaky Oyama. Noboru. And...I guess I'm just curious to know what Lāna'i city was like when you were a child growing up here.

Squeaky Oyama (SO): Well, when we first came to Lāna'i...I'd like to talk a little bit (inaudible).

(CD): Okay...okay.

(SO): We came here in 1925, and ah...there were actually only...ah, 44 homes set up in the city.

(CD): 44—

(SO): 44 homes. 22 on the north side of Dole Park—this is Dole Park here—and 22 homes on the other side of the town. And, ah, it was really, ah...like well-planned, 22, 22, and ah, the buildings for business, was...was similar, both sides. Okamoto store, on the other side, Yet Lung's, the Chinese store. Bakery on the other side, bakery...another bakery on this side of the town.

(CD): Oh, uh huh.

(SO): And ah...the police station was set up after 1924. And ah...the gym was built about 1933. And ah, of course the Union Church now, that sit on Fraser Avenue, was ah, built by the Japanese Community, and ah, during World War II it was taken over by...by the government—the plantation rather—and given to the..., ah, Protestant Church.

(CD): Oh. Where did you guys—you and your family come from?

(SO): We came from, ah, Wailuku, Maui.

(CD): Oh. Is that where you were born?

(SO): Yes, that's where I was born.

(CD): And what was your family doing there before they moved here?

(SO): My father was ah...working with ah...with horses [at Kahului, Maui].

(CD): Oh.

(SO): And he was I think with the Kahului Racing Association. So his...his life it seems to me was with horses. He came here as a stable man.

(CD): So he continued to work with horses here.

(SO): Yeah. Dole hired him in March of 1925.

(CD): Oh... Wow. Did he...ride?

(SO): Well, he was in charge of all the stables they had, and he was like a veterinarian too.

(CD): Oh he was!

(SO): Taking care of sick horses, you know.

(CD): Oh, wow. What was his name?

Takeo Yamato (TY): They used horses for ah, agricultural work. Pulling plows, ah, pulling...

(SO): Cultivat[ion]...

(CD): Right, so that was before...machines?

(SO and TY): Uh huh, uh huh.

(CD): Oh...

(SO):...mules, horses...

(CD): What was your name? (laughter)

(SO): Takeo Yamato.

(TY): Yamato.

(CD): Okay. I'm just writing that down.

(TY): Y-A-M-A-T-O.

(CD): Takeo?

(TY): T-A-K-E-O.

(CD): Oh wow... So, did he ever have stories, or do you remember, umm... 'Cause I understand that they would find Hawaiian artifacts and stuff sometimes in the fields. Did he ever talk about that stuff, or..

(SO): No, no...

(CD): He was mainly just taking care of the horses.

(SO): Yeah, yeah.

(CD): He wasn't out—was he out in the field, working the horses?

(SO): No.

(CD): Okay. He just took care of them.

(SO): Stable man.

(CD): Oh...that's neat.

(TY): I remember finding artifacts, around this...(gesturing circular shape with hands)

(CD): Ulu maika? In the...fields?

(TY): Yeah.

(CD): Yeah I heard that...

(TY): I found many of them...

(SO): Ulu maika was all over the place.

(CD): They were all over the place. So do you guys remember anybody talking about, umm...I don't know...or, do you remember—were any of the families who knew why ulu maika were all around here? (shaking heads "no") Were there any stories, or, umm....how about, when you guys were kids here, what kind of, were there any kind of superstitions that you remember? (Laughter.)

(SO): Yeah...The liver man.

(CD): The liver man?

(SO): Yeah, every year. The same story...came out. The liver man gonna catch you, and what not.

(CD): (Laughter.)Who was the liver man?

(SO): We don't know who.

(CD): Do you remember that one?

(TY): Something about, taking the liver out of you, and...being eaten or something. (Laughter.)

Maggie Masicampo (MM): You know I was thinking, who knows the story about the bowling alley?

(SO): What about it?

(MM): That the, the field workers the ones...were the ones that put all the money together to build the bowling alley.

(SO): It was the Company, Dole Company.

(TY): Dole, yeah.

(MM): But all the money came from the pineapple workers.

(SO and TY): No. No.

(MM): Yes.

(SO): No.

(TY): I never heard about that.

(MM): True.

(SO): No, Dole put it up because there were too many...too many, ah, rumblings. Dole didn't do enough for the people so the Dole...so they asked what—what did you guys what? The bowling alley, I think that the swimming pool—that's how the swimming pool, the bowling alley come up. During the 1951 strike.

(MM): Yeah, but didn't the pineapple workers put money into that bowling alley?

(SO): No

(MM): You're sure?

(SO): No. People would never put up the money.

(TY): They didn't have the money for put up.

(Unidentified woman): How come I heard that story?

(SO): No, it was like...

(TY): I mean, people didn't have money even in the 40s and 50s.

(CD): Okay, back to the Liver Man. So where do you... When you think back to that do you, do you...does anybody how that story originated?

(SO): No.

(CD): (Laughter.)

(TY): I think it's uh...uh...maybe stems from Japanese. Old Japanese.

(SO): Yeah, because, the word *kimo tori*...

(TY): Yeah! (Laughter.)

(SO): ...*kimo tori*. "*Kimo*" means "liver."

(CD): "Kimo?" *How do you spell that?*

(SO): What?

(CD): K-

(SO and TY): K-I-M-O.

(CD): "Kimo tori."

(SO): *Tori*, yeah.

(CD): One word? Is that one word?

(SO): Oh, it can be two words.

(TY): Yeah, it's two words I think.

(CD): And that means "liver?"

(SO): Uh, "liver taker."

(TY): Yeah... (Laughter.)

(CD): Oh...So...so who would tell you guys that? The adults?

(SO): No. Adults, adults too you know, to scare us.

(CD): So you think that was a Japanese, um...superstition...

(SO): Yeah.

(TY): Yeah, I think so.

(CD): ...Or just a thing, a way that they try to make kids listen?

(TY): Yeah, I've heard about kimo tori (Laughter.)

(CD): So, did you say it only happened, like...were they threatening you with it all the time or just every now—

(SO): No, no. Every once a year it comes out.

(CD): Once a year? Like, was it a certain time of year?

(SO): Yeah. I don't know if it was a certain time, but...

(CD): Huh. What about, umm...any, any stories like, you know, "you can't go to that part of town because." I don't know, some superstition?

(SO): No, nothing like that. But...but Lāna'i plantation was like any pineapple, sugar, sugar plantation in the State of Hawai'i. Japanese was set up to live in a certain block, or section.

(CD): Okay, that's what...that's what Bob was talking about.

(SO): Oh, okay.

(CD): So, can you explain to me where all the different [ethnic groups] people lived?

(SO): Um, most of the Japanese were concentrated in the eastern...northeast part of Lāna'i. Ah, we used to call that place Stable Camp because the stable was situated there. And then, there's another section of town, uh....end of town. Okinawa Camp. Okinawa is ah... Japanese, came from Okinawa.

(CD): Yeah.

(SO): And the Puerto Rican was situated in the north section, together with the Koreans. And the Chinese were situated on the north side.

(CD): Interesting.

(SO): The Filipinos were scattered here and there.

(CD): Throughout the different camps, or...

(SO): Yeah, but mostly, mostly they were here...and ah...ah...across Dole Park.

(CD): And what about the haole *families?*

(SO): *Haole* was all up on the hill. They call that Knob Hill. But there were only—

(TY): (Laughter.) Snob Hill.

(SO): In the old days there were only about...

(CD): Is that what it was called?

(TY): Yeah. (Laughter.)

(SO): ...In the old day there were only about ten Caucasian families and they were all managers, top managers.

(CD): Ah. Do you remember those families?

(SO): Yeah.

(TY): Sanborn.

(SO): Well Mr...Mr. Brown was the first plantation manager. And ah, ah...Mr. Fraser was assistant manager.

(TY): And he became manager later.

(SO): And there was one Japanese big shot. His name was Mr. Tanigawa. Ah...

(CD): Japanese big shot?

(SO): Yeah. (Laughter.) He was up...up there.

(MM): Do you have that list of names, I can find phone numbers for you?

(CD): I printed it out and forgot to grab it. Did you say you have a fax machine? I'll have—I'll just fax it.

(SO): Yeah there was Mr. Caldwell, Mr. Sanborn, Mr. Scott—

(CD): What?

(SO): Scott.

(CD): Scott.

(SO): S-C-O-T-T. Ah, Mr. Katterman, ah...Munro, Sutherland.

(CD): Munro...

(SO): Munro.

(CD): And as far as the, like...Were the...were the fam—the Japanese, and Okinawan, and Filipino, all the other families, were there a lot of different families or maybe not so many?

(SO): Well the Filipinos were mostly single, single people.

(CD): Individuals.

(SO): Yeah. And ah...what 's the question?

(CD): Well, for example, the Japanese families, were there like a hundred families or less?

(SO): Oh, more than a hundred.

(CD): More than a hundred. Oh, lots...So you couldn't just tell me family names like you did just with all the haole *families.*

(SO): I can tell you...

(CD): There was more than...there was hundreds.

(SO): Well most of the people, Japanese families, a lot of them came from Lahaina, Maui. And a lot of them came from, ah, Big Island too. And ah...

(CD): So the Koreans, and Filipinos, and maybe even Okinawans, and Puerto Ricans, were they, like, they were coming straight from the Philippines and Korea...

(SO): The Filipinos, yes. And ah...the Japanese came from here and there like Lahaina, Big Island...

(CD): Yeah, they had already been here, working at plantations on Maui.

(SO): Yeah, uh huh. And yeah, I can recall even the, the...the maid, or the...people who worked for Mr. Brown, the manager. Ah, the family of Takahashi, and the family of Ishikawa.

(CD): Were you friends with those kids?

(SO): Yeah, I used to...I used to sleep up at one of the families up there. And ah, when Mr. Brown was fired, they left, ah, the island. One...the one that I used to sleep with them, they went back to Japan. And the other family, ah, Takahashi, went, went back to Honolulu.

(CD): What kind of things did you guys do as kids, around here?

(SO): Oh, a lot of things to do.

(CD): Yeah? Like what?

(SO): Walking up to the mountain like billy goats.

(CD): (Laughter.) Which mountain?

(SO): Going down to Maunalei Gulch...

(CD): And, why would you go there?

(SO): We were like...wanderers, you know, going all over, all over the island, except for Keōmuku.

(CD): Uh huh. And, you guys just walked.

(SO): Yeah. No cars.

(CD): No horses, just...

(SO): Uh huh, just walked.

(TY): No, I did a lot a walking, this...this way.

(CD): Uh huh.

(TY): You know...

(CD): What do you remember?

(TY): Picking guavas, and picking, ah...

(SO): *Lilikoi*, that's passion fruit.

(CD): Oh, that was still...that was already growing here.

(TY): Oh yeah, lots of *lilikoi*.

(CD): What um...so, when you guys went, did you go for the whole day, or...

(SO): Far, yeah.

(TY): Sometimes we'd pack lunches.

(CD): So you'd take your lunch bag.

(TY): In a brown bag. And, just hike around.

(CD): Do you remember were...were people gathering things from the mountains, for example, like flowers, or...

(SO): No, just guavas and lil-passion fruits.

(CD): You guys. You wouldn't—would you see anybody else up there?

(SO): Sometimes but usually not.

(TY): We blazed new trails. (Laughter.) No we used to pick ah, ah...what the Hawaiians would call *pepeiao*, which is a, mushroom, fungus—

(CD): Yeah!

(TY): —A fungus that grows on *kukui* nut trees.

(CD): Oh. And what would you guys do with that?

(TY): Eat it. Then we'd take it home and chop suey.

(CD): So you'd take it home to your parents?

(TY): Yeah.

(SO): Excellent for chop suey.

(CD): Oh...

(TY): And it's good to dry... you know, dry it? And to store it. And it will last for years and years. You can soak it in water and it will just freshen up.

(CD): I remember...I remember that vaguely. Does anyone still go up...

(SO): No.

(CD): ...To collect that?

(TY): I did until about ten years ago.

(CD): Do you guys eat that in chop suey anymore?

(TY): Um hmm.

(CD): You do?

(TY): If I find it. If you can find it.

(SO): Today not anymore. Go to the grocery store, to buy a different kind of mushroom.

(TY): I ah...right now every year I go up to the mountain to cut...ah, cut the bamboo shoot.

(CD): Oh...

(TY): Everybody loves it. Ah...

(CD): But when you were kids you would get the pepeiao. *Is there any...anything else you'd bring back for your parents to cook?*

(TY): Yeah, bamboo shoot.

(CD): Oh yeah? Did you do that too?

(SO): No.

(CD): Bamboo shoots...Hmmm.

(TY): Even now, maybe next month I'll be going up there, gathering up some bamboo shoots, and I'll bring it down here and spread it around a little bit.

(CD): So you guys would just...just go wander and explore.

(SO): Uh huh.

(CD): Maunalei. What was Maunalei like? Maunalei Gulch?

(SO): Nothing, but we'd go through the tunnel, day after day. Most the time. There's three tunnels, coming from the ranch, going to Maunalei. Over to Maunalei.

(CD): And those tunnels are for water drainage?

(SO): No, for...for that irrigation—not irrigation, the water system runs through there, so...

(CD): So was there water in them when you walked through them? When you used to go through them—

(TY): There's pipes, pipes eh?

(CD): Was there water? Did you have to walk through water?

(TY and SO): No, no, no...

(SO): Get the pipe laid...just for...The tunnel was made 'cause, for the, ah...water...water system.

(CD): Oh! So there's a tunnel, and then there's another pipe that runs through it that carries the water.

(SO): Yes. And I was telling the...the fellow that runs the Historical Society here...

(CD): Uh huh? Kepa?

(SO): Kepa. I wish somebody had kept one of those pipes that they used to have the water pumped up to the city. It was a redwood, ah...

(CD): Oh...

(SO)...Made of redwood with a wire around it, tar material to cover the, ah, the wood...

(CD): Tar material...

(SO): Like all the...like all the irrigation pipes that were set up in the pineapple fields, you know.

(CD): Um hmm. Those were all, those were all redwood?

(SO): Yeah.

(CD): Oh.

(SO): All redwood, redwood pipes. I was just telling ah, Kepa, just last week, you know.

(CD): Yeah.

(SO): That I wish somebody had kept...

(CD): So are they all just...they've deteriorated?

(SO): Deteriorated completely.

(CD): Hmm. Wow.

(SO): Yeah I was telling another fellow the same thing last week too. He was with the Fish and Game. Retired.

(CD): Oh...So when you guys would go up to the mountains, how did you get there?

(SO): Walked.

(CD): Were there...did you follow trails, or did you just kinda go find your own way?

(SO): Just, just go up.

(CD): Just found your own way. Were there, were there trails that you could follow, that you knew of?

(SO): Yeah ah, like ah, we'd go to...when we'd go down to the shoreline to fish, we'd use a certain trail.

(CD): Um hmm. But there wasn't any one specific one you took when you went up as kids or even...later...

(SO): Yeah, like ah...when we'd go up to...beyond Charles Gay, we used to have a path going up, up to the mountain.

(CD): Path.

(SO): Yeah

(CD): Oh. And it went, where did it—

(SO): All here and there, all...We would go all the time.

(CD): Who made—do you know who made that path?

(SO): No, no...we...we used the same, same ah...path all the time, so...to, to go and pick guavas and passion fruit...

(CD): Yeah. Do you know umm...where are the teachers' cottages?

(SO): The first teacher's cottage was ah...I—I can't say if it's the first, 'cause I don't know about Keōmuku. The public school was up at Cavendish, ah, up on the hilltop. It was, I think was a three bedroom home.

(CD): Oh. Aren't there some down right here by the school?

(SO): Oh that's, that's new ones.

(CD): New ones...

(SO): That's original. The school moved from Kō'ele to here in 1937.

(CD): And then in 1937 when it moved to here, were there...so the new ones, were they built in 1937, or...

(SO): Well, the school was ah, brought, brought down with tractors, and ah, and set up here, right here.

(CD): Um hmm. Are the teacher's cot—are there teachers' cottages right here?

(SO): Yeah, all right against the school. But there was only—at, at the beginning in 1925 there was only one cottage, teacher's cottage. And the principal's residence was at Kō'ele.

(CD): Oh. How far away is that?

(SO): Oh...you know where the hotel is?

(CD): Yeah. The Kō'ele Lodge?

(SO): Yeah. On the...

(CD): Yeah, I don't know Lāna'i that well...

(SO): Well, anyways...

(CD): But I don't—I've been there, but I can't remember how far it is.

(SO): Oh it's not far from here.

(CD): Oh.

(SO): So in the old days everybody had to walk to school up at Kō'ele.

(CD): How long did that take?

(SO): Oh, from town....about ten, fifteen minutes, ten minutes maybe.

(CD): Oh, that's not far. That's close. Unless it's raining. (Laughter.)

(SO): Well, we were young too, you know.

(CD): Yeah. Oh...So you went to school there...until you graduated?

(SO): Yeah. I was from the second graduating class.

(CD): Oh wow.

(SO): 1940.

(CD): Wow. Umm, let's see what else. Well, do you...what do you think about these projects? Do you think that, umm...do you think they're gonna have positive impacts, or, negative impacts?

(SO): That's a long ways away. Only, only two resort hotels...I can't, I can't see the population increasing *that* much, you know. Today I hear...there's a lot of ah, unemployment. There's many houses for—homes for sale that's not moving at all.

(CD): Yeah. So there's...there's not a need right now for affordable housing, or...umm...a school expansion in your opinion?

(SO): Well if the economy doesn't pick up I don't see any need for it. And I look at all the young Caucasian people—I've never seen so many Caucasian boys and girls from Lāna'i that there is today—

(CD): Living, as residents...

(SO): And I don't know whether they have—I don't know whether they're employed or not. In the old days I used to know everybody, and now I hardly know people, you know, since we've retired.

(CD): Yeah. What about the senior center? Are you...are you happy that it—that you might get a new one? (Laughter.)

(SO): When did...when are they gonna start building it?

(CD): Umm, I don't really know their building schedule. Umm, there's a little bit of a process still. Uh, we need to do this study, and they need to finish—this is part of their environmental assessment, and...you know, they need to get a few things accomplished first, umm, so I don't really know when they plan to start. I mean I think the money becomes available to start the work in June. Umm...

(SO): So I'm saying, I'll be dead before I can get a new senior center.

(Laughter).

(CD): Hopefully not! Ohh, hopefully not. Is there anything that you would like to see in the new senior center, specifically?

(SO): I've seen the one in Lahaina, that...when they dedicated that, that new ah, center in Lahaina, we were also invited so we went to see it. It was just a new building and ah...I don't know...a new building. It was real nice, but ah...And ah, we have ah...we have a need for it though. 'Cause we have two organizations, senior organizations. And the other senior organization is bigger then than the one here. And there's no place to meet now.

(CD): You mean, without this here?

(SO): Yeah, we have a big, big organization on the other side, and ah, recently we've been using the Union Hall to get—to meet...to conduct meetings.

(CD): So yeah , I understand this is a really important meeting place in, on Lāna'i.

(SO): It's constantly being used by all the different organizations.

(CD): Uh huh. Yeah. Hmm.

(SO): So there is really a need for a new and bigger center.

(CD): Uh huh. So when you first came here, um...these trees weren't like this—

(SO): No.

(CD): —Yet. Were they planted yet?

(SO): These, no...they weren't planted.

(CD): It was just—

(SO): Bare.

(CD): Bare.

(SO): And like any plantation, the only...only trees that were...that were really growing was the banyan and ironwood trees.

(CD): Aimu?

(SO): Ironwood.

(CD): Oh ironwood.

(SO): Yeah. Like all the sugar and pineapple plantations, all the same, same kind of plants. And ah, of course the purple bougainvillea, that's typical of the plantations. I come to Maui I see the same thing.

(Laughter).

(CD): Is it ah...was it nice growing up here?

(SO): Yeah, I haven't seen...I didn't see anything wrong with growing up here. This was a real, real backwoods community.

(CD): Backwards community?

(SO): Yeah.

(CD): Like how?

(SO): Well all the roads were dirt roads. We hardly saw...you know, the different cultures. Different cultures.

(CD): You hardly saw them?

(SO): Yeah, 'cause, 'cause we didn't get Chinese, few Chinese. The Chinese moved on Lāna'i in the beginning, in the mid, mid thirties. Koreans starting moving out around there too. So you hardly see any Koreans, hardly any Chinese. So, when I left for the military service in 1944 during World War II, I went, I left the island, you know, not knowing a lot of things. I'd never seen a Jewish...

(CD): Oh yeah, uh huh.

(SO): I, I didn't know why they were so, so...the people were so against them, you know, and all those things. So I had to learn so fast.

(CD): Where did you go when you joined?

(SO): Well I was in Texas. I took my basic training there. I went to go to join the 442nd combat team in Europe but I was held back on the mainland, so, I served my time in Texas and Kansas.

(CD): Oh...and what did you do? What was your duties?

(SO): I was an office boy. I was in supply.

(CD): An office what?

(SO): I was an office boy (laughter).

(CD): Office boy. Oh! (Laughter).

(SO): I was in supply (inaudible).

(CD): How long were...how—is the army? Was it the army, you said? How long were you in the army?

(SO): Two years.

(CD): Two years. And then what did you do after that?

(SO): I took my separation in New Jersey, hoping to go to Columbia University, so I lived in New York a short while. But instead of going to college I got married. (Laughter.)

(CD): In...on the East Coast.

(SO): Yeah, New York City.

(CD): Wow. Did you stay there?

(SO): I stayed there a short while then I came back to Lāna'i.

(CD): Really?

(SO): Yeah.

(CD): With your wife? Oh wow...So, where is she from?

(SO): She was originally from Los Angeles, and ah, during the World War II, they were—the Japanese on the Pacific Coast were all interned, and she was interned at Heart Mountain, Wyoming.

(CD): Which mountain?

(SO): Heart Mountain, Wyoming.

(CD): Heart Mountain?

(SO): Yeah, it's a place, I don't know, in Wyoming.

(CD): Oh...An intern?

(SO): Yeah that's what they called them. Relocation camp...intern.

(CD): I don't know what that is.

(SO): Well, there were 120,000 Japanese...

(CD): Okay.

(SO): All over in the Pacific Coast area, were rounded up and put in different relocation camps.

(CD): Oh my goodness. So...where was from—she was originally from LA?

(SO): Yeah. So they, they lost their businesses and all.

(CD): Yeah. Yeah...

(SO): She was one of the first ones to get out of the relocation camp, and she went...she had a job for a General Motors executive, taking care of the kids.

(CD): Oh!

(SO): So she moved to Detroit, and then ah, settled in New York City.

(CD): Wow...Were you, so when you got—when you came back to Lāna'i...all that was done... What was it like here when you came back?

(SO): Well, I don't know. My thought was I wanted my wife to understand, you know, the life, of the plantation and stuff. She was—she adapted fast.

(CD): Hmm. Wow. But it was...it was still pretty friendly over here?

(SO): Yeah.

(CD): 'Cause I know that, that was a tough time for Japanese in America.

(SO): Yeah...I think they lost everything you know. They had a thriving restaurant business on Sunset Boulevard in California catering to movie people and what not.

(CD): Uh huh. Yeah. Wow. So then you guys just came back and settled down here, and you've been here ever since?

(SO): Yeah.

(CD): Have you seen, umm...I don't know, I mean the changes that have happened in your lifetime here, do you think they've been...I don't know, I guess just tell me about that.

(SO): Yeah, well, even though I came back from the mainland to work on the plantation, I didn't want...people of my generation didn't want our kids to settle here and work in the pineapple fields so, so almost all of the families sent their kids out, you know, to Honolulu to college, to mainland colleges, so none of my kids are on Lāna'i anymore. Two are on the mainland, one (inaudible). But ah....

(CD): 'Cause it's hard—'cause it's hard—

(SO): Life on Lāna'i...it wasn't a bad place to, to raise kids and everything, you know.

(CD): Yeah. So, so yeah, as far as you've known, that's always been pineapple, those lands. Umm...wow.

(SO): Depend on, ah...Depend on your job and everything. You know, okay...if I was a, if I was a general field worker I wouldn't have had the money to stay here.

(CD): Yeah.

(SO): I had a salary position.

(CD): Yeah, Wow. Right, well...well, is there anything else that you can think of that might be important to...to, umm, share for Lāna'i City?

(SO): Of course, umm...in the old days there were scattered communities. Kō'ele...

(CD): Yeah.

(SO): ...And ah, what do you call, Namba Camp [Namba was the name of the supervisor of this camp], Crusher Camp, Miki Camp, Harbor...

(CD): Tarber? Harbor?

(SO): Kaumālapa'u Harbor, there's a community there. No longer...all these outskirts no longer exist, you know.

(CD): And...and then before the plantation it was ranching.

(SO): Yeah, ranching at Kō'ele.

(CD): So that was a whole, a whole other time on Lāna'i. Umm...

(SO): Yeah, did you read the book, George Munro, or...?

(CD): I've been...I've been reading through it, umm, little—

(SO): I don't see how a lady can, can read through that book!

513 *(CD): Why?*

514 (SO): Oh my goodness! It's so damn dry and...nothing but plants and...

515 (Laughter.)

516 *(CD): Well, I think that—*

517 (SO): The number of goats and...

518 *(CD): (Laughter.) (To another person): Yeah, you can take that.*

519 (Unidentified woman): Oh, okay.

520 *(CD): I'm sorry, I...I think I might need to come back! (Laughter.)*

521 (Unidentified woman): You have to come a little bit earlier!

522 *(CD): I need to come earlier! Pardon? (Inaudible conversation). Maui. Oh...I'll come back.*
523 *Yeah, oh, I got here too late I think, well, not for you, but, all the ladies are leaving. Umm...well,*
524 *the....the book is interesting...because you do, though, get a picture of, you know, the plants and,*
525 *you know, exactly what they were doing here. But I can see...it's not like a novel or anything.*

526 (SO): I was with the Honolulu Society four weeks ago on Lāna'i.

527 *(CD): Which—which group?*

528 (SO): The Honolulu Society—ah, Historical Society.

529 *(CD): You did?*

530 (SO): Yeah. I was here...they were here about, oh several months ago.

531 *(CD): Oh, what, what were you guys doing?*

532 (SO): Wandering all over the place.

533 *(CD): Oh, walking around?*

534 (SO): Taking these people to all the different places.

535 *(CD): Oh! That's neat! I would—I would like to do that. I think I'm gonna need to come back!*

536 (SO): So to Kepa I named all the different places, the different buildings, the school, ah, who ran
537 the—the businesses.

538 *(CD): Oh yeah? Oh...Would that hard—would that be hard to, to rename right now? No? And*
539 *that's right around this park?*

540 (SO): Yeah. Right around this park.

541 *(CD): Oh well, can you—maybe, maybe—*

542 (SO): You have one—a map?

543 *(CD): Umm...just...oh, not of the whole city, just this one.*

544 (SO): Uh...this is Dole Park here?

545 *(CD): Yep, that's Dole Park. Yeah, this is Dole Park, this is...the senior center, that's where we*
546 *are. So...here's a pen.*

(SO): (Starts annotating map.) The original owners...This is the theater here.

(CD): That's the theater?

(SO): Yeah.

(CD): This is Lāna'i Avenue.

(SO): Put down the theater?

(CD): Yeah, yeah, can you? Do you know who owned—do you remember who owned that?

(SO): Dole Plantation.

(CD): The plantation? Oh okay. Can you put that?

(SO): Do you want me to write that?

(CD): Yeah...Oh okay, I walked...So that's, that's the same theater.

(SO): Yeah.

(CD): *That's still there.*

(SO): Still there.

(CD): Is it...an original structure still or have they added on, and...

(SO): Well, they have added on but ah, the frame, the frame is...

(CD): The original structure? Oh, okay...

(SO): Umm...This was empty...this was...empty...Give it today's, alright...

(CD): Umm, well, if you can remember the original building and the original owner...

(SO): Yeah, wait now...

(CD): Okay.

(SO): City hall... (Writing on map...)...Barber Shop...Tailor Shop. T-A—

(CD): Tailor shop?

(SO): T-A-I-L-O-R?

(CD): Yeah...

(SO): (Writing on map.)

(CD): What was here before the senior center?

(SO): Nothing.

(CD): Nothing. Empty?

(SO): Yeah. The Thirties (inaudible) afterwards.

(CD): Yeah, that's right.

(SO): (Writing on map.)

(CD): So right from the get-go, there was businesses set up, pretty much as soon as it was built.

(SO): Yeah. So, like...like this was vacant, vacant lot, you know, and, umm...

(CD): And then the Savings and Loan came in.

(SO): Yeah, and now it's a Bank of Hawaii. 'Cause I put the original...

(CD) Okay. So when did, when did the Savings and Loan come in about?

(SO): 1975, about...

(CD): Oh, '75.

(SO): So it's a—

(CD): Okay, can you put 1975 there? So long after, but it was a vacant lot.

(SO): Same thing, here...it was a vacant lot...Hmm, this is, ah...(Writing on map)...So this is, this is originally two separate buildings and...

(CD): Oh okay.

(SO): ...Ah...General merchandise here, and the butcher shop there. And same thing here. Yet Lung butcher shop, Yet Lung general merchandise. These are original.

(CD): Wow, okay.

(SO): And ah, this came in—I don't know when, but ah...about 1935 I think. Jewelry store. Was a vacant st—vacant, vacant ah...

(CD): Lot?

(SO): And yeah, here, ah, Clark Nakamoto photo studio. This came in late too...came in...was 1950s...This was vacant lot before.

(CD): Is there any—is there any reason you would go to one butcher shop over the other?

(SO): Why? What, what do you mean?

(CD): How did you decide where you wanted—which butcher shop you wanted to go to?

(SO): What do you, ah...

(CD): Was one, did one have different things than the other?

(SO): No, just about the same, you know.

(CD): Oh. Just to have, variety of places.

(SO): Yeah. And then, in the old days, ah...each store, Yet Lung and Okamoto store, had a...had a man who...who went around the town to take orders, and ah...they'd deliver the product to you during, during the day. Both sides had the same system.

(CD): Oh! That's nice.

(SO): And there are a lot of unusual things that...that maybe would interest you. Like we had a calendar in our house, in our...and ah, ah...and in that calendar, calendar-like thing there were pockets you know, and ah, there were all...this, Japanese store, Japanese family, and ah, we'd have all the different kind of medications in there, like, in the pockets.

(CD): Herbs? Medica—

(SO): Well ah...yeah, maybe...but ah...

(CD): A calendar?

(SO): Like a calendar thing, ah...and, had the basket, or pockets—

(CD): For every day?

(SO): No, they—was just for the month, and ah...and the man from the store would come and check your medicine, if you have used this headache medicine, stomach medicine, and they would replenish, you know. This was at ah...this store, Okamoto Store.

(CD): Oh! And that's a Japanese...

(SO): Japanese style.

(CD): Style...Was it, like, 30 different pockets?

(SO): No, no, not that many different pockets.

(CD): Oh, just a bunch.

(SO): Each pill, yeah. Like headache pills, you know...

(CD): So they'd come to your house, check to see if you're low on anything, and then they'd replenish it.

(SO): Yeah.

(CD): Wow, that nice!

(SO): System, systematic thing, you know.

(CD): (Laughter.) Wow. I think you were over here, you were looking over there when I—before I interrupted you.

(SO): (Continues annotating map.) Yeah, well this was here, ah...what did they call themselves?...That's not mine...Oyama Family. Okay...Ah, about 1950...It's now, ah, Mike Carroll's art gallery.

(CD): Okay, yeah.

(SO): This is the original one.

(CD): Okay, yeah, great.

(SO): And now, this was ah...(Writing on map.)

(CD): Who ran the fish market?

(SO): Ah, I don't remember the names, I don't...one name I don't remember.

(Laughter).

(SO): (Writing on map.)

(CD): Is Sugar on her way out?

(SO): Yeah. (Writing on map.)

(CD): I can't figure out a way to pause this...

(SO):...I made a mistake here...(Writing on map.)

(CD): What was that strike like?

(SO): Oh terrible.

(CD): Terrible.

(SO): Terrible. Like my brother folks exhausted all their, their funds you know, and they didn't go to the community mess hall to eat or anything, so my brother was desperate too and, he had to go to Honolulu...to find a job (inaudible).

(CD): Wow. How long did it last?

(SO): Six months.

(CD): And everybody was on strike.

(SO): Except for the management. Salary people.

(CD): And why did they go on strike? Oh the pay, the pay, that's right.

(SO): Well, it's...it's a statewide...negotiation. It was approved by the different, all the different plantations. Some of them rejected it.

662 *(CD): Right. Yeah. I read about that. Oh boy. What did* you *do—how—what did you do?*

663 (SO): Well, I was on the job, so…

664 *(CD): You, you worked.*

665 (SO): Yeah, I worked. I had a…the salary people, most of them effected…did community
666 service things, you know, like going down to…to Mānele, to set up the fish ponds that they have
667 there. The swimming pool—not the swimming pool but they dug the…the, ah, rocks.

668 *(CD): The harbor? So…*

669 (SO): Mānele beach.

670 *(CD): Uh huh.*

671 (SO): Made a wading pool.

672 *(CD): The wading pool?*

673 (SO): There's a wading pool...

674 *(CD): You mean that, that big tide pool thing?*

675 (SO): Yeah.

676 *(CD): Oh, with the stairs that come down?*

677 (SO): Yeah.

678 *(CD): Oh...you guys dug that?*

679 (SO): The…the guys on s—ah, salary people were idle, you know.

680 *(CD): So, how...so that's not completely natural?*

681 (SO): No, no, it was dug out. Shovels.

682 *(CD): And they did that, for the community?*

683 (SO): Yeah.

684 *(CD): Oh. During that strike, that's when that was done.*

685 (SO): Another strike, we went down ah, Keōmoku side, to...ah, there's a historical train down
686 there, we dug it up, you know. You, you just can't imagine the silt in all the years, through rain,
687 the, the soil run down to the shoreline. It created a...a larger Lāna'i, right, by acreage.

688 *(CD): Wow.*

689 (SO): There was a land owner there thinking that they had five acres, and he sold it and it was
690 eight acres.

691 *(CD): Oh.*

692 (SO): Through silt that ran down to the shoreline.

693 *(CD): Wow.*

694 (SO): And ah, the train is what, about...eight, nine feet high. The silt covered it...

695 *(CD): Was it during a storm, or...just over the years?*

696 (SO): Over the years, yeah. So you can just imagine the silt running down every time there's a
697 big...

698 *(CD): Rain.*

699 (SO): Rain.

700 *(CD): And where, where's that again?*

701 (SO): In Keōmoku.

702 *(CD): Keōmoku. Oh.*

703 (SO): I tried to look for the bell. We don't know where it's at.

704 *(CD): So did you uncover the train?*

705 (SO): Yeah.

706 *(CD): What did you guys do with it?*

707 (SO): We just left it there but just covered, you know.

708 *(CD): Oh. So it's sitting down there still.*

709 (SO): Yeah so I don't know, after all the years, since the 1950s, how much silt ran down again. I
710 haven't been down there for an awful long time.

711 *(CD): Oh so that's the kind of things though that people were doing during the strike.*

712 (SO): Yeah.

713 *(CD): Wow.*

714 (SO): The salary people were getting paid anyway, so...

715 *(CD): Wow, that's amazing.*

716 (SO): Yeah, I worked—I worked for salary, I took projections.

717 *(CD): Um hmm. Um hmm...Now what, what did you do, for work...*

718 (SO): Well...

719 *(CD): ...During that time?*

720 (SO): I was in ah...in the harvesting department.

721 *(CD): Housing department?*

722 (SO): Harvest...

723 *(CD): Harvesting. Oh, harvesting. Oh...*

724 (SO): And ah, during harvest I had...and I had to do a lot of planning and ah, estimating, so I had
725 all different kind of jobs. All...so many different things. Anything new came up (inaudible).

726 *(CD): Oh, wow. Alright, well that—this looks good.*

(SO): Post Office came about five years ago, I don't...just, just about.

(CD): Okay. That's fine. It doesn't need to be exact.

(SO): Hmmm...five years ago. '92...2004...

(CD): So what's this now, then?

(SO): Ah...there's nothing there now.

(CD): Nothing? Oh. Hmm.

(SO): Yeah, the...the administration building came up in 1950. And that, that area there, that office building was a small office, plantation office.

(CD): Umm, was this courthouse...I don't—what do you remember about it?

(SO): Well...

(CD): Was there a lot of people...in it? (Laughter.)

(SO): No, just...just the clerk there

(CD): That didn't actually hold people, in jail?

(SO): Yeah...

(CD): Was it the jail house?

(SO): Yeah, there's a cell, I don't know how many it could hold. When I was a kid I went in there, for forty-five minutes.

(CD): Oh you did?

(SO): (Laughter.) Yeah.

(CD): They took you in?

(SO): Yeah.

(CD): What did you do?

(SO): Forget it was, we went up to the Charles Gay, you know that, umm, mountain, and ah, from the Kaumālapa'u Highway there weren't many, there weren't many trees around, so ah, the sheriff could see, you know...I don't know how many kids was. But (inaudible) and we're not supposed to...to be in the mountain. And, we were surprised. He came up, we didn't even notice..."Come on boys, come on out, or I'll shoot you."

(Laughter.)

(SO): Off to jail, (inaudible) kids.

(CD): How old were you?

(SO): I was about...ten, I think. Twelve.

(CD): Who were you with?

(SO): Oh, I was with...ah...some boys that was older than me. I always used to go with older people, old—older boys.

(CD): Do you remember their names?

(SO): Yeah. They're no longer here. They are dead now.

(CD): Just your...your gang?

(Laughter.)

(CD): So you guys got—went in jail for forty-five minutes. Were you scared?

(SO): No.

(Laughter.)

(SO): Yeah, the...the judge on Lāna'i was Postmaster, he was the banker. Ah...and what else...He was scout leader too.

(CD): The scout leader?

(SO): Yeah.

772 *(CD): What was his name?*

773 (SO): Mr. Carlson, Arthur Carlson.

774 *(CD): Atta?*

775 (SO): Arthur Carlson.

776 *(CD): Carlson.*

777 (SO): Arthur, ah, Carlson.

778 *(CD): Carlson. Arthur Carlson. Oh...*

779 (SO): He was the banker, Postmaster...

780 *(CD): Busy!*

781 (SO): One man.

782 *(CD): Were you in the scouts?*

783 (SO): I was, yes.

784 *(CD): What kind of things did you guys do in the scouts?*

785 (SO): Camping, and things like that.

786 *(CD): Where would you guys go camping?*

787 (SO): Oh, down at Mānele beach.

788 *(CD): Down at the beach. Ohh...okay well...I don't want to take any more of your time. Thank*
789 *you very much.*

790 (SO): This is the tennis court.

791 *(CD): Oh. Is that still there?*

792 (SO): No.

793 *(CD): Oh, okay.*

794 (Song begins.)

795 *(CD): (Speaking with someone else.)Yeah, this is fantastic...(Inaudible conversation.)*

796 (SO): This used to be a big truck garden, but, it is gone...

797 *(CD): A what garden?*

798 (SO): Truck garden.

799 *(CD): Truck garden.*

800 (SO): Family garden...garden.

801 *(CD): Truck garden?*

802 (SO): Yeah, a vegetable garden.

803 *(CD): Oh, okay.*

804 (SO): Truck farm.

805 *(CD): Oh, I see. Minami?*

806 (SO): Yeah, that's the owner.

807 (CD): I see. Oh, okay, so then...so the agricultural stuff started right here. Hmm.

808 (SO): You plant down here...ah, here, the 19...ah...in the 30s, ah, they used to bring the...the
809 planting mat--pineapple planting materials in the back of the gym here, and the ladies used
810 to...ah, what they call, trim the crown, you know.

811 *(CD): Trim the crown?*

812 (SO): Yeah.

813 *(CD): Back there? Was it, ah...like a shed, or...*

(SO): Was just a hill, a...hilly area.

(CD): Oh just—they'd just do it out in the open?

(SO): Yeah, and then they'd drop the crowns in the field, they'd drop the crowns in the field, drop it there, so the ladies could trim it. And ah...and the pineapple, they used to say that they'd have to be dried for weeks and months, you know, before planting.

(CD): Oh, okay.

(SO): So they did (inaudible) the ladies just turn out, sometimes with lanterns and all.

(CD): Oh wow. At night.

(SO): Yeah. But...but, as...as science got into the picture, it was not necessary. Just plant the thing.

(CD): Oh, huh...Maybe you could put umm...you know like an area where the women tr—trim the crowns, o:...how you said it.

(SO): (Inaudible.) (Drawing on map.)

(CD): Yeah. Wow. So, can I ask you, is this, umm...Oh here, here's some old photographs. This is 1979. Was the—so this is the school, here's the park...ah, here's some fields, baseball fields. Has this, this area, this same area been in cultivation...since when? Since—okay, let me, let me try to say this a little better. Before all this was here, that's the gym I think, yeah, and the school. Before the school was there, it must have been that farm, was it that farm?

(SO): Yeah, exactly.

(CD): Okay, that was the farm. And then...what was this—then did the pineapple start right there?

(SO): Yeah.

(CD): So that—that area in cultivation has pretty much been in cultivation...

(SO): (Inaudible.)

(CD): Over there too. Okay.

(SO): The mountain too. Mountain (inaudible).

(CD): Oh yeah? Oh okay. Wow, long time. Neat!

(SO): Yeah, there were 15,000 acres over the town in cultivation.

(CD): Wow. 15,000 acres.

(SO): Harvesting about 100—180,000 tons, up to 200,000 tons a year...at that time. See I remember all these things!

(Laughter.)

(CD): Oh wow! All right. Well that's fantastic.

(SO): (Inaudible.) ...assistant plantation managers (inaudible). And...I remember all the names of the top manager people, and I wrote, wrote it down too, you know, in my book, in my notes.

(CD): Maybe you should write a book.

(SO): Yeah! My children's been telling me.

(CD): Yeah!

(SO): Yeah, and I've been interviewed by students from off-island.

(CD): Oh yeah? Yeah, get all the stuff together. We'll give you this, by the way, too...

(SO): And there was a time a class came here, to the seniors, and I brought my, I went over to bring, to bring, ah, like a (inaudible) group come from the president, you know.

(CD): Really?

(SO): Bring interns, you know.

(CD): Yeah.

(SO): (Inaudible.)

(CD): Wow. Yeah. That'd be good.

(Laughter.)

862 (SO): I started took picture long ago but I (inaudible).

863 *(CD): Well, I think, I think I need to start wrapping it up. But thank you so much for your time.*

864 (SO): Yeah.

Aunty Irene Perry

File Name(s)	Aunty Irene Perry and Uncle Sol.wav
Job Code	Kamoku 4, Kamoku 6, Kamoku 8
Recording Date	April 9, 2009
Transcription Date	April 16, 2009 to April 20, 2009
Participants	Irene Perry (IP); Colleen Dagan (CD); Iwao "Turkey" Kawakami (TK); Sol Kaopuiki (SK)

Aunty Irene Perry, daughter of Robert Cockett, former manager of Ko'ele Ranch and Uncle Sol Kaopuiki are kūpuna and descendants of two Hawaiian families from Keōmoku, Lāna'i.

Irene Perry (IS): I don't know, Sol, I—I think he didn't, didn't know, or maybe he knew because he's outside talking to people yeah?

Colleen Dagan (CD): Well, you know what, it's not, it's not so much...you know...I don't know. I guess we— we're just interested in learning what you're interested in sharing. But this is—so this is, umm...this is the affordable—that's the affordable housing project. And they're gonna—

(IP): That's going to be?

(CD): They're planning it, yes. So, it's gonna be there and then they're gonna improve this road. I think that's Ninth Street? So it's these pineapple—that's all pineapple fields. Here's a umm...here's a picture. This is the school expansion.

(IP): See the guy you should have gotten was ahh, umm Scavendys boy?.

(CD): Who?

(IP): Umm...this here, he knows a lot of these things.

(CD): Well...when—so you grew up down at Keōmoku?

(IP) I was born in Keōmoku, and I umm, we, we came up to the Lāna'i, umm, Kō'ele, in 1928, I think it was.

(CD): Oh, 1928.

(IP): Yeah.

(CD): Oh.

(IP): And when we—when I...when we got up here, I don't remember all the roads, you know... the streets and all that.

(CD): That's what you remember?

(IP): I just remember the highway, the main highway.

(CD): Did you ever come up here before it was a city?

(IP): Hmm...no.

(CD): When you were a small, small—

(IP): —To come up to get our groceries, to come up, because we cannot, umm, we had no stores down Keokmoku. You know, there was nothing just the families that stayed there. We had, we had boat that—boats to go over to Maui and get our supplies. It's the Kaopuiki family, they had

that one boat of theirs, and it goes, I think it's just about every—just about once a month or twice a month. They take their orders from the family, and what they need, you know, they take 'em. And then they go to Maui and then they give it to the grocery store manager, and then they would fill their orders and then take them down to the boat, and that's how we would get our supplies.

(CD): Oh. So, what was it like up here before the city? Do you remember what it looked like, before the city was here?

(IP): No, no, no...

(CD): Umm... but there—

(IP): Well, when...I just remember one of the...one of the first things, that had the homes, I think it was the theater, and then they had, right where the theater is, they built housing there, was about first homes that I remember here. And then there was some down at Miki camp, which was by the airport somewhere, and ah, they had homes and then they, I don't know when they built those. It's when we came up to do—get our supplies, you know when went to the butcher.

(CD): So, the butcher—

(IP): Like, we'd need water. We didn't have any fresh water, we had brackish water. So, we used to come up on horseback and fill up some gallons of water and go back home, down Keōmoku. So, that's about all I remember. And then my sister, my oldest sister, was living in one of these homes over here that was first built. And, that's all about I remember, and, I guess they had the store then, they had one store then, and a rubbish yard...a jewelry store, yeah. Just about ????. And, in fact they had the post office right over here in back of the, in the housing area. But ahh...

(CD): Did you say you were born in 1915?

(IP): '17.

(CD): 1917. And what's your maiden name?

(IP): Cockett.

(CD): Cockett, oh, okay. Okay.

(IP): Robert Cockett was my father.

(CD): Oh...Robin?

(IP): Robert Cockett.

(CD): Robert, oh.

(IP): Robert. He's from Maui.

(CD): Yeah, I know a few Cocketts over on Maui.

(IP): Cockett's a big family. We have so much that I don't know which is my cousin. (Laughter.)

(CD): Yeah!

(IP): You know and then we—they didn't know, I guess their parents tell them they, they have family on Lāna'i, and when we'd go there then we'd talk and visit, oh you're from Lāna'i, yeah, we Cockett. Oh, I'm a Cockett, you know! And my father is, oh my parents, and that, that's how we'd get to know them. The whole family, yeah.

(CD): So, what did you guys do down at Keõmoku...like, as kids?

(IP): Play. We'd play and that would be, which chores not til we're through with it, there's nothing to do but for to play.

(CD): What were your chores?

(IP): We had...well, we had wood stove, you know, that—I don't know what you'd call them, we'd call them wood stove. And ah, so we'd have to go out and cut your, you have to find the twigs, the young ones, you know, the good ones to start the fire. And we'd get a—pick all of those up, make a good bundle of them, and then we'd get the larger size, and then we'd get the big ones, where you, after you get 'em going and then you use the larger size. We used to do that...and, we used to go help my mom fish, you know, with, what you call it, the *hukilau.*

(CD): Oh!

(IP): On Saturdays.

(CD): Down there, on Saturdays.

(IP): Yeah, on Saturdays. We'd go out and *hukilau,* when the weather is nice. It was all, all the kids. You know, we get the kids—the family down there, we'd all get together.

(CD): So, all the fam—all the different families?

(IP): Yeah, and there's about only ?twenty?? of 'em, maybe, we get, umm...Kahaliau(?) And umm...

(CD): Kahaniau?

(IP): Kahaliaru (?)

(CD): Oh, Kahalianu (?).

(IP): And then there was the Kawila...and ah...we had a Japanese family but they came later, but—but they were with us anyway, the, ah, Miratas...used to be—

(CD): Were you still doing the hukilau *with the Miratas?*

(IP): Yeah, with the kids, and then they...my mom used to—we used to go with my mom and help her, with my mom and my older brother, used to get, surround the nets, you know.

(CD): Who made the nets?

(IP): I don't know, I guess they—somebody made it, I don't know who. But they know how to make it, though. My mom knew how to make nets, she threw the nets, and my brothers knew how. And they used to patch it when, you know, it get *puka* in it, you patch it up, you'd have to do it. And ah, I think I know how to do it too. With the knot stitch you know, you going around and you knot the loop, then you—Like crocheting. Yeah, yeah. You make loops and you keep on going.

(CD): Oh...So you would help patch the net—you would help patch the nets too?

(IP): Not all the time.

(CD): Oh, so your brothers and your mom.

(IP): ...My brother and mom would do stitches, yeah. We were—we were in the way when they were doing that (inaudible).

(CD): You were still—

(IP): (Inaudible)...we watch it, when they don't come we'd try go and do it and then we, we'd step so we'd stay around away from it (laughter). Anyway, yeah. So ah...

(CD): So, what about—did you guys gather limu *down there?*

(IP): Hmm?

(CD): Did you gather limu*?*

(IP): *Limu*? Yes but they didn't have too much *limu*. But they, they had the *limu* that they ah, called—you know *limu 'ele 'ele*?

(CD): Uh huh.

(IP): And ah, I understand that it only comes down after a big rain, 'cause it likes the—

(CD): Brackish water?

(IP): ...There's something about it, yeah. And then after the rain ??sludge??? And I love that *limu*, it's oh my—you know what kind that that is? (Inaudible.)

(CD): Yeah.

(IP): I love that.

(CD): Oh yeah?

(IP): And we used go to gather some of that...

(CD): Oh yeah?

(IP): And then, like fishing, we used to go with bamboo, 'cause our house is like, say, my house is here, our house, and we'd cross the street to the—'cause over there is the ocean. We were right close to the beach (inaudible).

(CD): Yeah! What kind of fish do you remember catching?

(IP): We get—we used to catch, umm, mullet, and umm...oh what's the other kind of fish? Sometimes... (inaudible sounds like jaymoons) more. We'd catch crabs in the net. They'd get caught in the net. You know, swimming crabs they called it. It was those reds ones and the tail fins with the flappers like on it?

(CD): What color are they?

(IP): Red.

(CD): Red?

(IP): Yeah, reddish color.

(CD): Oh.

(IP): And...that would get caught in the net, when we'd go *hukilau.*

(CD): Did you eat that too, the crab?

(IP): Oh yeah.

(CD): How'd you guys eat it? Did you cook it, or was it...?

(IP): We'd cook it. Boil it, in hot water and dump the crabs inside. Poor guys, was still alive and get dumped in the hot water. (Inaudible), you know! But ah...and umm...yeah, then when we'd catch fish, if we'd get enough, to umm, for dinner, you know, then we'd dry some of them. We'd clean it up, and salt it and dry it. 'Cause we had to, because we need to— when the weather is bad the boat can't go to Maui. Because it's a small boat, not a big one.

(CD): Yeah.

(IP): Small little sampan...

(CD): So, how did you guys salt it?

(IP): Hmm?

(CD): How did you cut it up and salt it?

(IP): Well, just scale it and cut 'em in half and salt it and put 'em out in the sun to dry.

(CD): Oh. How long did it last like that?

(IP): You mean the...

(CD): The fish.

(IP): The fish? It would last a long time. When you dry it you can keep it for a long time. And we'd save 'em up, that's a good size, you know, for, that are like, in the bad weather time, we'd start with the fish are dried, and then you, we'd umm...go and catch the fresh one fish whatever we'd have and eat it, but we'd have to store some for winter time, otherwise we'd...

(CD): Yeah. So that's a lot. Did you have like, a big store house, or...?

(IP): No, no, we have (inaudible). We'd just dry it and put it in...umm...??what te to??. We get the kerosene can, remember those big—

(CD): Kerosene cans?

(IP): We'd get the kerosene cans, we'd just wash all of that out, we'd get 'em all cleaned up and get 'em dried and then we, umm, cut the top off and we'd put the fish and store it, you can cover it with cloth. And, well, we have, they have different ways to clean it and but that's how we used to do it.

(CD): Oh, wow.

(IP): And we stored it so when winter comes the boat can't go we have something to rely on.

(CD): So...so you needed to get your supplies from Maui, before Lāna'i City was built. Before the city was built?

(IP): What about the city?

(CD): Did you still, after the city was built, did you still go to Maui to get your supplies, or did you start coming up here?

(IP): No...no, we still went to Maui.

177 *(CD): Oh yeah?*

178 (IP): 'Cause up here, we'd have to travel far, from Keōmoku...

179 *(CD): To come up here?*

180 (IP): Keōmoku, we used to come on horseback.

181 *(CD): On horseback...*

182 (IP): ...Hours...

183 *(CD): An hour?*

184 (IP): Maybe more I think. Have you ever been to Keōmoku?

185 *(CD): No.*

186 (IP): It's far. When are you going home?

187 *(CD): This afternoon sometime.*

188 (IP): Why so soon?

189 *(CD): What?*

190 (IP): Why—

191 *(CD): Why so soon?*

192 (IP): Why so soon?

193 *(CD): I was thinking about staying the night.*

194 (IP): Why don't you stay?

195 *(CD): It's an option...I—maybe.*

196 (IP): Well stay all night and then, ah...What you going do today?

197 *(CD): Well, I was just gonna meet with you—*

198 (IP): (Inaudible.) You get too much work, eh? Uh huh.

199 *(CD): Um...not really.*

200 (IP): After you talk with me what you—

201 *(CD): I don't know. I was gonna go to the Senior Center, and talk with some, umm, ladies, over*
202 *there, and that's it. I was kind of hoping to catch Uncle Sol too, but I don't know where, how to*
203 *catch him.*

204 (IP): Yeah, we can go see him. We can go look for him. (To someone else in restaurant) Hey,
205 you know if Sol home?

206 (Unidentified person): Sol?

207 (IP): This guy knows something about the place too, umm...

208 (Inaudible conversation.)

209 *(CD): I—I have a recorder on, just so you know.*

(IP): That's okay...Tape recorder.

(Laughter.)

(CD): No, if you don't mind. I could turn it off...

(Unidentified man): (Inaudible.)

(CD): ...Or leave it on. Do you want me to turn it off or leave it on?

(IP): He was down with, with, where I was staying too, you know, Keōmoku ??? backcountry.

(CD): Oh you live down at Keōmoku too?

(Unidentified man): Well, yeah...yes I had been down there when I was young boy, yeah...yeah.

(CD): Wow.

(IP): Yeah. (Inaudible.)

(Unidentified man): (Inaudible) the hard way in the old days.

(CD): Yeah, I was just getting some details on...building the wood fire...the wood stove.

(Unidentified man): Wood stove.

(CD): Fire.

(IP): Even up here we had.

(Unidentified man): I think so.

(Laugher.)

(Unidentified man): I have to get a cup of coffee...

(IP): If you have spare time we can just drive down to Keomuoku.

(CD): If I have spare time, that would be fantastic.

(IP): Yeah, we can drive down to Keōmoku, and, we—we went yesterday, we were down there, we took our lunch and we sat on the beach, my daughter and I. And we sat at the beach and we ahh...stayed there and had our sandwich and then we drove home. It was nice, but it was cold. It was windy yesterday, it was windy, it was cold.

(CD): Oh yeah?

(IP): But, it was nice. It would be nice, you could just go see what it's like and we could come back.

(CD): Okay, we'll see. Umm, so did you come up to Keom—uh, I'm sorry. When you were a young girl, did you guys come up to Kō'ele?

(IP): Did we what?

(CD): Did you know any of the families that lived up at Kō'ele?

(IP): Uh yeah, my umm, I have a Tutu down in Palawai, Palawai Basin. You know where that is?

(CD): Um hmm. I do.

(IP): I had a tutu over there, that, that we used to come up from Keōmoku. My ah, my mom's family. And umm, my eldest sister Annie was brought up by her.

(CD); By your tutu?

(IP): She—she, umm, she went, she stayed with Tutu to help them, I guess. But anyway, umm...but...Tutu was a—

(CD): What was your tutu's name?

(IP): Ah...Keliihananui. They were one of the last ones down there, in...Palawai.

(CD): Oh wow. Umm...I have a...I have this map. This has some of the old...old Hawaiian, some names...of some of the people that were living around the city. Or that used to. Can you read that?

(IP): What's this red one for?

(CD): That's the High School.

(IP): Oh, the High School.

(CD): That's gonna be the High School expansion. This is the city, and...if—it's kinda hard to see this is kind of small, but, ah...there's these names, like these were the Kuleana lands. And this says, umm...Pali. Here's a family, or a person called Pali who claimed LCA 10630. And there's ah...Kaa...I...K-A-A-I-A-E-I?

(IP): Um hmm...

(CD): Kaa, i...Kaaiai? Kaaiai?

(IP): That's a family—is that a name?

(CD): Yeah, that's a family's name, or a person's name. Kaaiai. Looks like they had some property right here, on the far side of the city. Umm...What else.

(IP): Oh I—Ai'kalae (SP?), I think, huh? Does it sound like Ai'kalae?

(CD): This name?

(IP): Yeah...no?

(CD): No...Kaai-a-i-a-i, ai-ai, I think it's Kaaiai. K-A-A...

(IP): Oh, I don't know.

(CD): Doesn't sound familiar? Umm...What's this...Ka'auwaeaina?

(IP): (Laughter.) I don't know.

(CD): Doesn't sound familiar? Here's ah...Naholowai. Kanohohoukahi?

(IP): Gee...

(CD): You guys—you guys have long names over here!

(IP): I should say, I was saying (inaudible). I don't know these ones.

(CD): Can you see those? It's these names that are underneath—the names that are underneath these, these little things with the numbers. The LCA number and then the name under it. That's the—that's the person who owned that property at the time of the Mahele.

(IP): Keliihananui? Keliihanahui, now that's—that's my tutu that's down...down in Palawai.

(CD): Do you see that name?

(IP): But I don't see it...

(CD): You don't—oh yeah, yeah, this isn't Palawai. This is right around the city.

(IP): The city here, yeah, I don't know.

(CD): Did you know the families around here very much? Just you're, umm, aunt, and...(To another person.) Hi.

Iwao "Turkey" Kawakami (TK): What you folks looking at?

(IP): At the, umm...

(CD): We're looking at—we're looking—

(TK): (Inaudible) Lāna'i?

(CD): Yeah. One that, ah...

(TK): You'd better look good someday you get lost.

(IP): What date you been in Lāna'i?

(TK): Huh?

(IP): How long you been in Lāna'i? When you came to Lāna'i? You were born here?

(TK): Ah, when I was three years old.

(IP): You came, oh...

(TK): (Inaudible.)

(IP): Maybe he know, look at this. She—this is the Lāna'i City. You was here when the city was built?

(TK): Yeah, my partner guys first ones over here.

(CD): Oh yeah?

(TK): Yeah.

(IP): Ichimura(?)

(CD): Right around the city.

(TK): Never had the trees yet. That's all, that's it.

(CD): What—what was your name? What's your name?

(TK): Turkey.

(CD): How do you spell it?

(TK): (Laughter.)

(IP): What's your last name?

(TK): Kawakami.

(IP): Kawakami.

(CD): And your first name.

(TK): ??Iwao??, But they call me Turkey, I don't know for what. (Laughter.) I hate eat turkey even (inaudible).

(CD): Toka? T-O-K-A?

(TK): T—Turkey.

(CD): How do you spell, what they—your nickname?

(TK): T-U-R-K-E-Y.

(CD): Oh, Turkey! (Laughter.) What?

(Laughter.)

(TK): Yeah. I have nickname, but I don't know even my letters all coming apart, so...

(CD): Turkey?!

(IP): Turkey!

(TK): And I hate turkey!

(Laughter.)

(TK): It's an ingredient for...soup, you know that one...

(IP): Sit down! Sit down, Turkey! Over here! Sit over here! Yeah, that's an old timer over here. I think he knows more than I do, but I think he forgets now.

(TK): (Inaudible.)

(CD): No, you're not! The more the merrier!

(IP): I didn't recognize him, he didn't look like he was Turkey, because he used to be a bit bigger, and I haven't—he live down that end of the city, and I don't see him often. But he has umm... his ah, sister is a good friend of mine. We went to school together and we still correspond. She lives right in Maui. And so, that's how I ah, I knew him. So whenever he sees me he says, oh, my sister's doing well, and oh, you know, he communicates with her, you know...Turkey. Lāna'i has people that get the nicknames that...

(CD): (Laughter.) Yeah, I'm noticing! Umm, so you moved up to the city—your family moved up to the city...

(IP): 1928.

(CD): 1928.

(IP): We stayed at Kō'ele.

(CD): And you lived at Kō'ele.

(IP): Yeah, Kō'ele. Do you know where the big hotel is now?

(CD): Yeah.

(IP): Well that was where it used to be, it was like the house over there and then a...the ah, the umm...the company had...a office there, a house there, for the manager. They used to have cattle before pineapple.

(CD): Yes, yes.

(IP): You knew. So they used to have, there was an office there. And then, my dad—Keōmoku, after 1928 they got him to come up here, and, to the City here, and we stayed in Kō'ele and he took care of the ranch.

(CD): What was his name?

(IP): Robert Cockett, my dad.

(CD): Robin?

(IP): Robert.

(CD): Robert.

(IP): Robert Cockett. He took care of the ranch, and, when they still had ranch. But, when they did away with the ranch, and, then my dad moved down into the city here, and then we lived in one of the homes there, and he worked in the, ah, storeroom.

(CD): Storercom?

(IP): Storeroom, for the pineapple company.

(CD): Oh...

(IP): And that's what he did until he retired.

(CD): Oh...So down at Keōmoku, was he doing ranching down there?

(IP): Yeah, he helped take care of the ranch, I guess you would say for the ranch, because ah, dealing with the cattle, yeah? He had to service the, ah, water troughs, and if they had enough water...

(CD): Down at Keōmoku?

(IP): Keōmoku, yeah.

(CD): Oh, okay. Did they run the cattle from here to there?

(IP): Well, they had cattle up here at Kō'ele and they had cattle down Keōmoku. And then when they did away with the ranch there, before that they didn't have any cattle, I think they drove all the cattles up to Kō'ele instead of, you know, so I don't know but anyway they had him come up to Kō'ele and then take care of their ranching and all that until they dissolved the ranch and then he...came down to the city and worked in the storeroom.

(CD): Ohh...Until he retired. What did your mom do?

(IP): My mom was just a plain housewife.

(CD): Did she still make it down to Keōmoku to fish, and...?

(IP): When we would go down to Keōmoku we did a lot of fishing, and I'd get a chance to...We used to—when we used to come up to see the family, see Tutu, we'd call her Tutu, we had to go by horseback, and we'd go all over, and through the mountains and down.

(CD): You'd go away which way?

(IP): From Keōmoku, we'd go up, we'd have to come up, we call it, umm... *Lāna'ihale, yeah.*

(CD): Oh, okay.

(IP): Yes, we'd came around that way. (Inaudible). So when we come up that side, to Tutu's place, umm, we had to come by horseback.

(CD): Um hmm. Hmm.

(IP): So my mom was...

(CD): Wow.

(IP): What was I going to tell you, I forgot?

(CD): Hmm?

(IP): What was I supposed to tell you I forgot?

(CD): Oh.

(Laughter.)

(CD): Just that! Umm...Oh yeah, that's what I was asking.

(IP): I was going to tell you about my mom fishing.

(CD): Oh yeah, that's right.

(IP): We used to come...when the tide is low—low, when we coming up to see Tutu, she had this horse, and I'd sit in the back of her...

(CD): She has a what?

(IP): The horse. We'd get the horse—

(CD): Oh, a horse.

(IP): —And we'd come on horseback. And we'd come, umm...I forgot the name of the place, anyway, the tide is low, my mom goes with the horse right into the ocean, and they have that reef, you know, there, they go out to where the reef is, and she looks for squid, and, and we'd go around there, and when she sees the squid, she has the gunny sack bag with her, big enough so she can come back and she had the spear, with the long handle.

(CD): What's her—what's her spear made out of?

(IP): I think steel, with a sharp point.

(CD): Steel, okay.

(IP): I think it's steel. Anyway, she held that, and I'm in the back of her, sitting, and so—and she say, and she tap the squid, and then she'd take the bag that she had, she'd lower it down in the water, the sea, and then the squid would try for and the tentacles are—

(CD): Yeah.

(IP): Then they grab on and come up to her hand came back and looked all scared 'cause pull my leg up (Laughter.) But she'd stick the—and then she'd put the bag in the water, you know, inaudible??? and she would bring up that squid in the bag and the squid would let go and then she ?????? the bag.

(CD): Oh! Wow.

(IP): It was scary! (Inaudible).

(CD): Uh huh.

(IP): ...And sometimes we used to get to two or three, sometimes we'd get one.

(CD): How did she...see them?

(IP): I don't—that's what I keep saying, how does she know where the squids are? But they can tell, you know, I guess—

(CD): Experience?

(IP): It's experience, they can see, you know. And I'd look and I wouldn't see anything, but she goes in all and shoots it and...

(CD): Wow!

(IP): And then, yeah, she was just a good fisherman—fisherwoman.

(CD): Wow.

(IP): Get, when we go Keōmoku sometimes we get, if we lucky, she gets about three, or sometimes nothing. Depends.

(CD): Wow. Did ah—so where'd she learn how to fish? Who—who'd she learn to fish from?

(IP): I don't know, I guess she had to...maybe with her grandparents. I don't know. I never asked her.

(Laughter.)

(IP): All I know is she can fish, she can even use a shotgun.

(CD): A shotgun?

(IP): Yeah, she goes, ah, not fishing with shotgun but goes...we, ah, go hunting for birds.

(CD): Oh...

(IP): In Keōmoku get plenty *kiawe* trees, there was a lot of doves.

(CD): Oh...

(IP): And, we would take the shotgun. And we'd go to places and we'd look around and look out for the doves, and see a big bunch of the doves, they all get together, yeah?

(CD): Uh huh.

(IP): And, okay, and we'd see the—and then, she'd, bang! The doves fall.

(CD): What would she make with the doves?

(IP): We'd take the doves, we'd take them home, and we'd...have to take out the feathers, and then *pulehu*. And we'd put 'em over the fire, and we'd eat it!

(CD): Ohh...

(IP): Ohhh...they was good!

(CD): Wow, she was a handy woman, huh?

(IP): My mom was—my mom was all around...and she could just do anything, I think. You tell her and she'll do it.

(CD): Wow.

(IP): Yeah, she'd fish, she can cook fish good, she can, ehh...garden, and everything.

(CD): Garden? Did you guys have a garden down there too?

(IP): We never had vegetables. We never had the vegetables...the garden was only, umm...oh no, yeah, we had sweet potatoes.

(CD): Sweet potatoes.

(IP): Yeah, but the inaudible was Tutu, we had Tutu lived she would come up to help harvest the sweet potatoes, when we were kids. They was sweet—sweet potatoes, they were orange colored.

(CD): Orange? Oh...

(IP): Maybe it's not sweet potatoes, maybe I forgot the name for it.

(CD): Yams?

(IP): Maybe it was yams, but even then we'd call it sweet potatoes.

(CD): There's orange...there's orange sweet potatoes.

(IP)....There's orange ones...

(CD): Yeah. So your Tutu grew those?

(IP): My tutu grew

(CD) In Palawai?

(IP): Yeah, so we, ah, they were good. They were.

(CD): Sounds good.

(IP): My mom used to do that, and (inaudible). And umm...well when we were up here too we have to go do laundry.

(CD): Up here?

(IP): Yeah.

(CD): In the city?

(IP): When we—no, up, not the city, my Tutu, way back. The city wasn't even here then I think.

(CD): Oh, before the city.

(IP): This was before the city.

(CD): You went—you did laundry at your Tutu's?

(IP): When we'd go down we'd—we'd come up to help Tutu, and we help Tutu do laundry, so they used to have trough, get the kettle, get water, and they, so we'd take all our clothes, and we'd go to...down Palawai, further over from Tutu's place and look for a nice boulder, rocks that are (inaudible) that was to wash clothes on it. Take water, you know...wash your—or the umm, the umm, dirt off. And, never had, umm, washing board, so, we'd find nice stone and then we'd wash. Wash by hand, take water, rinse off the clothes, put the line over there, take a rope and put the line from tree to tree, hang all our clothes, and then, while the clothes was drying, and while they were—mom was washing, the kids would be playing around. And there were a lot of cactus, down there, big cactus plants. *Pānini*, you know what *pānini* is?

(CD): Yeah.

(IP): Big ones, like that.

(CD): The fruit?

(IP): Was the fruit, pick *pānini*.

(CD): Oh, you'd go pick it?

(IP): Yeah, and then we'd, we'd take it back and we'd go out to those huge boulders out there, we'd put water on 'em, wash up the boulders, you know, sort of clean 'em up, and we'd take them, the umm....*noni*, you know what *noni* plant is?

(CD): Yes.

(IP): Well we had—they had lots of *noni* plants out there. So we used to take that, and we'd take the ripe fruit, and we hit it on the rock, and splash it, and then we'd leave them there to dry. So then Mom takes the washing, and ready to go home. Gather all the clothes up, dry from on the line, and then we'd go out we'd and peel the umm, the *noni* that we had smashed on the rocks, like candy when they're dried. And so we peeled 'em all off and it tasted like candy.

(CD): Really? It was sweet? Was it sweet?

(IP): It was good. It tasted good to us!

(CD): And it was just dried...

(IP): It was dry. It taste good to us. I can't stand how it tastes now, but that time was good we used to have for candy.

(CD): Noni's *supposed to be real good for you.*

(IP): Yeah, it is.

(CD): Did you guys ever get sick?

(IP): Nope.

(CD): You guys never had colds?

(IP): We'd be ah... Well, I don't remember getting sick. But I got sick after...when I was older, was when I—the kids playing down there. See like I tell my daughters there, ???????, said oh, that's a big deal and I said we didn't have water, we're playing, and then maybe ??? they said how come you're strong and all, I said I think maybe when we were young we ate dirt.

(CD): (Laughter.)

(IP): Ate dirt? I said yeah, eat dirt, it's good for you, plenty iron! (Laughter.)

(CD): Oh my goodness!

(IP): Yeah, 'cause when we were kids, you don't have water (inaudible), we cannot, we had brackish—we were lucky we had brackish water, 'cause my dad—

(CD): So what did you drink?

(IP): We boiled the water.

(CD): You boiled it.

(IP): Yeah, and then, when we can get water from Maui, or we come up to the city to get water, in the meantime we get it from Maui in gallons, you know, and get—we'd use that for drinking, and then we'd, the well—water from the well we'd use for cooking. And it's good. I drank the brackish water. It's good.

(CD): After boiling it.

(IP): When we were kids we don't even have time to go in and boil it, we'd stay out and play we'd get water and drink it. I'm still alive,(Laughter.)

(CD): Did umm—so you said that down there you didn't have a garden. You'd come up to your Tutu's and—

(IP): Yeah, we never had garden. The only time we had a garden like is when we had planted watermelon.

(CD): Oh, you planted watermelons?

(IP): We had...had melons.

(CD): Every now and then?

(IP): With Sol's [Kaopuiki] family, they lived further up the way, about three miles away from where we used to be,

(CD): Sol's?

(IP): Sol Kaopuiki, the one that was supposed to talk with you.

(CD): Sol, oh Sol's family.

(IP): Yeah, they have, they have ????? they would plant watermelon...plant watermelon, and no other...So, when the watermelons would pick, and then the—when they'd grow the vines, the watermelon, yeah, we'd have to go and take something, take sticks and hold up the vines this way and then, you know, they'd—they'd ?????? melons they'd put 'em, so we take 'em somewhere.

(CD): You brought 'em—and you brought that down to your guys' house? Or you did it up at Sol's house?

(IP): We did it at Sol's—Sols place up the hill, and, and then...we didn't have it, we went to ????? kids get together help them, you know, let's get together, everybody gonna help 'em and ??? this time.

(CD): That must have been nice, when they were ripe.

(IP) So one time, one time we picked uhh, umm...It was down at our place I think, yeah, it was, we had a little patch too, a watermelon patch, a little patch. And umm, you know, we had to make some kind of fence, we just (inaudible) fence, in like the *kahawai*? And then had fence over there so the cattle won't go down into the beach area. Anyway, we got this watermelon, and it was a big watermelon, real nice, big watermelon. And we would take that and take it—take it to the beach and put 'em on the boat and take it to Maui and sell it. And...but, like my Tutu say, I never know how much we got for the watermelons, the kids, they don't tell you, but yeah...so we don't know, but anyway, but when we'd get the money back ?????. Anyway I saw this big watermelon. I said that one's mine! I said I'm going to take that! And my mom said no, that's too big, you know, let my uncle take it. I said, no uncle's gonna take it. I am. So, I took the watermelon, and I'm going down, it was okay I had took it, but I got to the fence—

(CD): You carried it?

(IP): Yeah, I carried it, and I got to the fence. So, we had to go through the fence, and there wasn't no gate, so I go down and I didn't put the watermelon down, I had to go through the fence with the watermelon, and, you, know, they wide, eh, the wire fence, and I—so I thought I could get through there. So, ???? the watermelon, I put my feet over there, and I stepped over to get under, and the watermelon fell, and (crack crack), just went open, just cracked. And oh it was just red, and sweet, you know you look inside and it's just like little grains of, nd, oh the kids went back, everybody ??? ran over and we all ???and digged in to the watermelon.

(CD): Oh good, so everybody ate it.

(IP): Yeah, we cannot take on the barge, my mom, my mother was so angry, I did get scolded but I didn't get a spanking because all the kids were there. She said, I told you not to take that! Oh, well, too late!

(CD): How old do you think you were?

(IP): Oh, I must have been about six...or seven. (Laughter.)

(CD): Oh wow, I bet it was—

(IP): I always think of that, it tasted perfect, sweetest watermelon ever. It was red, red inside, just like you know, ??vegetables?? inside there. (Inaudible.)

(CD): Everybody just came and ate it.

(IP): Dirty hands. That's why I tell my girls, we eat dirt when we're young, our hands were dirty and we didn't.wash it all ???? but our ??????? we dig in. (Laughter.) Yeah, but...so anyway.

(CD): Oh wow...Umm...

(IP): So like this, this, I don't— I cannot help you with that.

(CD): Here let me see if I can read a—let me see if I can read a couple more name. Maawe?

(IP): No.

(CD): Maawe? Umm....

(IP): ???? real, real bad.

(CD): Yeah, Naholo—oh I read that already.

(IP): I guess you know this stone down in the park here?

(CD): The stone?

(IP): There's that—Yeah, there's that monument? Have you seen it in the park?

(CD): Yeah.

(IP): It got names on 'em. All the Hawaiians that used to be here before, have their names on them. We can go see it in the park, right over there.

(CD): You wanna go out there—you wanna—can you walk around?

(IP): Yeah! Sure!

(CD): Maybe we can take a little walk around, and go out in the park. Okay, let me pause this...

(Recorder paused.)

(IP): ...build a, what you call, monument, for the people that used to live down in Palawai.

(CD): Oh! Yeah!...Alright, okay, now I'm walking around the town with Aunty Irene.

(IP): Let's go over here.

(CD): Oh, that stone, right there?

(IP): Yeah. That's where—

(CD): But there's another one, what's that? Oh this is...

(IP): They're here. Now that one is (inaudible)—this one.

(CD): There's another one.

(IP): When the company took over the place down there, they uh, made this monument for the people that used to live down there.

(CD): Oh.

(IP): But the company...umm, took over my ah, my Tutu's place—

(CD): Oh, they took it over, huh?

(IP): Yeah, yeah, they took it over. Because the Hawaiians were gone already, but, but they...

(CD): Did—did they buy her property?

(IP): Yeah, I think so, I think they bought it—I don't know what, but umm, my Tutu's place, my sister had it, and when ah...my sister had the place there. And, she had her, her brother I think one time, I don't know what he did, something, but, he must have done something wrong, and they, the company, they sent him away from Lāna'i, for some reason.

(CD): Oh...Oh, that's World War II.

(IP): Oh, well—oh, well then that one down there, but—

(CD): Vietnam...Okay, so that's for the service in the—

(IP): ...And ah, so they make these stones, you know (inaudible). So the property, the company, ah, wanted the pineapple, so they wanted to place to just...but it was for us, for my...my sister, but what they did to my father, and so, we ah...the company want it, so they asked my father that, if I can, my father said, no, you know, he isn't gonna sell it, and he said well, if you sell it I can't pass to them, they won't—they're not gonna let him, we cannot go there the property. So anyway, my dad and my sister, her husband was working for the company, and they, ah...her brother, I don't know what he did, company said, the company said, you cannot get any job over here. So, ah...they moved to Moloka'i. And umm...then he didn't find a job, so he went come back home, and the company wouldn't give him a job, and that's when he—

(CD): Sold.

(IP): Sold the place. If my dad would let them have the place, they could have the place and they can come back. That's the only way, so my dad had to let go of the property. Because my sister's husband couldn't find a job, and they had their kids, and...

(CD): Uh huh. And that was the Palawai property? Palawai, where your Tutu lived?

(IP): Uh huh. So umm, they took the property, because what—if we kept it, we couldn't go, make a house or anything, whatever they want. They said they won't let us get in there, or they gonna, you know...

(CD): Wow.

(IP): That's, chicken, yeah? So these are the people that had their homes down there, that they, the company took the...all the Hawaiians used to live, a lot of Hawaiians.

(CD): Hauhiwahine...

(IP) And I don't know them, the only one I know is Keliihananui.

(CD): Keliihananui. Is that, was that your Tutu?

(IP): Yeah, my Tutu was—

(CD): Keliihananui.

(IP): Keliihananui, yeah.

(CD): Oh, okay. Kauhane. Akiki?

(IP): Kauhane, yeah.

(CD): Puupai...Kukololoua?

(IP): Yeah, uh huh. Kukololoua, I think...I think they was related to us, I'm not sure. But, anyway...That's why, which is why put a, take the place and then just leave them a name like this, don't do any good, yeah?

(CD): Yeah.

(IP): Why don't they give 'em money...So, umm, anyways.

(CD): They didn't give 'em money?

(IP): Yeah.

(CD): They didn't give 'em any money?

667 (IP): I don't think so.

668 *(CD): Wanna sit under that—wanna sit under that shelter? Are you cold?*

669 (IP): No.

670 *(CD): You're not cold?*

671 (IP): You wanna go under the shelter?

672 *(CD): Just for a little bit.*

673 (IP): I—I'm not cold. Yeah, but...

674 *(CD): Where do you live now?*

675 (IP): Me?

676 *(CD): Yeah.*

677 (IP): Over here. Hey, what do you wanna do now? We can go take a ride.

678 *(CD): Do you have a car?*

679 (IP): Yeah.

680 *(CD): You do?*

681 (IP): Yeah.

682 *(CD): Okay.*

683 (IP): Okay, if no have you cannot do anything though.

684 (Laughter.)

685 (IP): Well I wish I could talk to you more with the town but like I said, by the time I come up
686 here, the only time I know is about the theater there, is one of the first building they had, and
687 then the city...I don't remember if it's—

688 *(CD): Did you guys ever go to the mountains for anything?*

689 (IP): Yeah, to Lāna'ihale.

690 *(CD): What did you do over there?*

691 (IP): Oh, just for fun, go get *lilikois*, and...we still had plenty *lilikoi*—you know what *lilikoi* is?

692 *(CD): Uh huh, yep.*

693 (IP): Oh, used to have lots. And *lilikoi* and *maile*.

694 *(CD):* Maile?

695 (IP): *Maile.* Used to have plenty and *lilikoi.* You know we don't have that purple one anymore.

696 *(CD): Purple* lilikoi?

697 (IP): Yeah. When they have, uh...you know, things going on, they go pull *lilikoi* vine, and make
698 decorations, and now we don't have any *lilikoi*, I haven't seen any.

699 *(CD): Oh...what about the* maile*? Does* maile *still grow up there?*

(IP): The *maile*, they have some, I think. They said that they have some, but, I don't know (inaudible).

(CD): Did ah. when you were a kid living in the city, what kinds of things did you kids do for fun?

(IP): I never lived in the city.

(CD): Oh, you lived up at Kō'ele.

(IP): Over at Kō'ele. Here, this is my car.

(CD): This Jeep?

(IP): Yeah.

(CD): Oh okay...do you want me to drive? Do you think Uncle Sol's at home?

(IP): I think, I don't know, but we'll go and see.

(CD): Are you related to him?

(IP): Yeah. Yeah, my ah...my—his mother is my mom's...my mom's...not sister, oh I don't know, but yeah, she's related.

(CD): Oh...Maybe we can go by where you lived when you came up to this part of the island.

(IP): Yeah.

(CD): Did you—do you call this...I mean, everybody calls it Lāna'i City now, but, did you guys call it Kō'ele before?

(IP): Kō'ele is up there.

(CD): What did—what did people call this part, before it was Lāna'i City?

(IP): Lāna'i City, is just Lāna'i I guess. What do you mean?

(CD): Before the city was built, what did everybody call this area?

(IP): Just Lāna'i.

(Laughter.)

(IP): It was Lāna'i, just Lāna'i. This area is...you can go...you can...Windshield wipers...this is our theater, but the, the bank.

(CD): Yeah. Did—did you like—

(IP): And this area here is the first, I think, ones of the city.

(CD): Oh, the first part—

(IP): This is where remember, right, because my older sister was living up here, and she lived over there...when we were up in Kō'ele.

(CD): Oh...So what street was that?

(IP): What?

(CD): What street was that we just passed?

(IP): Fourth.

(CD): So that was Fourth.

(IP): Yeah. And then we used to live in this house when we moved...

(CD): Sixth, that was Sixth. Which house?

(IP): That first house there. We moved up to Kō'ele, and then, umm, when my dad retired we moved down here, to the town I was telling you. But umm, I wasn't living there, I was already out of the house.

(CD): (Sneezes.) Oh, excuse me, I think I have allergies. (Sneezes.)

(IP): This is the golf course.

(CD): Oh, okay.

(IP): Yeah.

(CD): That's the golf course.

(IP): (Inaudible) when we come back we go see if Sol is, ah...at the house. He's kind forgetful, too, now.

(CD): What was your favorite thing about living up here?

(IP): Uh, I like the, ah, the weather up here...You know, in 1934, in all the Lāna'i City, it used to be cold, cold, we get a hail storm one night.

(CD): A hail storm?

(IP): Yeah! But, but... we were playing in the—in the house, and then we heard this boom, boom, boom, you know and then, we came up and all this, about that big—

(CD): Oh wow, like golf ball size?

(IP): Yeah. And ah...we were all excited, what was it you know, so my dad showed us. But never no more. That was the only time. It used to be so cold. This is the Lodge.

(CD): So it's not as—it's not as—No, I've never been here! I wanted to stay here tonight! (Laughter.) But I can't. Wow...

(IP): You wanna go in and see?

(CD): Ahh, that's okay, no, we can drive. Yeah that's okay, I can see this another time. So you lived at a house, on this property?

(IP): No. Over here, this is where the, the Kō'ele, ah—

(CD): Ranch.

(IP): Ranch was. The slaughterhouse down there, and over here the manager's house, and Mr. Munro's house was over here, he was the manager at that time, Munro. And his house was here and then our house was here.

(CD): Where did you guys—where did you live?

(IP): Me?

(CD): Yeah.

(IP): We lived over here. There was a house over here. (Where the existing Ko'ele Lodge is now)

(CD): Oh, okay.

(IP): When we came from Keōmoku.

(CD): So this, this structure was the hotel?

(IP): —hotel was a house before.

(CD): This very same structure.

(IP): No, no. This one's all new.

(CD): That's all new. What was here before?

(IP): Yeah, way before was old house. A nice house. A bigger house, yeah? And then, by that big—that's the oldest pine tree you know! This is our church.

(CD): That's a church—that's the church?

(IP): That's our church, yeah.

(CD): Oh, what's it called?

(IP): Kalanaki—Kalana—Kalanakila (*sic*) O ka Malamalama. And this is the oldest pine tree in Lāna'i. See how...It's old, I don't know how long, more than 100 feet, yeah?

(CD): Yes. Yeah, that's big.

(IP): Mr. Munro's house used to be there, then the, the—we used to live here, and then, right next to here, had one, umm...store, an old house which was the ranch store, and ah, where the cowboys used to get their foods, and canned goods, and, when they'd ship 'em in...so, ah...but then they moved, and we had a church right back up here, this one, they moved it over here when they built the hotel.

(CD): Oh...

(IP): So, this was moved, this was in the back. This is Kō'ele.

(CD): Yeah, it's beautiful!

(IP): Kō'ele. And then the slaughterhouse used to be down in here.

(CD): Over there?

(IP): Yeah, you know, see where that, umm...

(CD): Truck?

(IP): Yeah, yeah, right in that area used to be the slaughterhouse. And our school used to be up on that hill over there, on this side. And ah...that's when...that's the school I went to.

(CD): Yeah.

(IP): Yeah, this road's gonna take you down to Keōmoku.

(CD): Oh.

(IP): We'll go see if Sol is, ah, home.

(CD): And so this was all cattle—cattle—part of the cattle ranch.

(IP): This one never used to be cattle, it was just when, the ranch—umm, company gave up pineapple, then they started having cattle over here.

(CD): Oh, okay.

(IP): And those houses down there are the Hawaiian housing.

(CD): Oh, Hawaiian Homes?

(IP): Hawaiian Homes, yeah...

(CD): Oh...

(IP): I tried to get a place there, but they said that I didn't have enough Hawaiian.

(CD): Terrible, yeah?

(IP): Yeah.

(CD): That happened to my dad, too.

(IP): And then I see somebody there, and they—they don't look Hawaiian, and they get a place. You know, they...I—I—I—just...so I told my daughter, oh, forget about it. I get my place over there. So...

(CD): Third.. Is this Lāna'i Avenue? You know, I think my...I saw my friend on the ferry this morning, I...he's, he lives there.

(IP): He lives here?

(CD): Well, no, he's refurbishing it. His, his ah, mother-in-law used to own that.

(IP): Who's the mother, do you know?

(CD): I don't know her name, but his name is Kimo...ah, his wife is Lisa...I don't know Lisa's maiden name. Anyway.

(IP): Anyway, these big homes, these used to be, ah...used to be, umm...

(CD): The big homes?

(IP): Boarding houses. The—the big, big house over there. You know, for the pineapple workers that come and ah, live here.

(CD): The boarding houses?

(IP): The boarding house, yeah.

(CD): Like the, umm, dormitory?

(IP): Cinderella's house.

(CD): Yeah, who's house is that?

(IP): I don't know!

(CD): That's fancy!

(IP): I don't who, they made a fancy house, we call 'em Cinderella's house, and I don't know...

(CD): Woah, look at that one!

(IP): But it's just—they're still working on it.

(CD): Wow, yeah.

(IP): Yeah , but it's ah...'cause I'd sure like to know. And this is the Purple Church, we call this the Purple Church.

(CD): The Purple Church, ohh...and that—has that been around since you were a kid?

(IP): Hmm?

(CD): Have—have these houses—these have all been here since you were a kid?

(IP): Yeah. That used to be a boarding house there, the Purple Church, though.

(CD): Oh...a boarding—which one? Which boarding house was it? Was it the Filipino, or Japanese...do you remember?

(IP): Ahh...Filipino.

(CD): Filipino? What about the one above it, that you pointed out first? Which one was that?

(IP): I guess...well, well whatever—whoever lives there. I mean, the boys that come here and live and, work, so they'd go over there and eat. It's the one's from outside the island, yeah? It's only for the boys—the people that come to Lāna'i to work, and that's where they go and eat. These are all, umm...this is where Sol lives. Guess I go see if he's home.

(CD): Do you think he'd mind?

(IP): I don't think so. Let me go see if he's home.

(CD): Does he live with anybody? Does he live with anybody?

(IP): No, his grandchildren is all away. Uh, his wife passed away long ago. So, he's home alone. We can go and see if he's home. (Inaudible) myself.

(Laughter.)

(IP): He's got grandchildren. He has a son—son that lives in the mainland. He's something, big shot with the Haw—airline. He should be home.

(CD): Feels warmer here.

(IP): That grass needs water. That house is neglected.

(CD): Yeah, it's for sale.

(IP): (Inaudible.) Sol! He's hard of hearing, too. (Knocking.) Sol!

(IP): Do you hear somebody walking? (Knocking.)

(Laughter.)

(IP): Sol! I have someone here to meet you!

(cut interview here, Uncle Sol joins in but did not sign authorization form)

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APPENDIX F.

Market Study

PREPARED FOR:

MR. MICHAEL T. MUNEKIYO, AICP
President

MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Hawaii 96793

EFFECTIVE DATE: **October 11, 2008**

A MARKET STUDY FOR A PROPOSED AFFORDABLE HOUSING PROJECT IN LANA'I CITY, ISLAND OF LANA'I, HAWAII

ACM CONSULTANTS, INC.

October 8, 2009 08-9118

Mr. Michael T. Munekiyo, AICP
MUNEKIYO & HIRARA, INC.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Re: Market Analysis for the proposed Lana'i Affordable Housing Project, Island of Lana'i, County of Maui, State of Hawaii

Dear Mr. Munekiyo:

In accordance with your request, we have inspected the above-referenced property in order to provide a defined scope market study of the proposed Lana'i Affordable Housing Project, Island of Lana'i, County of Maui. This *counseling report*, and the conclusions herein, are based on the on-site inspection of the property, a study of current political and economic conditions, and a historical review of the real estate market in Lana'i City and on Lana'i overall. The effective date of this report is October 11, 2008.

The subject consists of approximately 73 acres of land and is currently zoned Interim District. The project, which is still in its preliminary planning stage, is identified as the Lana'i Affordable Housing Project and will be located on the western side of Lana'i Town and accessed via extensions of Fifth Street and Ninth Street.

The assignment will include the following report:

> **Market Analysis** The Consultant agrees to provide a market analysis for this proposed project by (1) defining and delineating the market area; (2) identifying and analyzing the current supply and demand conditions that comprise the specific real estate market segments; (3) identifying, measuring and forecasting the effect of anticipated developments or other changes on future supply in each market segment; and (4) to the extent possible, forecasting the effect of anticipated economic or other changes on future demand.

The following report presents a narrative review of the market study and our analysis of data along with other pertinent materials on which this report is predicated. It contains data and exhibits gathered in our investigations, and will include a description of the analytical process and our conclusions.

Thank you for allawing us the opportunity to work on this interesting assignment.

Respectfully submitted,
ACM Consultants, Inc.

Glenn K. Kunihisa, MAI, CRE
Certified General Appraiser
State of Hawaii, CGA-039
Expiration: December 31, 2009

Shane M. Fukuda
Certified General Appraiser
State of Hawaii, CGA-810
Expiration: December 31, 2009

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PART I – INTRODUCTION

A. EXECUTIVE SUMMARY

Background

The proposed Lana'i Affordable Housing Project will be located on the western side of Lana'i City, Island of Lana'i, County of Maui. The subject consists of approximately 73 acres of land and is currently zoned Interim District by the County of Maui, while the State Land Use District designation is currently Agricultural. The project, which is still in its preliminary planning stage, will consist of 412 residential units and will possess mountain views. The Consultant was provided with a Preliminary Site plan and has gleaned information from this plan for information regarding the subject project district. According to the plan, there will be 239 house lots of approximately 5,000 square feet (R-1 Residential District) and 173 multi-family units on 14.46 acres. Early indications also include 4.19 acres of park space, 4.94 acres of public/quasi-public land, and a 4-acre detention pond.

Study Objectives

ACM Consultants, Inc. has been retained by Mr. Michael Munekiyo of Munekiyo & Hiraga, Inc. to analyze the residential real estate market as it relates to this proposed project. In particular, the Consultant studied economic trends and demographics, and supply and demand factors for residential property which includes single family homes and condominium units. In the process, they gathered as much information as possible on real estate sales on Lana'i, while focusing on the Lana'i City market.

The objectives of the market analysis were as follows: (1) to define and delineate the market area; (2) to identify and analyze the current supply and demand conditions specific to the subject's market; and (3) identify, measure and forecast the effect of anticipated developments or other factors on future supply.

Conclusion

Lana'i has seen growth in its populatian, tourism and economy over the past two decades. Similar to many real estate markets on the mainland, Lana'i's real estate market saw increases in the early 2000's. During that period, median prices as well as sales volume were at record highs, with the lack of affordable housing being a major concern for the island workforce. As a result, the county administration placed the affordable housing issue among its top priorities since 2004, which led to the passage of the Residential Workforce Housing Policy in 2006.

Since 2006; however, the residential real estate market has softened, with median prices and sales volume retreating from their previous peaks. Marketing times have also increased. There are a number of factors believed to have caused this turn around, including fluctuating

interest rates, a less stable economy, increases in fuel and construction costs, and the evaporation of secondary lending sources.

There were little, if any, new housing units brought to market on Lana'i during this most recent real estate surge and short-term projects are also very limited. While Castle & Cooke Hawaii is rumored to have a potential project on 30-acres adjacent to the subject and the Department of Hawaiian Homelands may create an additional 25 to 30 units in another project, the certainty of their development plans is unknown. Furthermore, research with the County of Maui Planning Department Long Range Planning Division revealed no known projects.

With this in mind, there appears to be little in the way of new inventory planned for Lana'i. Granted, the pool of potential buyers is limited, due in part to the small population base. However, if housing units are offered at price points at the lower end of the affordable housing guidelines, it is assumed that they would have a greater chance of realizing market acceptance.

Although the exact product mix and pricing of the project have not been determined, this market study will show that the sentiment of Lana'i residents, based on both the Lana'i Affordable Housing Survey results and interviews with representatives of the island's real estate market, is for a three-bedroom and two-bathroom single-family home, of between 1,200 and 1,400 square feet. An acceptable price range was determined to be from $100,000 to under $300,000. It is suggested that the initial phase of this project be limited to 50 single-family residential units, with subsequent phases of 15 to 20 units per year. The Consultant recommends that construction of the multi-family units be held off until after the single-family residences are completed.

B. PURPOSE OF THE REPORT

The purpose of this report, as of October 11, 2008, is to generate a market study with respect to the proposed Lana'i Affordable Housing Project.

C. INTENDED USE OF THE REPORT

The intended use or function of this report is to provide real property information and real estate market data in support of a 201H application on behalf of the County of Maui. The intended users of this report are Munekiyo & Hiraga, Inc., the County of Maui, Pacific Architects and the government agencies involved in the proposed land use changes and entitlement process.

D. SCOPE OF THE REPORT

The Consultant has agreed to provide a current market analysis of this project by (1) defining and delineating the market area; (2) identifying and analyzing the current supply and demand conditions that make up the specific real estate market; and (3) identifying, measuring and forecasting the effect of anticipated developments or other changes on future supply. The market analysis will be developed and prepared in conformity with, and subject to, the requirements of the Code of Professional Ethics and the Standards of Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice.

E. STATEMENT OF COMPETENCY

ACM Consultants, Inc. (formerly ACM, Real Estate Appraisers, Inc.) has been actively involved in the real estate appraisal business since 1982. Our business emphasis has focused mainly on the valuation of residential and commercial properties located within the State of Hawaii. The company considers itself competent to conduct a market analysis for a proposed affordable housing project in Lana'i City, Island of Lana'i, County of Maui.

F. EXTRAORDINARY ASSUMPTIONS AND HYPOTHETICAL CONDITIONS

As of October 2008, the subject was still in the preliminary stages of planning. A Preliminary Site Plan, prepared by Pacific Architects, provided a visual indication of the proposed layout of the development. The Consultant is not liable for any changes in the project plan past this date, nor for information that has not been released or communicated to the Consultant.

The Consultant has no control over economic conditions and other international events that could have an affect upon Hawaii's economy and the Lana'i real estate market. As a result, this report has not made any assumptions regarding potential conflicts with other nations, or external factors affecting economic conditions here.

The counseling report is also subject to standard "Limiting and Contingent Conditions" located in the pages following.

G. CONFIDENTIALITY PROVISION

The contents of this market study are confidential. Release of this counseling report by ACM Consultants, Inc. is limited to you and for your preparation of a 201H application for the proposed Lana'i Affordable Housing Project. Any further release of this report, or

portions herein, is strictly prohibited and you shall accept the risk and liability for any such release without the previous written consent of ACM Consultants, Inc. Further, you shall indemnify and defend ACM Consultants, Inc., and its individual consultants/appraisers, from any claims arising out of any such unauthorized disclosure.

H. CERTIFICATION

The undersigned does hereby certify that except as other-wise noted in this appraisal report:

1. The Consultant's compensation is not contingent upon the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event.

2. The Consultant has no present or prospective interest in the property that is the subject of this report, and no personal interest or bias with respect to the parties involved. The "Estimate of Market Value" in the appraisal report is not based in whole or in part upon the race, color, or national origin of the prospective owners or occupants of the properties in the vicinity of the property appraised.

3. The Consultant has personally inspected the property, and is a signatory of this Certification.

4. To the best of the Consultants' knowledge and belief, all statements of fact and information in this report are true and correct, and the Consultant(s) have not knowingly withheld any significant information.

5. No other person provided significant professional assistance to the person(s) signing this report.

6. The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal unbiased professional analyses, opinions and conclusions.

7. All analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Appraisal Practice.

8. This counseling report is subject to and in conformance with the Code of Professional Ethics and Standards of Professional Conduct of the Appraisal Institute. The analyses, opinions and conclusions of this counseling report have been made in conformity with, and subject to, the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.

9. This counseling report is to be used only in its entirety and no part is to be used without the whole report. All conclusions and opinions concerning the real estate are set forth in the counseling report were prepared by the Consultant(s) whose signature(s) appears on the counseling report. No change of any item in the counseling report shall be made by anyone other than the Consultant, and the Consultant shall have no responsibility for any such unauthorized change.

10. The Appraisal Institute, of which this Consultant is a member, has a legal right to review this report.

11. The qualifications of this Consultant, including completed educational requirements of his/her candidacy are located in the Addendum to this report. Any member signing the report has completed the requirements of the Appraisal Institute's continuing education program.

ACM Consultants, Inc.

Glenn K. Kunihisa, MAI, CRE
Certified General Appraiser,
State of Hawaii, CGA-039
Expiration: December 31, 2009

Shane M. Fukuda
Certified General Appraiser,
State of Hawaii, CGA-810
Expiration: December 31, 2009

I. LIMITING AND CONTINGENT CONDITIONS

1) This is a Counseling Report which is intended to comply with the reporting requirements set forth under Standards Rule 5 of the Uniform Standards of Professional Appraisal Practice for a Counseling Report. The information contained in this report is specific to the needs of the client and for the intended use stated in this report. The Consultant is not responsible for unauthorized use of this report.

This report has not been prepared for federally-related mortgage financing purposes, and has not been prepared in compliance with the requirements of Title XI of the Federal Financial Institutions Reform, Recovery, and Enforcement Act of 1989.

2) No responsibility is assumed for legal or title considerations. Title to the property is assumed to be good and marketable unless otherwise stated in this report.

3) The property analyzed is free and clear of any or all lines and encumbrances unless otherwise stated in this report.

4) Responsible ownership and competent property management are assumed unless otherwise stated in this report.

5) The information furnished by others is believed to be reliable. However, no warranty is given for its accuracy.

6) All engineering is assumed to be correct. Any plot plans and illustrative material in this report are included only to assist the reader in visualizing the property.

7) It is assumed that there are no hidden or unapparent conditions of the property, subsoil, or structures that render it more or less valuable. No responsibility is assumed for such conditions or for arranging for engineering studies that may be required to discover them.

8) It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations and laws unless otherwise stated in this report.

9) It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined, and considered in this counseling report.

10) It is assumed that all required licenses, certificates of occupancy or other legislative or administrative authority from any local, state, or national governmental or private entity or organization

have been or can be obtained or renewed for any use on which the value estimates contained in this report are based.

11) Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. Maps and exhibits found in this report are provided for reader reference purposes only. No guarantee as to accuracy is expressed or implied unless otherwise stated in this report. No survey has been made for the purpose of this report.

12) It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described and that there is no encroachment or trespass unless otherwise stated in this report.

13) The Consultant is not qualified to detect hazardous waste and/or toxic materials. Any comment by the Consultant that might suggest the possibility of the presence of such substances should not be taken as confirmation of the presence of hazardous waste and/or toxic materials. Such determination would require investigation by a qualified expert in the field of environmental assessment. The presence of substances such as asbestos, urea-formaldehyde foam insulation or other potentially hazardous materials may affect the value of the property. The Consultant's value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value unless otherwise stated in this report. No responsibility is assumed for any environmental conditions, or for any expertise or engineering knowledge required to discover them. The Consultant's descriptions and resulting comments are the result of the routine observations made during the analysis process.

14) Unless otherwise stated in this report, the subject property is evaluated without a specific compliance survey having been conducted to determine if the property is or is not in conformance with the requirements of the Americans with Disabilities Act. The presence of architectural and communications barriers that are structural in nature that would restrict access by disabled individuals may adversely affect the property's value, marketability, or utility.

15) Any proposed improvements are assumed to be completed in a good workmanlike manner in accordance with the submitted plans and specification.

16) The distribution, if any, of the total valuation in this report between land and improvements applies only under the stated program of utilization. The separate allocations for land and buildings must not be used in conjunction with any other appraisal and are invalid if so used.

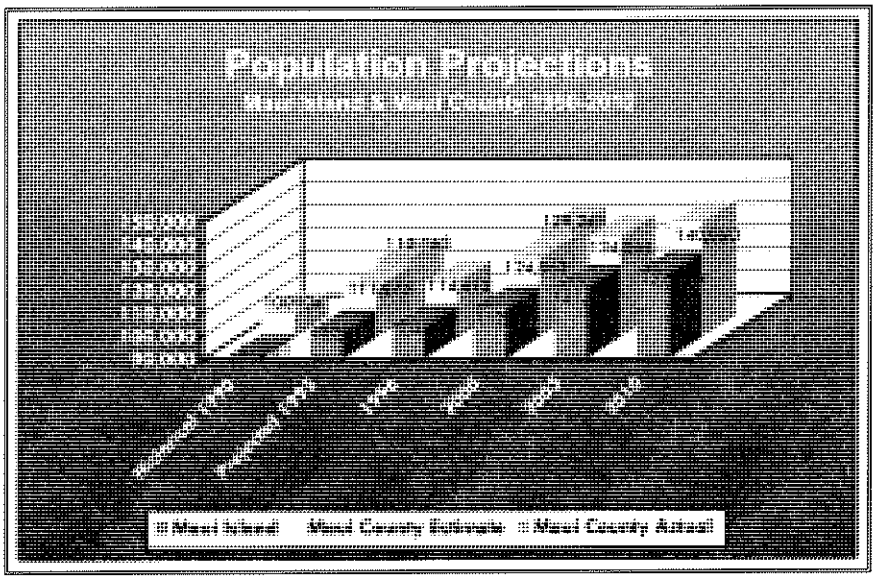
17) Possession of this report, or a copy thereof, does not carry with it the right of publication. It may not be used for any purpose by any person other than the party to whom it is addressed without the written consent of the consultant, and in any event, only with property written qualification and only in its entirety.

18) Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the Consultant, or the firm with which the Consultant is connected) shall be disseminated to the public through advertising, public relations, news sales, or other media without prior written consent and approval of the Consultant.

PART II – FACTUAL DATA

A. REGIONAL DATA - MAUI COUNTY

Maui County is the third most populous of the four counties of Hawaii, with a total resident population of 128,241 (2000 Census) and a change of 27.6 percent since 1990. Maui County consists of the islands of Maui, Molokai, Lana'i, and Kahoolawe. Ninety percent (90%) of County residents live on Maui; the 2000 U.S. Census of Population reported 7,404 residents on Molokai and 3,193 on Lana'i. The Island of Maui consists of a total of 734.5 square miles, or 470,080 acres. Population Projections for Maui County and the Island Maui are illustrated on the table below.



Like all the Hawaiian Islands, Maui, Molokai and Lana'i are blessed by warm air temperatures year-round, and ocean waters that range from 72-77°F in winter to 77-81°F in summer. The islands' distance from other continents, the moderating effects of the surrounding water and the tropical location combine to create this pleasant climate. Hawaii's topography, particularly the mountains and valleys and location of each island, contributes to the great variety of microclimates within very small areas.

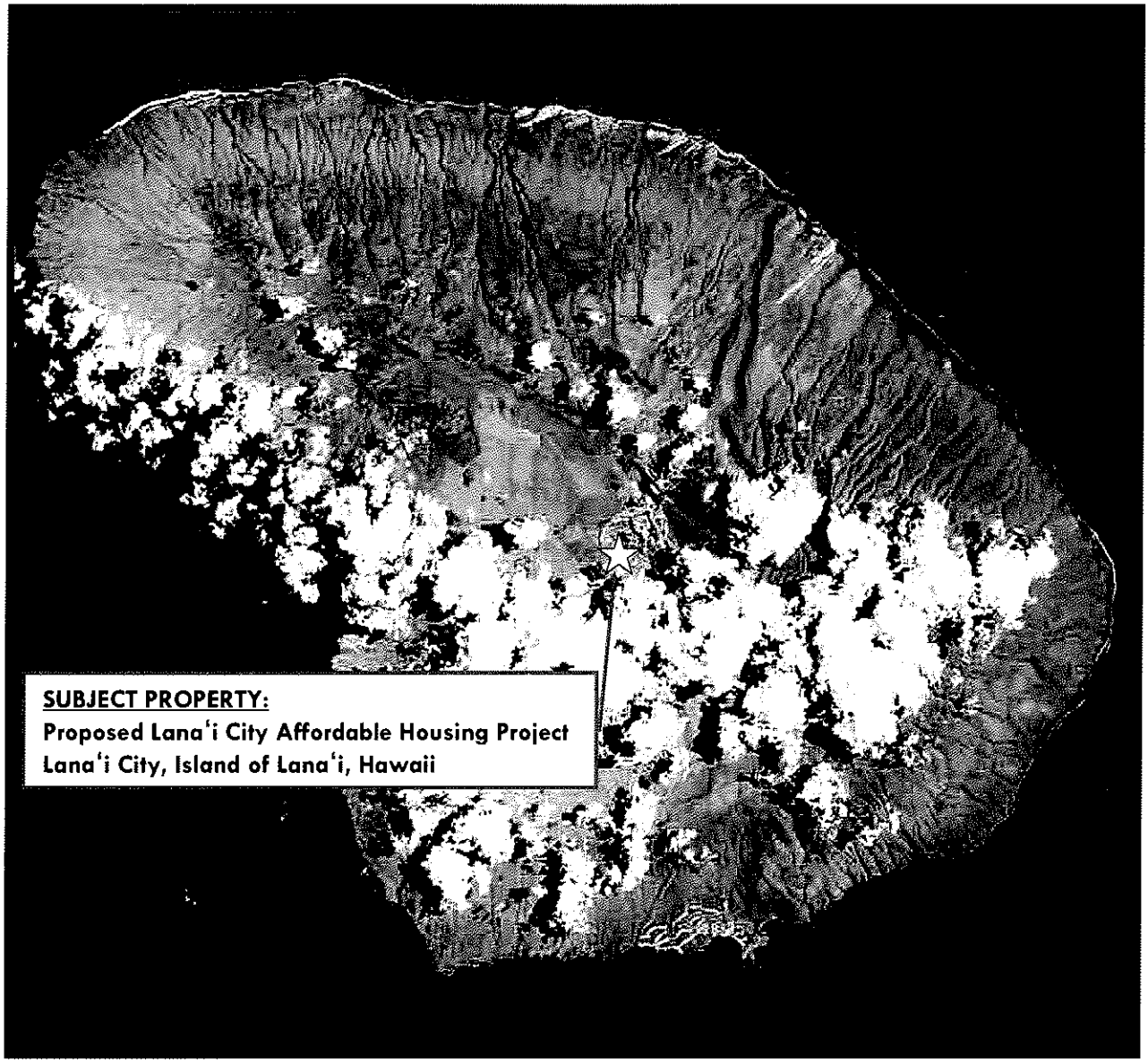
Maui County has clearly dominated the tourism competition between the neighbor islands (excluding Oahu), drawing more tourists than the other Neighbor Islands of Hawaii and Kauai combined, and has consistently had the highest occupancy rates of all island (Oahu included).

Overall, Maui County's performance has exceeded other counties during the state's ongoing string of job losses that began in late 1992. A falling Maui County unemployment rate corroborates the tightening labor market; since the mid 1990's, Maui County's unemployment rate has steadily declined and is currently one of the lowest in the state.

Maui County has an elected Mayor and County Council, and the Board of Water Supply and Liquor Control Commission are semi-autonomous with appointed directors. Although all courts are conducted by the State, the County is responsible for prosecution and the Mayor appoints the prosecutor. The council has nine members, each residing in one of nine districts; however, voters cast ballots for all nine seats.

Unlike other states, Hawaii has only two layers of government: State and County. The State is responsible for many functions that elsewhere come under the jurisdiction of municipalities, such as schools, hospitals, airports. Also, unlike other states, Hawaii has statewide zoning carried out by the State Land Use Commission. The County has zoning authority within the boundaries established by the commission.

The County of Maui is encountering a lack of affordable housing. Maui is one of the most expensive counties for single-family home buyers, with an average monthly median sales price of $627,137 in 2007; and a record high median price of $780,000 in July 2006 for a single-family home. According to the latest State of Hawaii Data Book, 8 percent of the houses are overcrowded on Maui and 41.4 percent of the households pay more than the recommended limit of 30 percent of their income on housing. In fact, 27.1 percent pay more than 40 percent on housing. The County administration has made the creation of affordable housing its priority and several new projects are either underway or in-process.



Not to Scale!

ISLAND OF LANA'I

B. NEIGHBORHOOD DESCRIPTION

Since real estate is fixed in location, its marketability and rentability are strongly influenced by economic and social trends in its immediate environment. The continuing attractiveness of this neighborhood environment to potential users and tenants, and its competitive relation to those of substitute properties, must therefore be evaluated and forecast by the consultant. In particular, perceived neighborhood trends affect both the quality and quantity of the revenues the subject property can reasonably be expected to generate. A neighborhood of income-producing properties is a geographic area characterized by similarity of uses and/or users, within which any change has a direct and immediate effect on the subject property and its value.

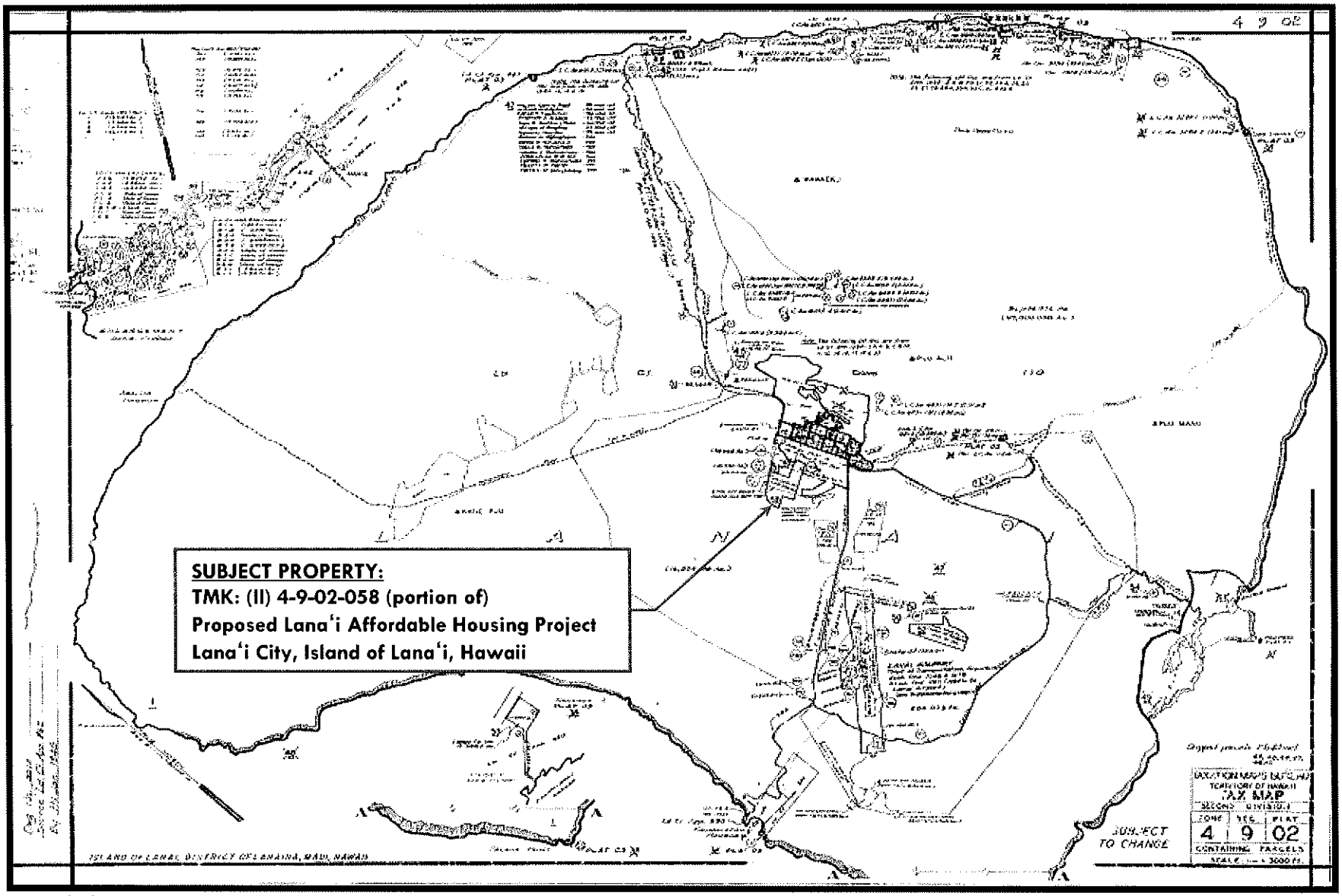
Lana'i, together with the islands of Maui and Molokai, make up Maui County; and, this small island is viewed as a single neighborhood. The island of Lana'i, formed by a single volcano, covers a land area of about 90,000 acres. Almost all of the island's residents live in Lana'i City, which is situated on the central plateau just below Lana'ihale, the volcanic peak. The location of this plantation community was based on the need to make the settlement area accessible to the pineapple fields that formerly extended through the central plateau. Kaumalapau Harbor is the only commercial harbor on the island and handles the shipment of the majority of the goods and products that support the island's population.

Resort development is concentrated in two areas: at Koele, above Lana'i City, and at Manele/Hulopoe on the coast. In 2007, Conde Nast Traveler magazine's reader poll listed the Four Seasons Lodge at Koele and the Four Seasons Lana'i at Manele Bay as 3rd and 4th best, respectively, in the "Top 20 Hawaii Resorts" category. The Manele/Hulopoe Bay area is also host to a small boat harbor and major beach park. Manele and Hulopoe Bays are designated Marine Life Conservation Districts. On the eastern shore there are a few homes on small *kuleana* and other land holdings. Approximately 98 percent of the island is owned by the major landowner, Castle and Cooke, Inc.

Lana'i City is home to the island's shopping retailers, financial institutions, schools and other civic and governmental agencies. The Lana'i Airport is located to the southwest of Lana'i City, with daily scheduled service from all of the neighbor islands.

No public transportation exists on Lana'i and there are numerous unpaved roadways stretching to its outskirts. However, Lana'i City, where most residents live, is easily accessible from both Kaumalapau Harbor and Lana'i Airport. The resort areas of Koele and

Manele/Hulopoe have similar ease of access. Based on the desirability of this area and forecasted demand here, property values on Lana'i are expected to appreciate over the long-term future.



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NEIGHBORHOOD MAP

C. PROJECT DATA

Environs

The subject will be located on a westerly extension of Fifth Street, Island of Lana'i, County of Maui. Fifth Street is a secondary roadway, that runs in a general east-west direction, perpendicular to Lana'i Avenue and Fraser Avenue, the primary thoroughfares of Lana'i City.

To the north, south and west of the subject are agricultural lands, while Lana'i High and Elementary Schools, the Lana'i Softball Field and the Olopua Woods subdivision are to the immediate east. Further east is Lana'i City, where the majority of the island's retail, financial, and civic institutions are located. Other nearby establishments include: Launderette Lana'i, The Local Gentry, Blue Ginger Café, Canoes Restaurant, Mike Carroll Gallery, Lana'i Playhouse, First Hawaiian Bank and the Lana'i Cultural Heritage Center.

Description of the Proposed Project

The proposed Lana'i Affordable Housing Project will be located on the western side of Lana'i City, Island of Lana'i, County of Maui. The subject consists of approximately 73 acres of land and is currently zoned Interim District by the County of Maui, while the State Land Use District designation is currently Agricultural. The project, which is still in its preliminary planning stage, will consist of 412 residential units and will possess mountain views. The Consultant was provided with a Preliminary Site plan and has gleaned information from this plan for information regarding the subject project district. According to the plan, there will be 239 house lots of approximately 5,000 square feet (R-1 Residential District) and 173 multi-family units on 14.46 acres. Early indications also include 4.19 acres of park space, 4.94 acres of public/quasi-public land, and a 4-acre detention pond.

PART III – ANALYSIS AND CONCLUSION

A. MARKET ANALYSIS

For the purpose of estimating the market response to this project, a market study was conducted to determine how current supply and demand for residential homes and multi-family units might be affected by the development of the subject's units. The extent of our survey encompassed new, ongoing and proposed residential developments on Lana'i to give the reader the best perspective of the overall market.

OVERVIEW

One of the more difficult factors in determining the success of a proposed project is estimating future absorption rates. There are two components to this: First, is the design and pricing of the proposed project. This, of course, is well within the developer's control but has not yet been determined for the subject. The second aspect is the overall market environment at the time of pre-sale and project completion. This is, obviously, more difficult to define because it involves forecasting such variables as interest rates, overall market conditions, and general and specific sector real estate market conditions.

The added complication with most projects is the time frames and time lags involved. Since most subdivisions or condominium projects take several years between conception and completion, market and interest rate conditions can change significantly. Thus, a project may commence in a favorable environment and be completed in an unfavorable one (or vice versa). Furthermore, real estate is a cyclical industry and sales activity tends to move in spurts. It is not unusual for a new project to sell half its units in the first year of marketing and require 2 to 3 years (or longer) to sell the remaining half. Of course, these time periods could expand or contract depending upon market conditions. Thus, the notion of a linear sales rate may be deemed unrealistic for practical purposes, but is a useful and convenient tool for planning.

RESIDENTIAL SUPPLY CHARACTERISTICS

The Lana'i Affordable Housing Project will extend the western boundary of Lana'i City. Although Lana'i is a portion of Maui County, it is considered to have its own real estate market, of which there are two distinct housing segments, workforce and resort. Since the subject will offer affordable housing units, the primary focus of this market study was the workforce housing segment.

Maui County Residential Workforce Housing Policy

In November 2006, the Maui County Council enacted the Residential Workforce Housing Ordinance. The purpose of the ordinance is to enhance the public welfare by ensuring that the housing needs of the County are addressed. The intent of the policy is to encourage the provision and maintenance of residential workforce housing units, for both purchase and rental, to meet the needs of income-qualified households for the workforce, students, and special housing target groups.

Essentially, all applicable residential development after the passage of this ordinance, including the subdivision of land and/or the construction of single-family dwelling units; two-family dwelling units; multifamily dwelling units; or hotels; shall be subject to the policy upon final subdivision or building permit approval. Applicable residential development includes, in part: five or more dwelling units, excluding farm labor dwellings or a second farm dwelling, not part of a condominium property regime; five or more new lots; a combination of dwelling units and new lots totaling five or more.

Prior to final subdivision approval or issuance of a building permit for a development, the developer is to enter into a residential workforce housing agreement that requires forty percent of the total number of units and/or lots shall be sold or rented to residents within established income-qualified groups, when more than fifty percent of the dwelling units and/or new lots in the development are offered for sale for less than $600,000. When fifty percent or more of the dwelling units and/or new lots in the development are offered for sale for $600,000 or more, fifty percent of the total number of units and/or lots shall be sold or rented to residents within established income-qualified groups.

Landowners who had already received entitlements, or were at least in the approval or permitting process, were granted an exemption from these requirements; and clearly have an advantage over those who began their entitlement process post passage. One of the primary concerns to developers is the reduction in sales revenue. Coupled with unprecedented increases in construction costs, potential projects could become financially unfeasible.

It should be noted that preliminary plans for the Lana'i Affordable Housing Project indicate that all of the housing units will be in the affordable category.

Available Residential Supply In New Lana'i Projects

A discussion with a representative of the County of Maui Planning Department's Long Range Planning Division revealed that there are no acknowledged potential single-family housing projects for Lana'i at present time. Research of short term projects for Lana'i revealed that a multi-family residential project was being discussed for a 30-acre site to the northeast of the subject. Another project was said to involve 25 to 30 units for Hawaiian Homelands. Both projects were in the early discussion stages and details were not available. For the purposes of this report, the primary supply and demand factors for the proposed project are considered to be from the Lana'i region.

Lana'i Residential Active Listings

Besides the properties available in the projects, the number of resale listings on Maui is a good indication of real estate market conditions. This market evidence is generally viewed as a "counter-cyclical" indicator, which means that it is typically lower in strong markets and higher in weak ones.

The Consultant researched listings of residential house lots, condominium and single-family homes on Lana'i and found that there are currently 36 active listings (See **Exhibit B** at the end of this report). The investigation of the Multiple Listing Service revealed the following:

Single-Family

There were a total of 15 listings of residential properties in the Multiple Listing Service, of which, three were for luxury properties. The remaining 12 non-resort single-family listings ranged from $295,000 for a 721 square foot two-bedroom/one-bath home built circa 1935 on a 2,901 square foot lot to $910,000 for a 1,459 square foot four-bedroom/three-bath home built circa 1930 on a 20,601 square foot lot. The 12 non-resort single-family listings had an average marketing time of 216 days. There were seven listings with price reductions of between 5 and 26 percent, while the remaining five listings had not been decreased.

According to the 2008 Affordable Sales Price Guidelines published by the County of Maui Department of Housing and Human Concerns, the high end of the range for an affordable single-family home on Lana'i would be $439,400, which is based on 160 percent of the 2008 median income, as determined by HUD. The scenario assumed a three-bedroom home at a 6.125 percent interest rate. According to

this listing survey, there are five (5) single family properties that are listed for sale at or below this price level.

Vacant House Lots

A survey of vacant house lots on the market on Lana'i revealed that there are eight (8) listings, with all but one lot found in resort areas. The remaining 8,052 square foot lot was found on Kualua Street; however, the $498,000 list price included the partially built home on the site. A listing photo depicted the lot had been improved with split block exterior walls on a concrete foundation. This house lot had been on the market for 107 days.

Condominiums

The majority of the condominiums available on Lana'i are found in the resort areas of Koele and Manele. Research of the Multiple Listing Service confirmed this, as all of the 13 available condominium units available for sale were found in the Villas at Koele, Terraces Manele Bay or Palms at Manele.

RESIDENTIAL DEMAND CHARACTERISTICS

Demand is analyzed from two perspectives: The first is "demographic" demand, the number of units needed for a given market or employment base. Second is "effective" demand, the financial demand equation which involves looking at the number of buyers who would be qualified and interested in purchasing residential real estate.

Population

The population of Lana'i grew drastically during the 1990s. Between the 1990 and 2000 censuses the population increased by 31.8 percent. In comparison, the County of Maui, as a whole, grew 28.5 percent, making it the fastest growing County in the State of Hawaii. According to Claritas Market Comparison Report (See **Exhibit A** at the end of this report), Lana'i outpaced the Central Maui region of Kahului and Wailuku, which registered growth of 26.0 percent, as well as the West Maui region, at 23.3 percent over the same 10-year period.

The growth trend has continued since the end of 2000, albeit at a more subdued pace. The 2008 population estimates have indicated a growth rate for Lana'i of approximately 13 percent over the population indicated in the 2000 census, while the 2008 to 2013 forecasted growth was almost 7 percent.

Household Characteristics

The growth in the number of households paralleled the population pattern. Household numbers grew by 37 percent between 1990 and 2000, estimated at 15 percent from 2000 to 2008, and forecasted to jump 8 percent between 2008 and 2013. The 2008 household estimate for Lana'i was 1,322, with just over 50 percent being owner-occupied and slightly less than 50 percent being rented. The 2013 forecast showed 1,430 households, up 108 households from 2008.

Employment and Household Income

The unemployment rate on Lana'i had been on a general decline since 1993, when unemployment was at 9.1 percent. There was a temporary spike in 2002 to 4.2 percent, before dropping to an all-time low of 1.4 percent in 2005. Since then, there have been annual increases, caused in part by the downturn in the economy and recent financial crisis. In 2008, the unemployment rate for Lana'i was 4.8 percent (Source: State of Hawaii Department of Labor and Industrial Relations- Hawaii Workforce Informer).

Household income figures have also been increasing. The estimated median annual household income on Lana'i is 2008 is $56,102 (Source: Claritas), a rise of approximately 29 percent over the 1999 median household income of $43,271 (Source: US Census 2000) and

a 34 percent increase over the 1989 figure of $32,137 (Source: US Census 1990). During the 10 year period from 1999 to 2008, this represented an average increase of over 2 percent per year.

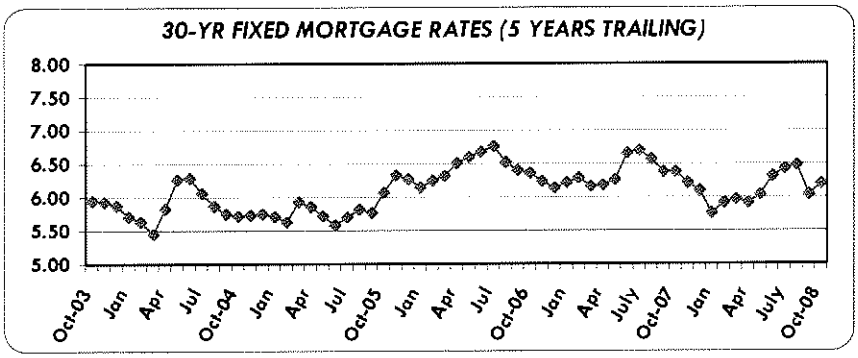
In comparison, the average median sales price for a single-family home on Lana'i went from $132,500 in 1999 up to $425,000 in 2007. This represented an increase of 221 percent over a nine year period, or an average of over 24 percent per year. With home prices increasing at a faster rate than household incomes, many potential buyers were quickly priced out of the market.

Mortgage Interest Rates

Mortgage rates steadily declined during the past six years and momentarily dipped to around 5.00 percent in 2003. As of October 2008, the average interest rate on 30-year, fixed-rate mortgages was at 6.20 percent according to a survey by FreddieMac. Rates averaged 6.41 percent in 2006 and 6.34 percent in 2007; and are currently averaging 6.24 percent for 2008-to date.

The recent rise in mortgage rates was spurred by rising yields in the long term Treasury bond market (See **Table 1**, below). In addition, short term interest rates have been rising due to concerns of inflation by the Federal Reserve Board. A constraint on oil production in the Middle East has led to a rise in fuel prices as well as prices for consumer goods. This has a considerable effect on Hawaii due to the increased cost of shipping.

Table 1 – Historical Trend of 30 Year, Fixed Mortgage Rates



Source: Freddie Mac-Primary Mortgage Survey

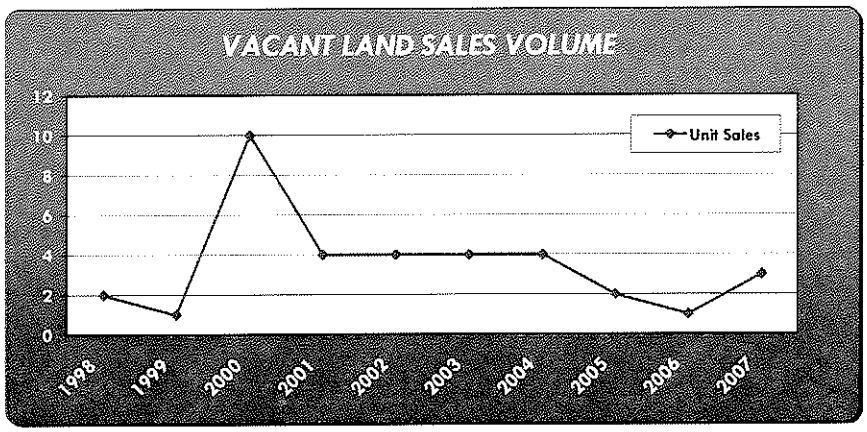
General Residential Sales Activity Island of Lana'i

The number of units sold is the most basic indicator of market activity and is useful in helping estimate the number of new units which a specific market segment may be capable of absorbing. As evidenced in the following section, prices and number of sales increased while marketing times decreased from early to mid-2000's. The tables on

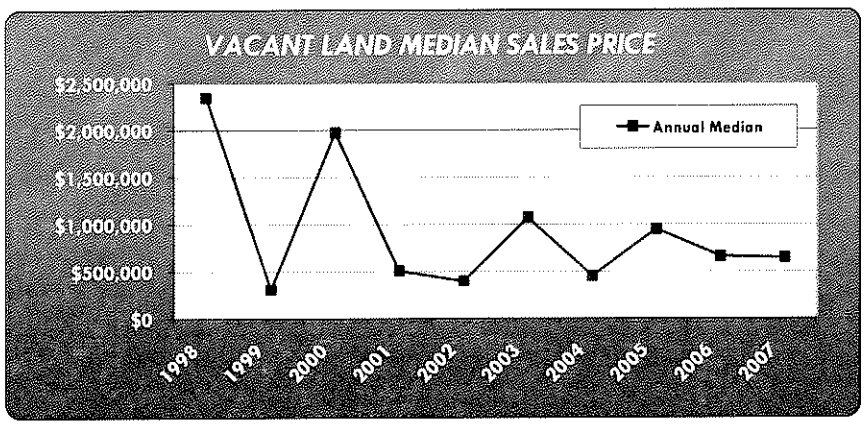
the following pages illustrate the general market trends over the past 10 years on Lana'i, as well as the year-to-date 2008 sales activity. It must be noted that the Island of Lana'i is a very small market, with little sales activity, regardless of market conditions. As such, annual median prices and average days on market can be easily affected by a single sale.

Vacant Land

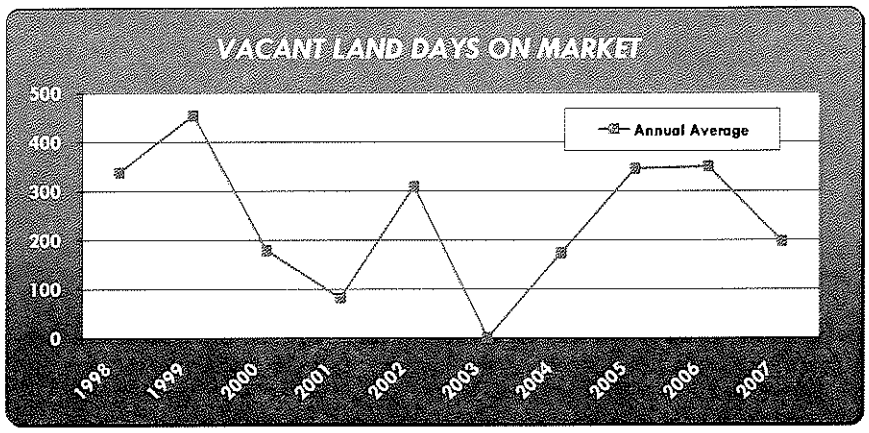
From 1998 to 2007, there was an average of approximately three (3) sales per year. The highest number of land sales occurred in 2000, with 10 units sold, while 1999 and 2006 only saw the conveyances of one vacant land parcel in each year.



Meanwhile, median prices varied greatly from 1998 to 2007. This is not unusual, when considering the diversity of the real estate on Lana'i. A house lot in Lana'i City, for example, would sell for way less than a similar sized home site in the resort areas of Manele or Koele. The lowest annual median price was $310,000 in 1999, while the high end of the range was in $2,347,500 in 1998.

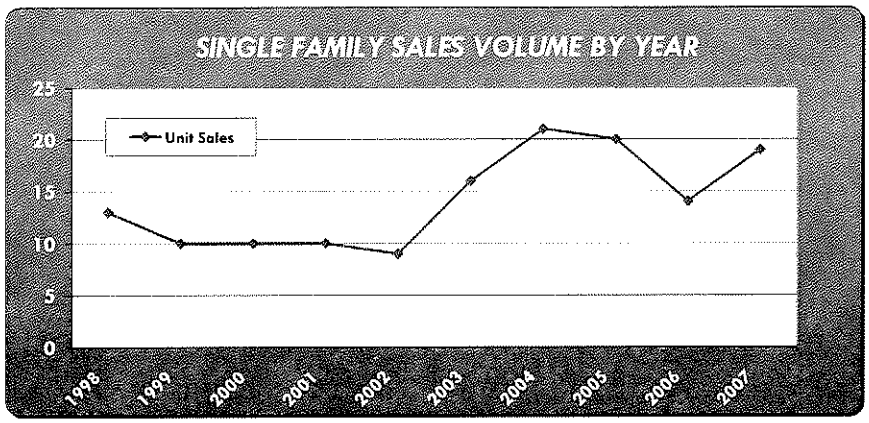


Annual average marketing time between 1998 and 2007 ranged from nil to 454 days. As previously discussed, sales on Lana'i are sporadic, and a single sale can greatly affect the annual average.

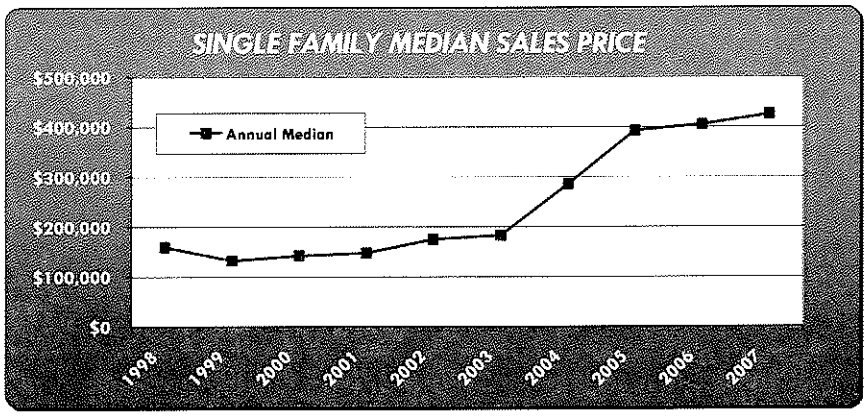


Single-Family

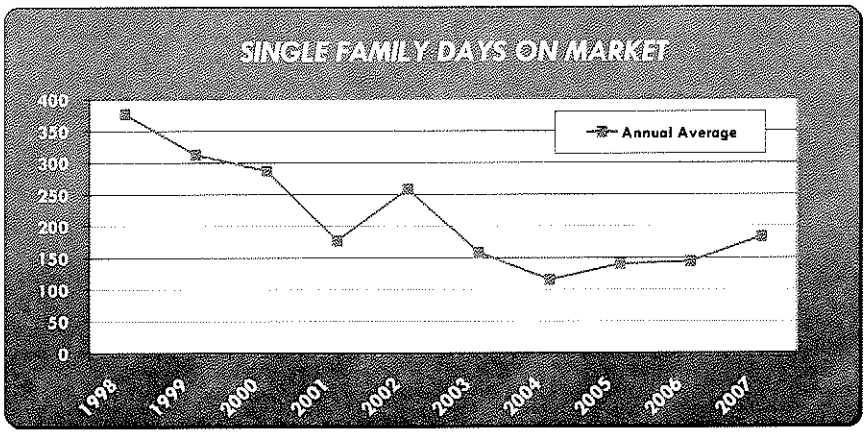
Sales of single-family properties were generally stable between 1998 and 2002, followed by sharp increases in 2003 and 2004. Unit sales stabilized in 2005, dipped in 2006, and recovered in 2007. The low end of the range occurred in 2002, with 9 sales, and the high end saw 21 sales of single-family residences in 2004.



Median prices for single-family units were generally consistent between 1998 and 2003, and then increased dramatically in 2004 and 2005, before stabilizing thereafter. The lowest annual median price occurred in 1996, at $75,000, as compared to a high of $425,000 in 2007.

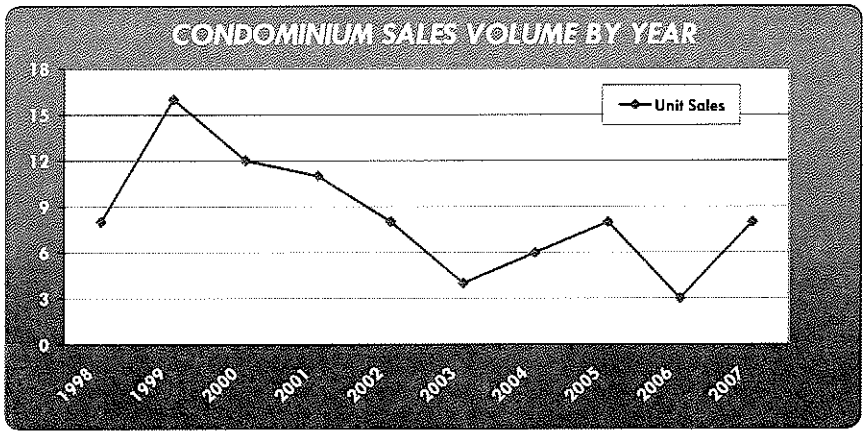


Annual average days-on-market figures showed a general decrease from 1998 to 2001. After an upward tick in 2002, marketing times had general stabilization in 2003 to 2007. During this 14 year period, the highest annual average marketing time was 574 days and the lowest was 94 days.

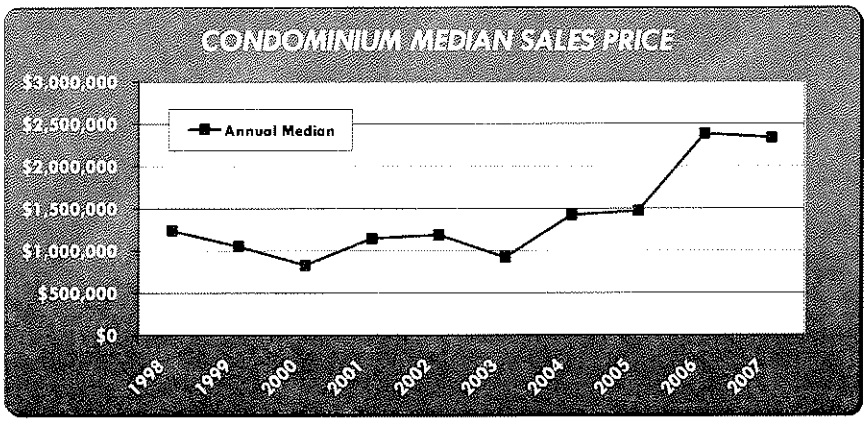


Condominiums

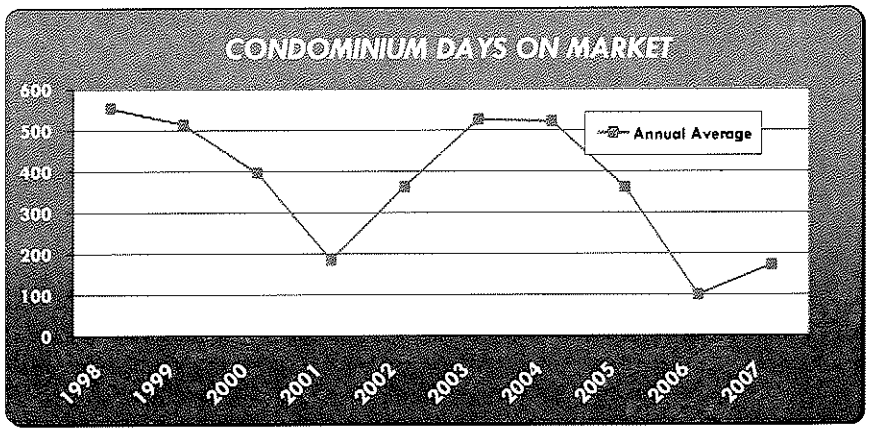
In 1998 there were eight (8) sales, followed by a high of 16 transactions in 1999. Unit sales saw downward movement up until 2003, after which there was a rebound in 2004 and 2005. A sharp drop off to three (3) sales occurred in 2006, followed by an increase in 2007.



Condominium annual median prices from 1998 to 2005 were within a range of $823,202 to $1,474,500, before sharply increasing to $2,384,800 in 2006. A slight dip was seen in 2007, as the annual median price was $2,337,331. It should be noted that all of the condominiums sold during this time period were in the resort areas of Manele and Koele. There were no sales of residential condominium units in Lana'i Town, as this type of property is uncommon for the area.



Average annual days-on-market figures decreased steadily from 553 days in 1998 to 185 days in 2001, but had climbed back to 526 days by 2003. Another downward trend was seen to 2006, with a low of 99 days, followed by and increase to 172 days in 2007.



Sales statistics for 2008, as compared to 2007, would have a decrease in unit sales for all property types; increase in annual median price for vacant land and single-family properties, while condominiums would indicate a decrease; and a decrease in marketing time for vacant while, but an increase for single-family and condominium properties. It should be noted that these projections are based solely on year-to-date sales for 2008 and are not a forecast of the real estate market.

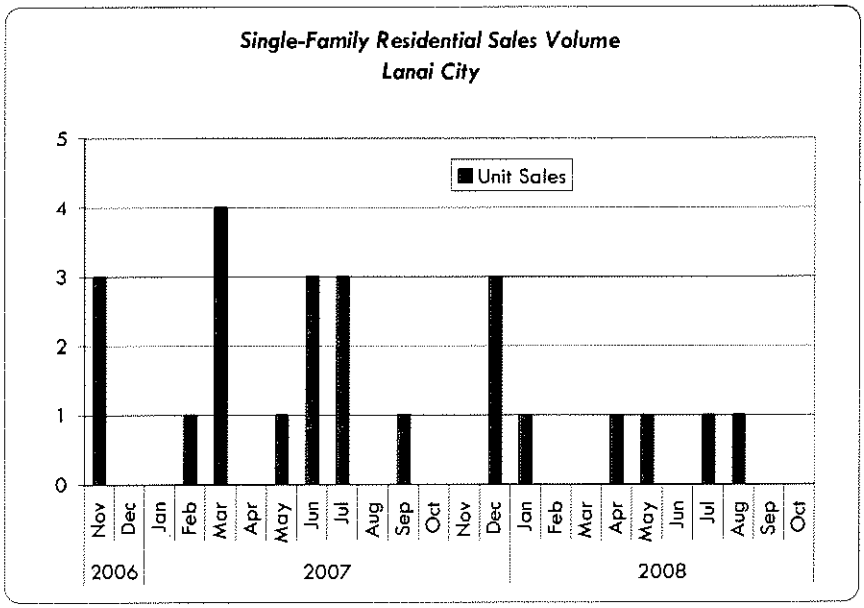
As discussed earlier, the real estate market on the Island of Lana'i is limited. Even during the peak of the market, there were never more than 21 sales of any property type in a given year. This makes year-to-year comparison difficult, as even slight difference in sales would result in a large percentage of change. For example, should there continue to be only two vacant land sales on Lana'i for 2008, this would indicate a 33 percent decrease from 2007's three sales; while at the same time, 2008 would be a 100 percent increase over 2006, which had a single vacant land sale.

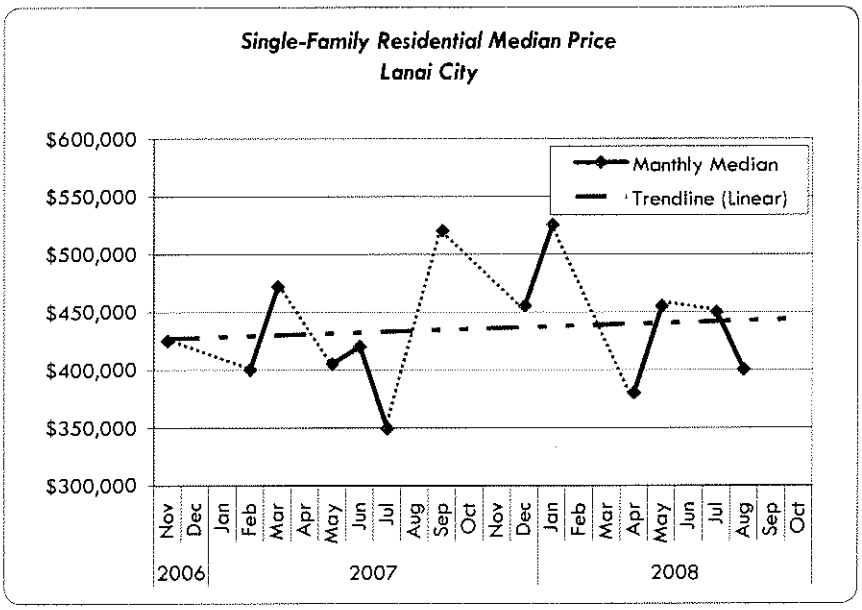
Recent new projects have been limited to resort developments, which are considered to be in a different market segment from the subject. As such, extracting absorption rates from these developments would not be appropriate. Instead, analysis was conducted for single-family residential activity in Lana'i City. In the Consultant's opinion, this would provide a better example of demand for the subject's proposed affordable housing units. Multi-family sales were also researched; however, there were no reported sales in Lana'i City within the past 24 months.

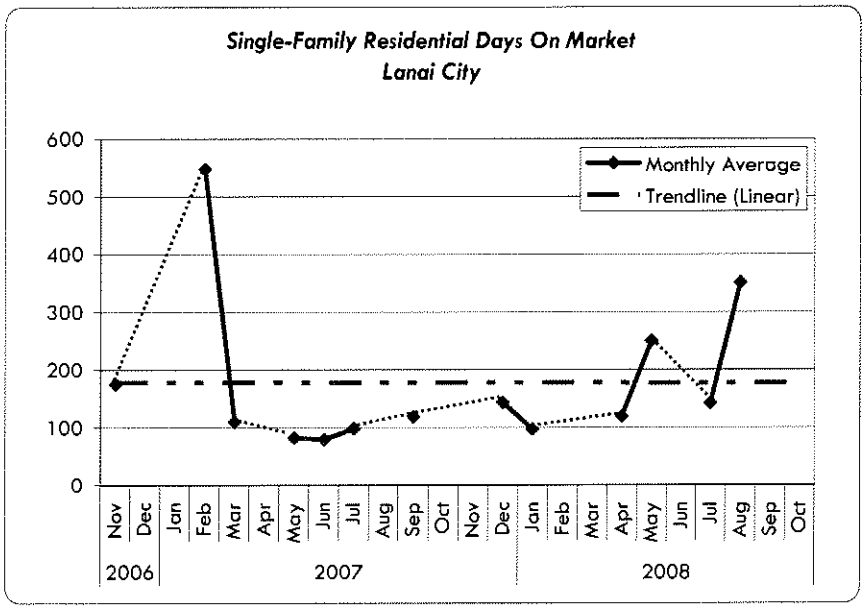
Historical Single-Family Sales Activity, Lana'i City (Past 24 Months)

Over the past 24 months, there were a total of 24 single-family residential sales in Lana'i City, which calculated to an average of one

sale per month. There were 13 months with sales of between one (1) and four (4) units, with the remaining 11 months having no sales activity. The monthly average marketing time for the 13 months having sales ranged from 79 to 547 days, while the monthly median was between $349,000 and $525,000. The average price decrease for the 24 sales was 9 percent, with 21 sales showing price reductions of between 1 percent and 35 percent. The remaining three sales were not decreased.







The 24 Lana'i City sales ranged from $300,000 for a three-bedroom/two-bath home with 1,084 square feet of living area, built in 1935 (renovated 2005), on Olapa Street, to $525,000 for a three-bedroom/two-bath home with 1,092 square feet of living area, built in 1996, on Thirteenth Street. The Olapa Street conveyance was in November 2006, while the Thirteenth Street sale was in March 2007. The marketing times for these sales were 100 days and 8 days, respectively.

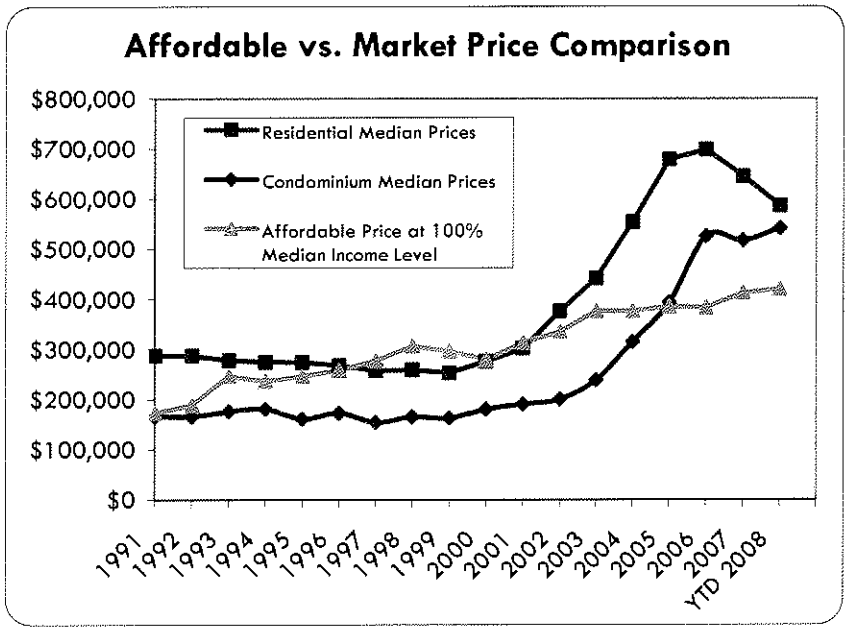
The two most recent sales transacted in August 2008 and July 2008, for $400,000 and $450,000 respectively. The August conveyance was of a three-bedroom/two-bath home with 1,092 square feet of living area, built in 1997, on Thirteenth Street. Meanwhile the July sale was of a three-bedroom/one-bath home with 1,594 square feet of living area, built in 1992 (renovated 2007), on Iliahi Street.

Comparison of Affordable And Market Prices

An analysis was done to compare the increase in affordable prices to the increase in the median prices for residential and condominium units. The affordable price is based on the median income level for the County of Maui and typical mortgage interest rates and loan requirements. This calculation assumed a typical 80 percent loan to value ratio and a 35 percent debt to income level. Since 1990, interest rates have dropped from an annual average of 10.13 percent to 5.83 percent in 2003, and for year-to-date 2008, is currently at 6.24 percent. In addition to the steady increase in the median income level, lower interest rates allow housing to be more affordable. As shown in **Table 2**, Page 22, the price which is

affordable to earners of the median household income was compared to the median prices of residential and condominium prices in the market.

Table 2 – Comparison of Affordable and Market Prices



As income levels rose from 1990 to 2000, residential properties became more affordable to those earning the County's median income level, although it wasn't until 1997 that the median price for a residential property was actually lower than the price that can be afforded by a household earning the County's median income. During this period, the only option was to purchase a condominium unit, which for larger families, can be less accommodating. In 2001, the nation's economy hit a recession, which was followed by the lowering of short term interest rates by the government. Consumer money flowed out of the stock market and into bonds and treasuries, which pushed long term interest rates lower. This, combined with other factors, caused a surge in demand for real estate, which sent prices skyrocketing within a few years.

By 2002, the soaring prices outpaced the County's median income level despite steadily falling interest rates. At the same time, condominium units were found to be a more feasible alternative and sales in this category started to pick up their pace.

From 2003 to mid-2006, sales prices for residential properties continued their climb to record levels, making it unaffordable for most of Maui County's residents. Condominium sales prices also began to rise during this period and by 2005 the median price for this type of

property also surpassed the level that would be affordable to those earning the County's median income.

Since mid-2006, the real estate market has seen a period of stabilization with a more recent downward trend. For 2007, the median prices for both condominium and single-family residential properties showed signs of retreat, which have continued into 2008. The softening market has been brought on by rising interest rates, evaporation of the secondary lending market, as well as a slowing economy and increased fuel costs. While the County's median income continues its upward crawl, there is still a large disparity between what is affordable and what is being offered in the market.

To help alleviate this situation, more affordable housing units should be brought to market. The added supply, in categories where Maui County's residents are being priced out of the housing market, has proven to be in great demand, even under current market conditions.

Hawaii Housing Policy Study Update 2006

This study provides evidence of the need for additional housing in Maui County. According to the report, nearly 45 percent of all Maui County households expressed a desire to move to a new home in the near future, of which, approximately 13 percent stated they wanted to move out of state. As such, effective demand was said to be 40 percent of all Maui County households, up from 36 percent from the previous 2003 survey.

Not surprisingly, the report indicated that almost 40 percent of those who expect to move outside of Hawaii made it known that one of their main reasons for leaving was the high price of housing, up from 14 percent in 2003. The 2006 study listed the average monthly mortgage payment for the County of Maui to be $1,820 and an average monthly rent of $1,080. Approximately 46 percent were said to be spending more than 30 percent of their income on housing. Although the study was done during a time of more robust market conditions, prices still appear to be out of reach for many Maui County residents.

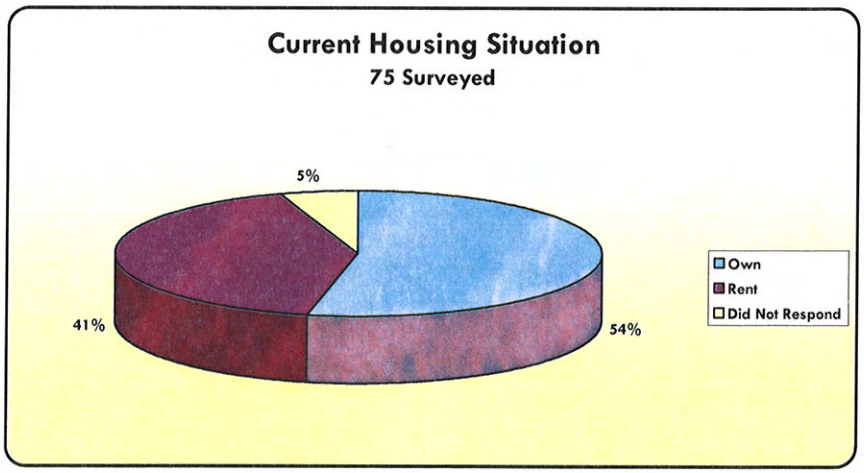
As indicated in the study, Maui County will need an additional 4,224 housing units between 2007 and 2011, with over 60 percent of the housing units needed for those households earning 80 percent or less than the HUD median income.

As previously indicated, Lana'i is considered to have its own real estate market, with two distinct segments, resort and workforce. Since the 2006 Hawaii Housing Policy Study Update dealt with Maui County as a whole, the Consultant conducted his own survey of Lana'i residents to provide a more focused view of the current state of

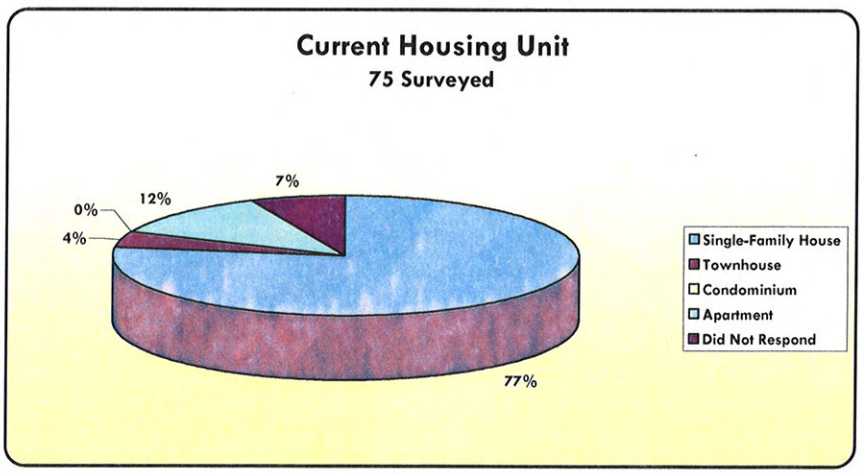
housing on the island, as well as the sentiment of it's working people. There were 75 surveys completed, which have been summarized in **Exhibit C.**

Lana'i Housing Survey

There were 54 percent who said they own their current housing unit and 41 percent who responded that they rent their current housing unit.

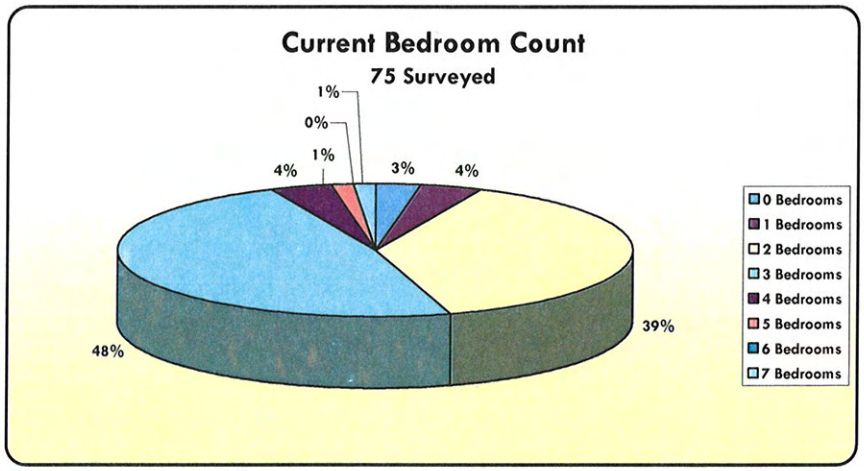


The study revealed 77 percent of the residents surveyed currently own or rent a single-family home, while 12 percent said they live in an apartment and 4 percent live in a townhouse unit.

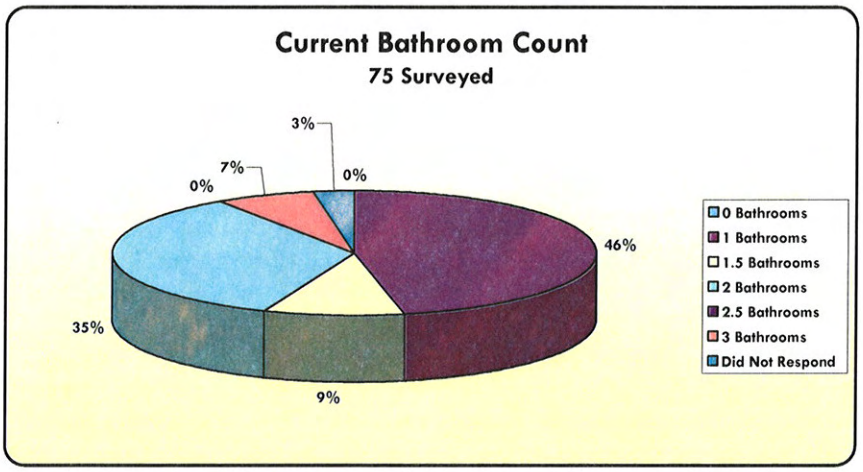


Many of the residents surveyed, approximately 48 percent, are currently living in a three-bedroom housing unit, with 39 percent residing in a two-bedroom unit. One-bedroom and four-bedroom housing units were each represented by 4 percent of the respondents and 3 percent lived in a studio unit. 1 percent of the households were

in a five-bedroom housing unit and an additional 1 percent in a seven-bedroom unit.

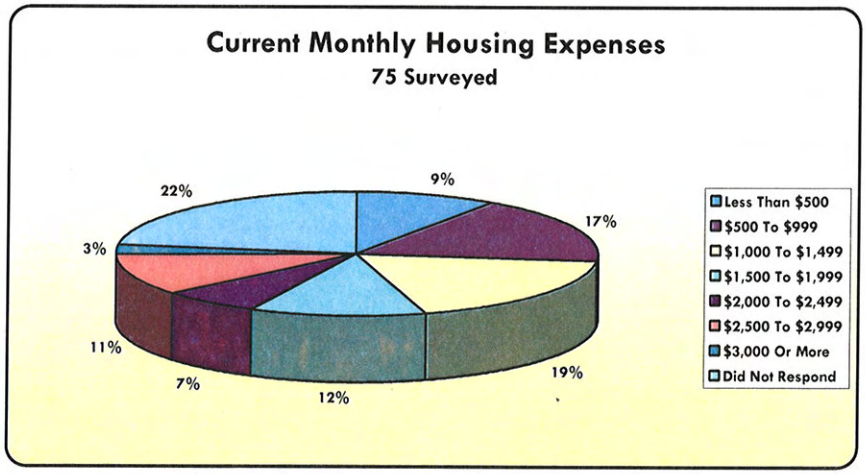


Of the surveyed housing units, 46 percent had one bathroom and 35 percent had two bathrooms. 9 percent of the housing units had one and one half-bathrooms. There were 7 percent of the households with three bathrooms.

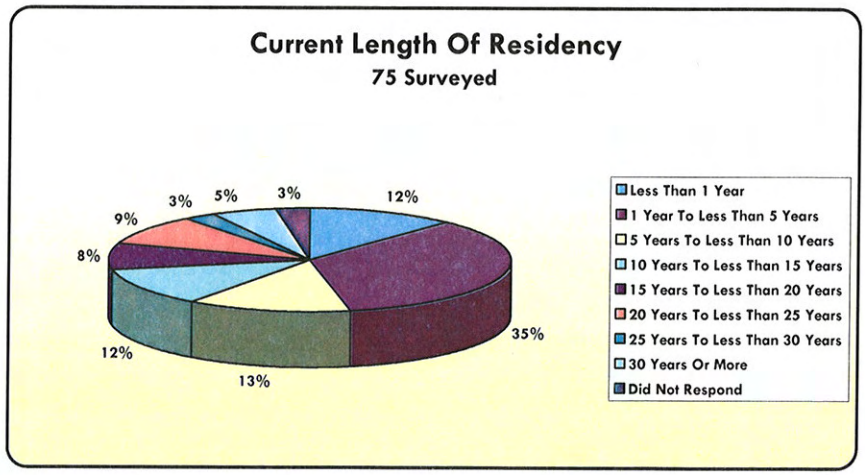


There was a wide range of monthly housing expenses being paid, which was attributed to some residents receiving rent subsidies. 19 percent are paying between $1,000 and $1,499 per month. 17 percent were paying from $500 to $999 per month. Residents paying between $1,500 and $1,999 monthly totaled 12 percent, while 11 percent said they had monthly housing expenses from $2,500 to $2,999. 9 percent of the respondents pay less than $500 per month and 7 percent pay between $2,000 and $2,499 monthly. There were 3 percent that reportedly pay $3,000 or more per month.

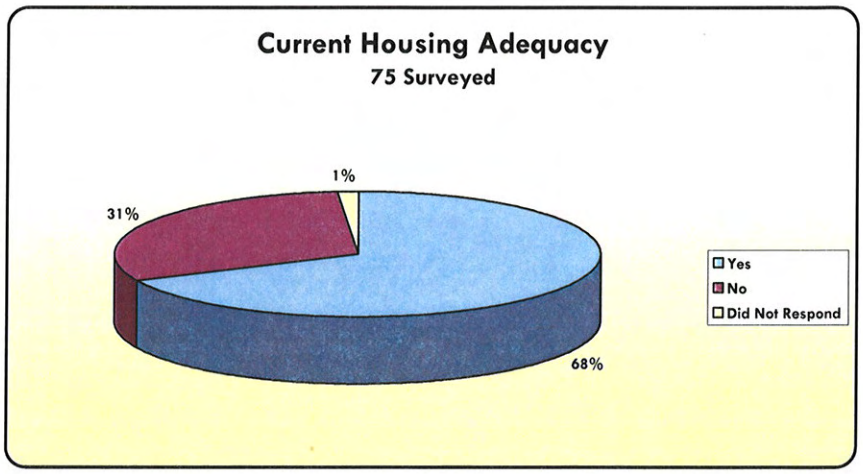
Residents were asked to include monthly utility payments and maintenance fees in their responses.



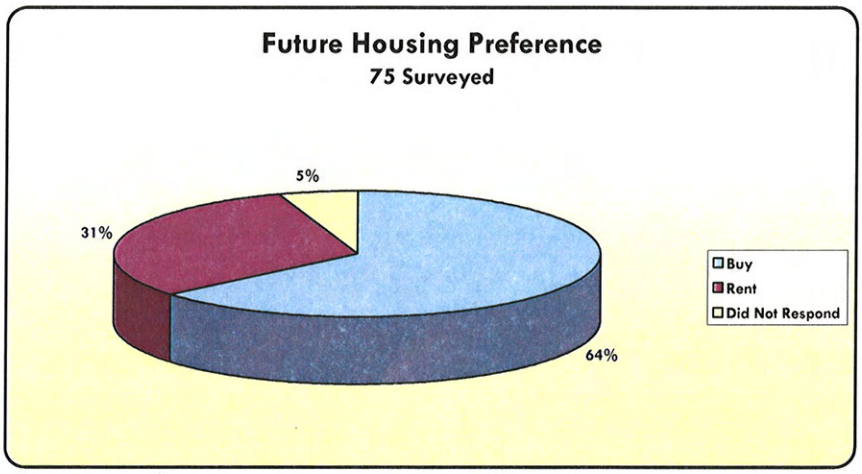
The largest group of residents surveyed indicated that they have lived in their current housing unit for 1 year to less than 5 years (35 percent). Those living in their current housing unit for 5 years to less than 10 years, 10 years to less than 15 years, and less than one year had about the same response, between 12 and 13 percent. 8 and 9 percent of those surveyed said they have lived in their current housing unit for 20 years to less than 25 years and 15 years to less than 20 years, respectively. Given the rural nature of Lana'i, it was not surprising to discover that 3 percent were in the same housing unit for 25 years to less than 30 years and 5 percent at 30 years or longer.



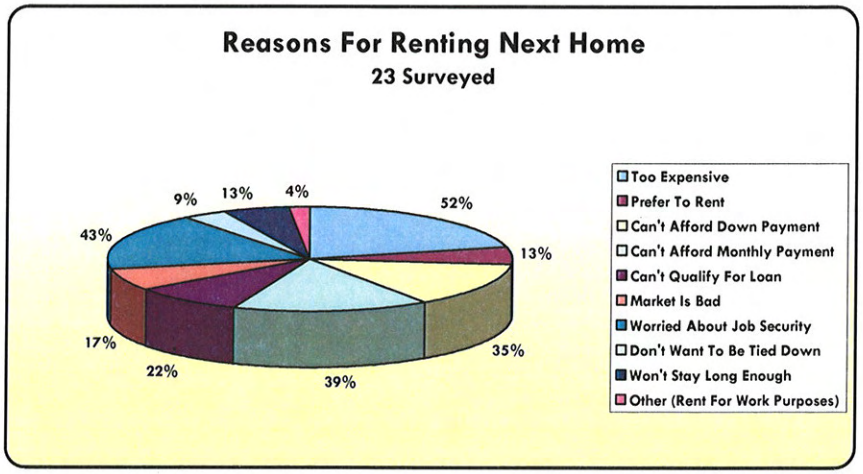
Approximately 68 percent of those polled felt that their current housing unit was large enough for the number of people living there. Meanwhile, 31 percent were of the opposite opinion.



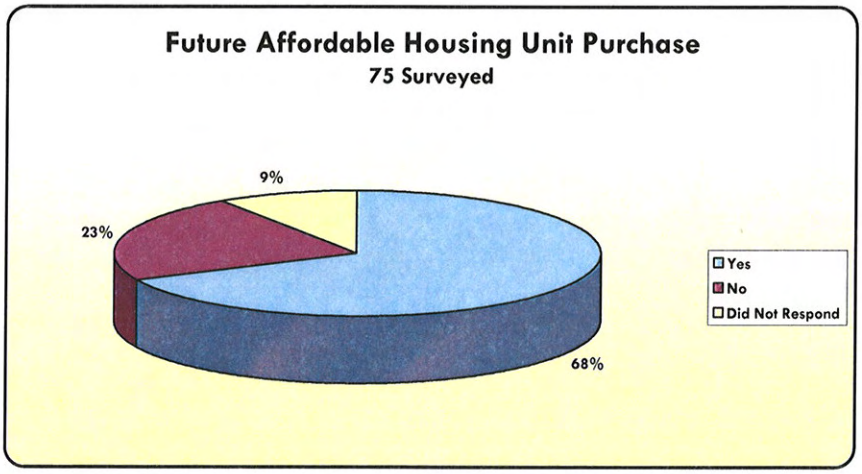
Regarding their next housing unit, 64 percent would prefer to buy, while 31 percent would rather rent.



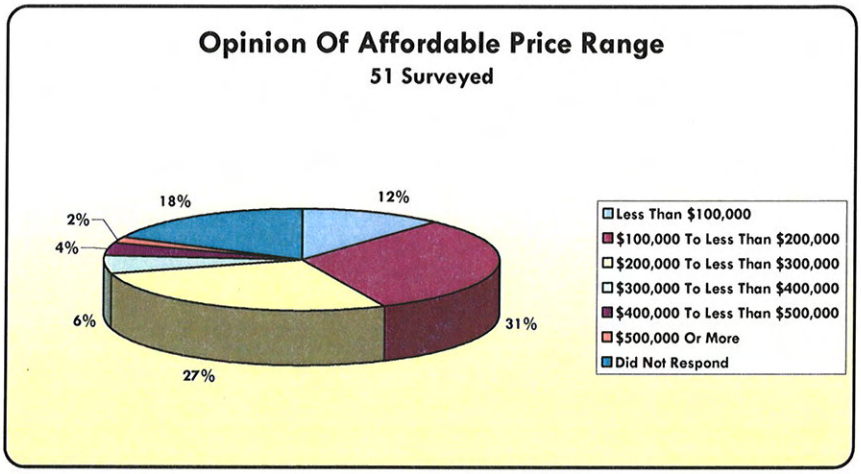
Of those who said they would prefer to rent their next housing unit, 52 percent considered buying a home too expensive, while 43 percent were too concerned about job security. 39 percent stated they felt they couldn't afford the monthly payments and 35 percent didn't think that they could come up with the down payment. There were 22 percent who said they wouldn't qualify for a loan, in addition to 17 percent that considered market conditions to be bad. 13 percent of those surveyed would prefer to rent and another 13 percent were not planning on being on the island long enough. 9 percent did not want to be tied down by a mortgage, while 4 percent needed to rent for work purposes. The 23 respondents of this question were allowed to list as many reasons as they considered applicable to their housing situation.



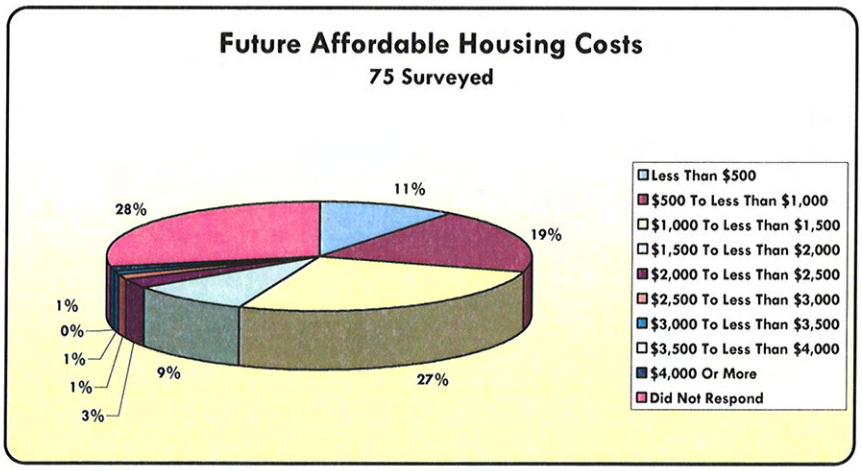
When asked if they would purchase a home that they could afford, if available, 68 percent responded positively. 23 percent opined that they still would not purchase such a home.



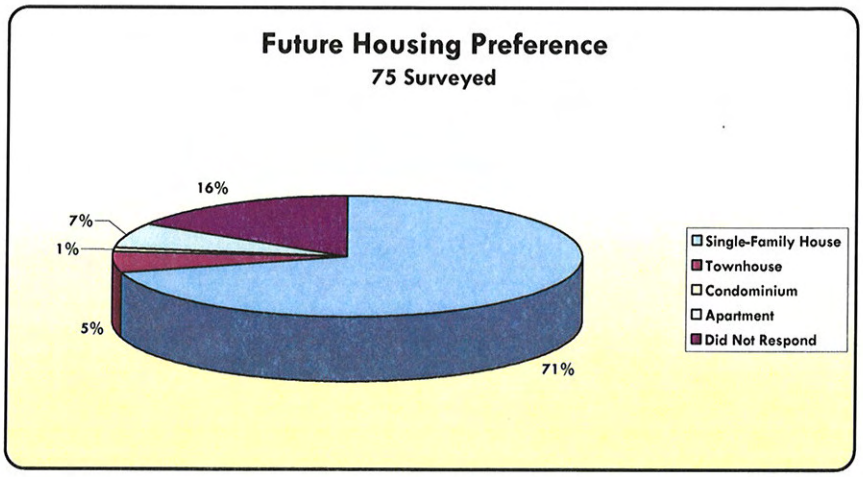
Those that stated they would purchase an affordable home, if it became available, had varied opinions as to what price range would be considered affordable. 31 percent felt that a range of $100,000 to less than $200,000 was appropriate, while 27 percent thought $200,000 to less than $300,000 was acceptable. Less than $100,000 was the choice of 12 percent of the respondents. At the same time, 6 percent considered $300,000 to less than $400,000 to be affordable and 4 percent would pay from $400,000 to less than $500,000. 2 percent of those surveyed were willing to pay $500,000 or more.



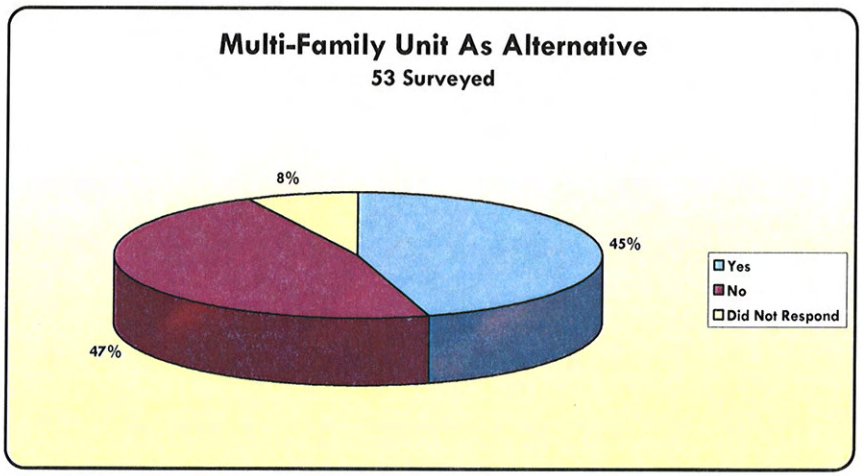
When asked how much they could afford to pay each month for housing costs, including utilities and maintenance fees, 27 percent stated $1,000 to less than $1,500. 19 percent said $500 to less than $1,000 and 11 percent felt they could only pay less than $500 per month. 9 percent could pay from $1,500 to less than $2,000, with 3 percent could afford monthly payments of $2,000 to less than $2,500. The categories of $2,500 to less than $3,000, $3,000 to less than $3,500, and $4,000 or more were each represented by 1 percent of those surveyed.



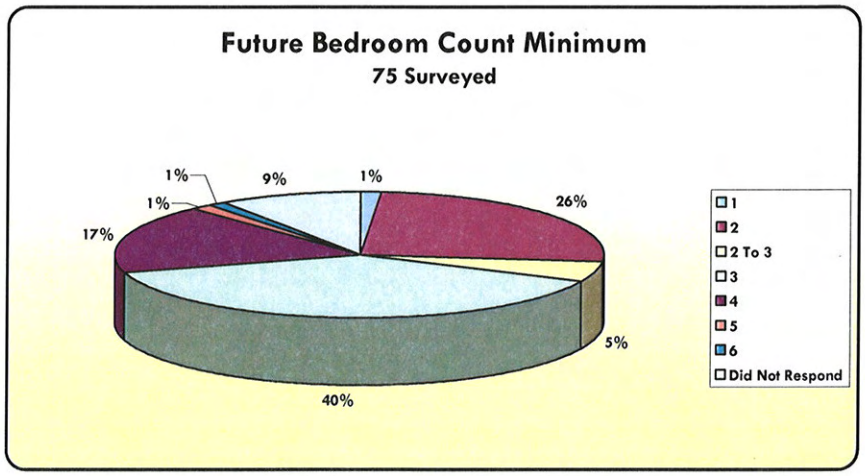
An overwhelming 71 percent would prefer a single-family home if they were to buy a housing unit. 13 percent would rather buy an apartment, townhouse or condominium unit.



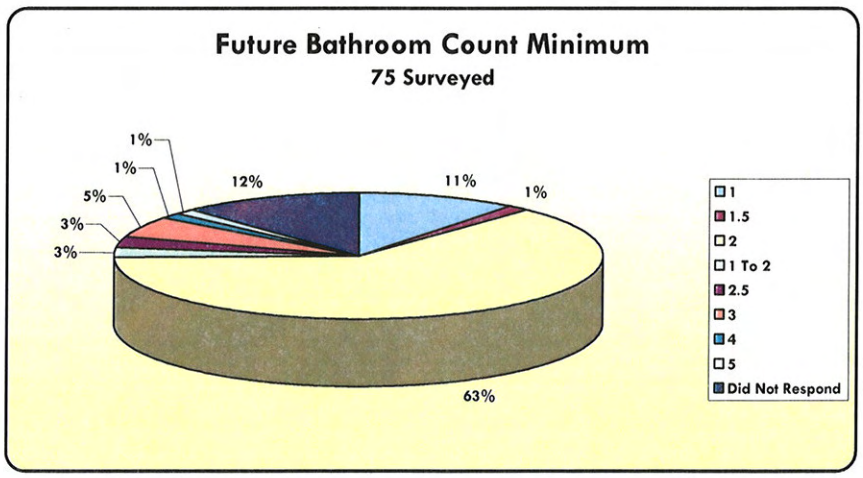
Of those that preferred to buy a single-family home as their next housing unit, 47 percent said they would not make a substitute purchase of a townhouse/condominium/apartment. This was compared to 45 percent who would consider buying a multi-family unit, should they not find a single-family home within their price range.



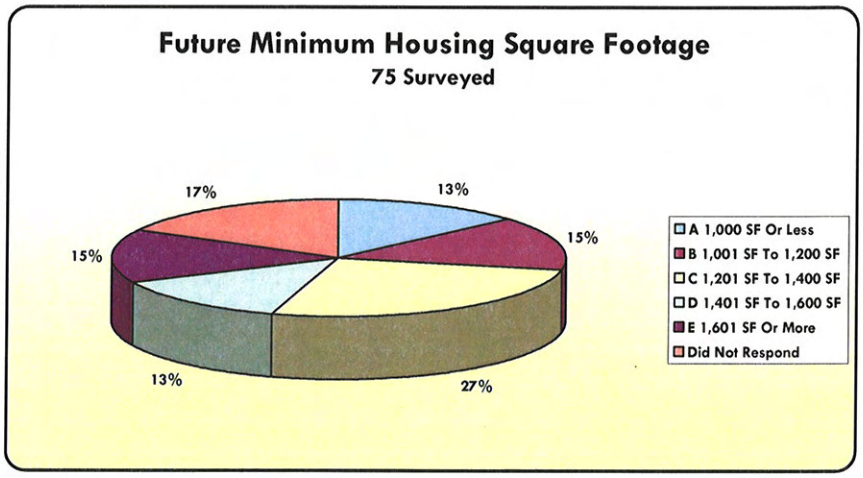
There were 40 percent who said they would need at least three bedrooms in their next housing unit. 26 percent felt they required at least two bedrooms. In addition, 5 percent stated either two or three bedrooms would be necessary. Four bedrooms were the minimum for 17 percent of the respondents. Those needing at least one bedroom, five bedrooms, and six bedrooms were each represented by 1 percent of those polled.



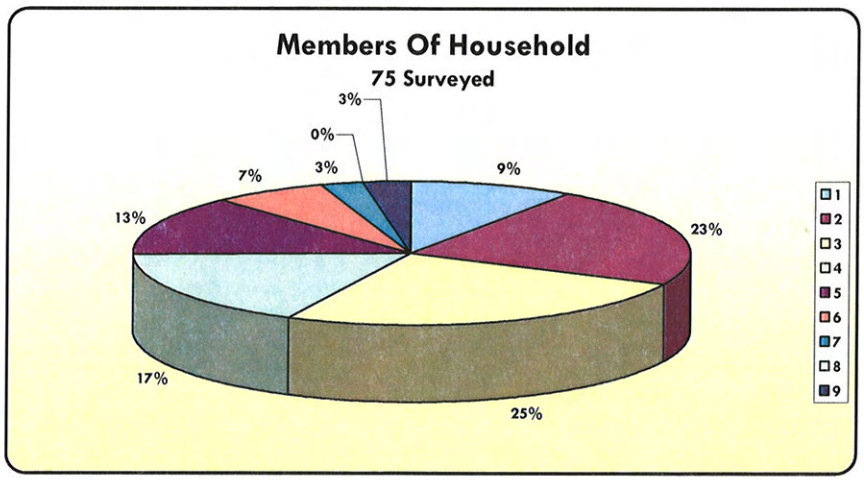
There were 63 percent who said they would need at least two bathrooms in their next housing unit. 11 percent felt they required at least one bathroom. In addition, 5 percent stated three bathrooms would be necessary. One to two bathrooms was the minimum for 3 percent of the respondents, as was two and one half bathrooms. Those needing at least one and one half bathrooms, four bathrooms, and five bathrooms were each represented by 1 percent of those polled.



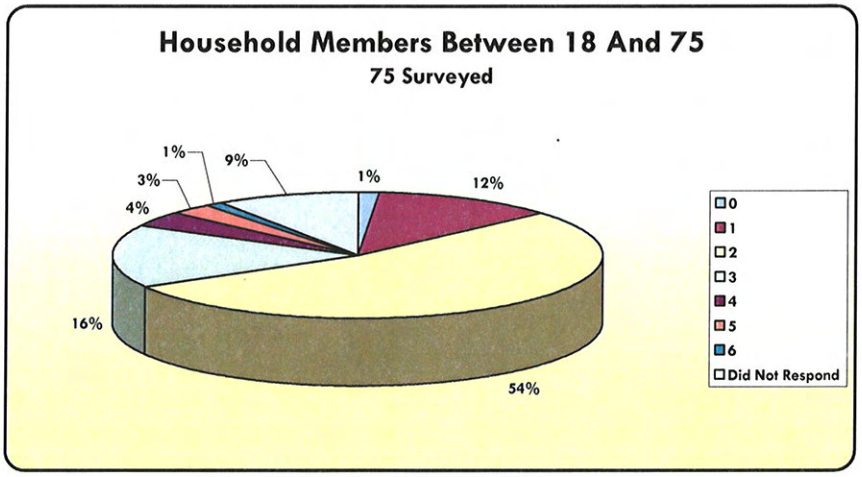
With regard to housing unit size, 27 percent required a minimum of 1,201 to 1,400 square feet. Each of the 1,001 to 1,200 square feet and 1,601 square feet or more categories had 15 percent of those surveyed. 13 percent felt a unit of either 1,000 square feet or less or 1,401 to 1,600 square feet was necessary.



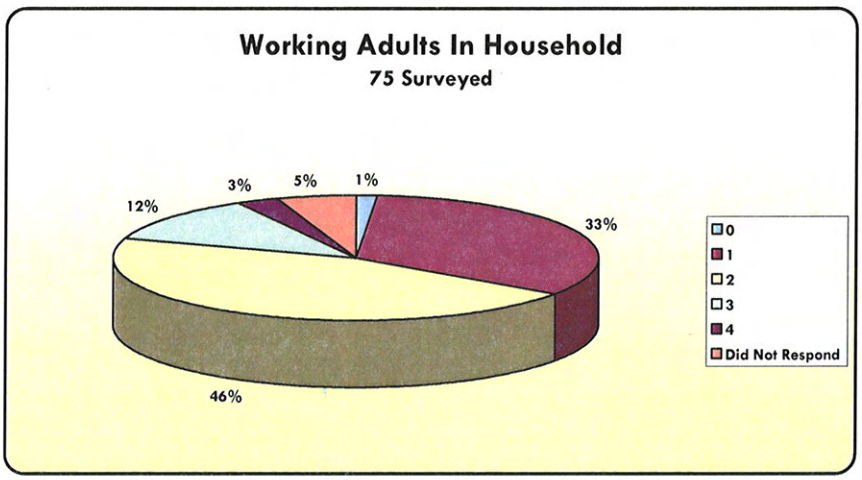
Many of the households, 25 percent, had three residents. This was closely followed by two residents, at 23 percent. Four residents was the response by 17 percent of those surveyed. 13 percent reported there were 5 people living in their housing unit. 7 percent of those polled had 6 residents. Seven residents and nine residents were each stated by 3 percent of the respondents.



54 percent of the households had two residents between the ages of 18 and 75. 16 percent of the households had three residents. There were 12 percent that stated only 1 resident was between the ages of 18 and 75. 4 percent of the respondents listed four residents in this age bracket, while 3 percent showed five residents. 1 percent of those surveyed had six residents between the ages of 18 and 75 and 1 percent had no residents in the age range.

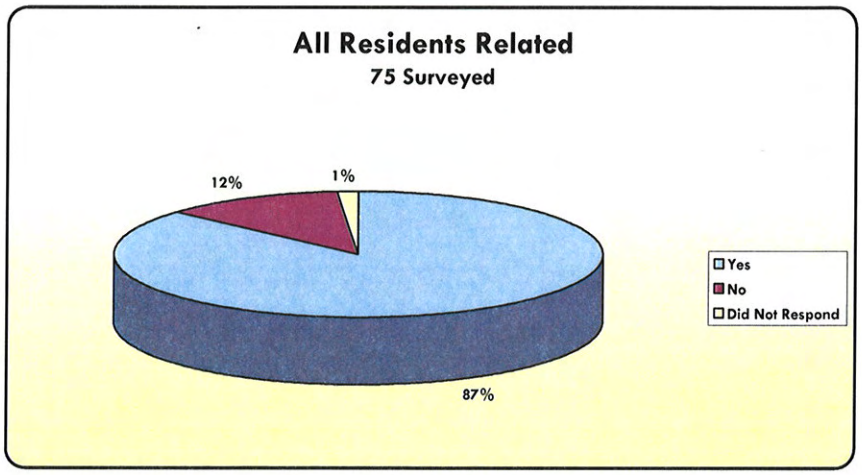


With regard to working adults per household, 46 percent listed two residents, followed by 33 percent answering one resident. 12 percent had three working household members and 3 percent had only one resident. Lastly, 1 percent had no employed adults.

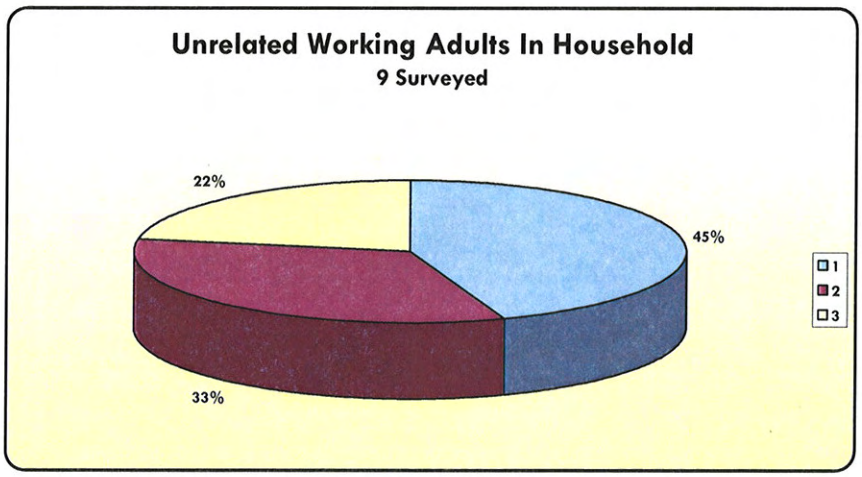


An overwhelming majority, 87 percent, stated that all of the members of their household are related by blood, marriage, or adoption. This was not the case for only 12 percent of those polled.

One could interpret this statistic to show that there were few housing units with more than one family unit living under the same roof. However, it was mentioned that it is still relatively common on Lana'i to have multiple generations of one family living together. Evidence of this was seen in the survey question regarding number of household members, where 13 percent responded has having six or more residents.



Of the nine households that were not all related by blood, marriage or adoption, 45 percent had one unrelated working adult. 33 percent reported one unrelated working adults, while 22 percent responded that there were three unrelated working adults in their household.



Summary of Lana'i Housing Survey

As previously mentioned, of the 75 households surveyed, 31 households were currently renting their housing units. Of these current renters, 55 percent would prefer to buy their next housing unit, while 45 percent would like to continue renting. There were 40 households that own their current housing unit, of which, 75 percent would like to buy their next housing unit. Interestingly, 15 percent of the homeowners stated they would rather rent their next housing unit.

Based on this information, it would appear that not all of those currently renting would be potential home buyers. However, it was apparent that affordability and the current economic conditions played a large role in many of their decisions.

It was revealed that 12 households surveyed reside in a multi-family unit. 75 percent of these households would prefer a single-family home as their next housing unit, while 17 percent stated they would like to remain in a multi-family unit. There were 58 households that presently reside in a single-family home. 76 percent would like another single-family home as their next housing unit, but 14 percent would like to switch to a multi-family unit.

Of the 75 households surveyed, 47 percent would prefer to live in a housing unit with more bedrooms. Conversely, 15 percent would rather live in a housing unit with fewer bedrooms. 39 percent of those polled would like a housing unit with the same bedroom count.

According to the responses received from the Lana'i Housing Survey, the preferred housing product would be a three-bedroom and two-bathroom single-family home, of between 1,200 and 1,400 square feet. The largest group of respondents suggested a price range of $100,000 to under $200,000, followed closely by $200,000 to under $300,000.

Lana'i Housing Interviews

The Consultant also met with numerous individuals familiar with the housing situation on Lana'i to gain additional insight into potential buyer sentiment. The following people were interviewed:

Ms. Sue Murray, Island of Lana'i Properties

Mr. Thomas Stuck, Lana'i Real Estate

Ms. Kay Okamoto, Okamoto Realty

Mr. Vince Bagoyo, Private Consultant

Many of the statements made by these individuals confirmed the responses of the Lana'i Housing Survey. However, those interviewed had similar opinions on several additional points:

- 50 single-family housing units would be appropriate for the initial phase
- Housing demand on Lana'i is directly influenced by tourism, as the hotels need more workers when it is busy
- Many current and former Castle & Cooke employees have subsidized rent; therefore, they may not want a mortgage
- Affordable rental units should see good demand
- Multi-family housing units may not be as readily accepted as single-family housing units

B. HOUSING PRODUCT ANALYSIS

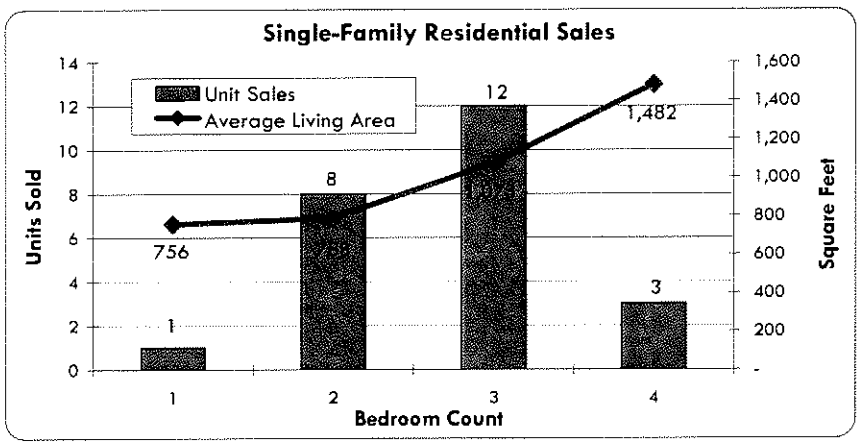
While the subject project is still in the planning stage, preliminary designs call for 412 residential units possessing mountain views. The Consultant was provided with a Preliminary Site plan and has gleaned information from this plan for information regarding the subject project district. According to the plan, there will be 239 house lots of approximately 5,000 square feet (R-1 Residential District) and 173 multi-family units on 14.46 acres. Early indications also include 4.19 acres of park space, 4.94 acres of public/quasi-public land, and a 4-acre detention pond.

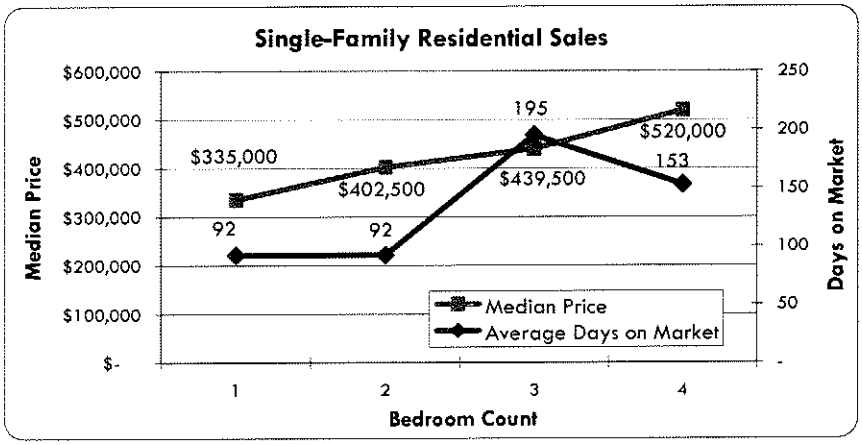
In 2006, the County of Maui's Residential Workforce Housing Policy (MRWHP) was enacted by the County Council. The MRWHP establishes affordable housing requirements applicable to all new projects. As required under the MRWHP, at least 40 percent of the proposed project's units must meet the affordable housing criteria. In this case, all of the single-family homes will meet the criteria; however, bedroom count and living area have not yet been determined.

The Consultant has researched data regarding the types of properties that have been sold within the various affordable price ranges.

General Product Characteristics

Research was conducted for sales for single family residential units in Lana'i City. Given the diminutive size of this market segment, sales from the last 24 months were utilized. Vacant land sales were excluded since the subject will offer an improved residential product. Condominium sales were also not analyzed, as all multi-family residential unit sales were from the resort areas of Manele and Koele. There were a total of 24 single-family residential sales within Lana'i City during this period.





Residential properties sold within the last 24 months ranged from one- to four-bedrooms. The majority of the sales were of three-bedroom properties, of which there were 12 sales or 50 percent of the total sales. They had a median price of $439,500 and an average living area of 1,073 square feet. This was followed by two-bedroom homes, which had eight sales and a median sales price of $402,500 and an average living area of 788 square feet.

There was one sale of a one-bedroom property at $335,000, with a living area of 756 square feet. Interestingly, this living area was not much smaller than the average of the two-bedroom sales; however, given the small sample pool in both categories, it is uncertain if this is typical of the Lana'i City market single-family residential market. Finally, there were three sales of four-bedroom homes, with a median price of $520,000 and average living area of 1,482 square feet.

Marketing times showed a broad range, from 92 days for the one- and two-bedroom homes to 195 days for the three-bedroom homes. At first glance, this could provide evidence of a market preference for one- and two-bedroom single-family residential units. However, this may also be attributed to the fact that these products had the lowest median sales prices, which could indicate a demand for affordable housing.

Affordable Housing Price Ranges

Listed below are the income ranges which qualify for the affordable housing income requirements as well as the breakdown of the allocated unit counts within each income range. This table is used by the County of Maui-Department of Housing and Human Concerns and reflects the HUD defined median income for 2008 for purchasing a three-bedroom home (**Exhibit D**). The price range was based on the assumption of a 6.125 percent mortgage rate for a three-bedroom home, as of the effective date of this report. It should be noted that

the price range could change, should a different bedroom count be selected.

Table 3 – Affordable Housing Price Ranges

Income Group	Range of HUD Median Income (%)	HUD Median Income Range ($) From	HUD Median Income Range ($) To	Single Family Price Range From	Single Family Price Range To	Multi Family Price Range From	Multi Family Price Range To
Very Low Income	50 and Below		$31,705		$ 137,300		$ 123,600
Low Income	51-80	$31,706	$50,728	$ 137,301	$ 219,700	$ 123,601	$ 197,700
Below Moderate Income	81-100	$50,729	$63,410	$ 219,701	$ 274,600	$ 197,701	$ 247,100
Moderate Income	101-120	$63,411	$76,092	$ 274,601	$ 329,600	$ 247,101	$ 296,600
Above Moderate Income	121-140	$76,093	$88,774	$ 329,601	$ 384,500	$ 296,601	$ 346,100
Gap Income Group	141-160	$88,775	$101,456	$ 384,501	$ 439,400	$ 346,101	$ 395,500

Assumed 3BR Home @ 6.125% 30 Yr. Fixed Rate

Properties Sold within Affordable Housing Price Ranges

To assist in determining an appropriate product design for the proposed Lana'i Affordable Housing Project, historical sales of properties were analyzed to determine what type of product is typically being sold within each price range. Given the limited number of sales in the Lana'i City real estate market, this proved difficult. Furthermore, many of the sales involved older plantation homes, which typically are smaller in size, having less bedrooms and bathrooms.

Research showed that within the past 24 months, there were 15 single-family sales within the affordable price range, one within the Moderate Income range (101 to 120 percent of median income), five within the Above Moderate Income range (121 to 140 percent of median income), and nine within the Gap Income range (141 to 160 percent of median income). The tables below summarize the average and median sales price, bedroom count, bathroom count, living area and marketing time for each income range.

101-120% HUD Median - Single Family

# of Units Sold		Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
1	Average	$ 300,000	3.0	2.0	1,084	100
	Median	$ 300,000	3.0	2.0	1,084	100

121-140% HUD Median - Single Family

# of Units Sold		Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
5	Average	$ 352,800	2.0	1.3	806	87
	Median	$ 349,000	2.0	1.0	756	92

141-160% HUD Median - Single Family

# of Units Sold		Sales Price	Bedroom Count	Bath Count	Living Area (SF)	DOM
9	Average	$ 414,300	2.4	1.3	896	174
	Median	$ 420,000	2.0	1.0	875	99

Summary of Housing Characteristics

The research of property characteristics was intended to provide a guidance of the type and pricing of products that should be offered by the project.

It goes without saying that a three-bedroom home priced within the lower ranges of the Lana'i Affordable Housing Guidelines should see market acceptability. From a developer's perspective; however, this can be extremely challenging, as construction costs continue to be at record levels. Also, many of the sales surveyed were older plantation homes; therefore, building a new three-bedroom home may require a sales price at the high end, or even above, the affordable price range, in order to be financially feasible.

In this case, since the parcel is already owned by the County of Maui, the lack of land acquisition costs may be a positive factor in the pricing of the proposed units. In addition, a two-bedroom home may need to be considered. Research indicated that this type of product has been well received in Lana'i City and may provide a good balance of cost feasibility and market acceptance.

Product pricing was also difficult to determine. At first glance, it appears that buyers are willing to pay for products at the high end of the affordable price range; but, this could just as easily be an effect of supply as it could demand. Listing evidence seemed to confirm this, as there was only one single-family home available within the Moderate Income range and four listings within the Gap Income range. There were no single-family residences available for sale within the Above Moderate Income range, Below Moderate Income range, Low Income range, or Very Low Income range.

Furthermore, although the Lana'i Affordable Housing Guidelines price ranges were based on the assumption of a three-bedroom home, many of the units being purchased within the affordable ranges had less than three-bedrooms. In fact, of the 15 sales within the last 24 months, only six were three-bedroom homes. This would indicate that market prices are still outpacing what can be afforded by the workforce.

As previously discussed, the most recent real estate surge saw little, if any, new housing units brought to market on Lana'i. Furthermore,

short-term new projects are limited at best. Castle & Cooke Hawaii's planned development may provide potential competition for the subject; however, its price points were unknown, as of the effective date. The proposed Department of Hawaiian Homelands project will only be available to qualified candidates, but at the same time could possibly draw away potential buyers from the subject development. In light of the emerging economic crisis, it is unknown whether either project will be seen to fruition.

Given the present state of the real estate market and current economic conditions, it was very difficult to determine the pricing and characteristics of the housing units for the proposed Lana'i Affordable Housing Project. After consideration of demographic data, historical real estate statistics in Lana'i City, results of the Lana'i Housing Survey, and interviews with representatives of the real estate community, the preferred housing unit has been concluded to be a **three-bedroom and two-bathroom single-family home, between 1,200 and 1,400 square feet in size, at a price range of $100,000 to under $300,000.**

Equally challenging was trying to estimate the project build-out. Market evidence showing the absorption of affordably priced housing units on Lana'i was limited; however, in general, this market segment typically sees the most interest. For example, Waikapu Gardens, on the island of Maui, is a single-family residential affordable subdivision with over 400 housing units. This project drew immense interest from the public, with over 3,500 households on their initial waiting list. Essentially, all of the housing units in this development "sold" in one day.

Granted, the population base on Lana'i pales in comparison to that of Maui. In addition, Waikapu Gardens was made available during a much stronger period of the real estate market. It is safe to assume that if the Lana'i Affordable Housing Project existed today; its absorption rate would not be as robust. However, there is a great deal of pre-construction entitlement work that would need to be completed before any housing units could be built. While this work is being conducted, it is possible that the economic climate could improve. Economists have varied opinions as to the recovery of the economy; however, many have estimated 2011 to be a possible turning point. If so, the subject may be well positioned to capture a potential upswing in the real estate market, provided that the entitlement process is completed by that point in time. Cognizant of this, it is the Consultant's opinion that construction of **50 single-family homes would be appropriate for the first phase** of the Lana'i Affordable Housing Project, with **subsequent phases of 15 to 20 units per year.** Furthermore, the Consultant recommends that

construction of the multi-family units be held off until after the single-family residences are completed.

EXHIBIT A

Demographic Reports - Claritas, Inc.

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total *Place*	*%*
Population		
2013 Projection	3,823	
2008 Estimate	3,576	
2000 Census	3,164	
1990 Census	2,400	
Growth 2008-2013	6.91%	
Growth 2000-2008	13.02%	
Growth 1990-2000	31.83%	
2008 Est. Population by Single Race Classification	3,576	
White Alone	679	18.99
Black or African American Alone	11	0.31
American Indian and Alaska Native Alone	22	0.62
Asian Alone	1,856	51.90
Native Hawaiian and Other Pacific Islander Alone	229	6.40
Some Other Race Alone	8	0.22
Two or More Races	771	21.56
2008 Est. Population Hispanic or Latino by Origin	3,576	
Not Hispanic or Latino	3,303	92.37
Hispanic or Latino:	273	7.63
Mexican	38	13.92
Puerto Rican	101	37.00
Cuban	1	0.37
All Other Hispanic or Latino	133	48.72
2008 Est. Hispanic or Latino by Single Race Class.	273	
White Alone	22	8.06
Black or African American Alone	0	0.00
American Indian and Alaska Native Alone	1	0.37
Asian Alone	85	31.14
Native Hawaiian and Other Pacific Islander Alone	9	3.30
Some Other Race Alone	8	2.93
Two or More Races	148	54.21

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Pop. Asian Alone Race by Category*	1,856	
Chinese, except Taiwanese	12	0.65
Filipino	1,455	78.39
Japanese	247	13.31
Asian Indian	3	0.16
Korean	11	0.59
Vietnamese	2	0.11
Cambodian	0	0.00
Hmong	0	0.00
Laotian	0	0.00
Thai	0	0.00
Other Asian	2	0.11
Two or more Asian categories	124	6.68
2008 Est. Population by Ancestry	3,576	
Pop, Arab	8	0.22
Pop, Czech	0	0.00
Pop, Danish	21	0.59
Pop, Dutch	0	0.00
Pop, English	42	1.17
Pop, French (except Basque)	26	0.73
Pop, French Canadian	14	0.39
Pop, German	58	1.62
Pop, Greek	0	0.00
Pop, Hungarian	0	0.00
Pop, Irish	76	2.13
Pop, Italian	12	0.34
Pop, Lithuanian	0	0.00
Pop, United States or American	10	0.28
Pop, Norwegian	22	0.62
Pop, Polish	6	0.17
Pop, Portuguese	44	1.23
Pop, Russian	0	0.00
Pop, Scottish	13	0.36
Pop, Scotch-Irish	4	0.11
Pop, Slovak	0	0.00
Pop, Subsaharan African	0	0.00
Pop, Swedish	0	0.00
Pop, Swiss	0	0.00
Pop, Ukrainian	0	0.00
Pop, Welsh	4	0.11
Pop, West Indian (exc Hisp groups)	0	0.00

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Population by Ancestry		
Pop, Other ancestries	2,741	76.65
Pop, Ancestry Unclassified	475	13.28
2008 Est. Pop Age 5+ by Language Spoken At Home	3,311	
Speak Only English at Home	2,099	63.39
Speak Asian/Pacific Islander Language at Home	1,187	35.85
Speak IndoEuropean Language at Home	15	0.45
Speak Spanish at Home	10	0.30
Speak Other Language at Home	0	0.00
2008 Est. Population by Sex	3,576	
Male	1,814	50.73
Female	1,762	49.27
Male/Female Ratio	1.03	
2008 Est. Population by Age	3,576	
Age 0 - 4	265	7.41
Age 5 - 9	243	6.80
Age 10 - 14	252	7.05
Age 15 - 17	176	4.92
Age 18 - 20	126	3.52
Age 21 - 24	164	4.59
Age 25 - 34	511	14.29
Age 35 - 44	498	13.93
Age 45 - 49	230	6.43
Age 50 - 54	215	6.01
Age 55 - 59	184	5.15
Age 60 - 64	185	5.17
Age 65 - 74	249	6.96
Age 75 - 84	175	4.89
Age 85 and over	103	2.88
Age 16 and over	2,763	77.27
Age 18 and over	2,640	73.83
Age 21 and over	2,514	70.30
Age 65 and over	527	14.74
2008 Est. Median Age	36.03	
2008 Est. Average Age	37.72	

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Male Population by Age	1,814	
Age 0 - 4	136	7.50
Age 5 - 9	126	6.95
Age 10 - 14	128	7.06
Age 15 - 17	90	4.96
Age 18 - 20	58	3.20
Age 21 - 24	88	4.85
Age 25 - 34	276	15.21
Age 35 - 44	265	14.61
Age 45 - 49	114	6.28
Age 50 - 54	111	6.12
Age 55 - 59	92	5.07
Age 60 - 64	70	3.86
Age 65 - 74	113	6.23
Age 75 - 84	92	5.07
Age 85 and over	55	3.03
2008 Est. Median Age, Male	35.21	
2008 Est. Average Age, Male	37.16	
2008 Est. Female Population by Age	1,762	
Age 0 - 4	129	7.32
Age 5 - 9	117	6.64
Age 10 - 14	124	7.04
Age 15 - 17	86	4.88
Age 18 - 20	68	3.86
Age 21 - 24	76	4.31
Age 25 - 34	235	13.34
Age 35 - 44	233	13.22
Age 45 - 49	116	6.58
Age 50 - 54	104	5.90
Age 55 - 59	92	5.22
Age 60 - 64	115	6.53
Age 65 - 74	136	7.72
Age 75 - 84	83	4.71
Age 85 and over	48	2.72
2008 Est. Median Age, Female	36.99	
2008 Est. Average Age, Female	38.31	

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Population Age 15+ by Marital Status	2,816	
Total, Never Married	786	27.91
Married, Spouse present	1,528	54.26
Married, Spouse absent	118	4.19
Widowed	170	6.04
Divorced	214	7.60
Males, Never Married	464	16.48
Previously Married	112	3.98
Females, Never Married	322	11.43
Previously Married	272	9.66
2008 Est. Pop. Age 25+ by Educational Attainment	2,350	
Less than 9th grade	427	18.17
Some High School, no diploma	272	11.57
High School Graduate (or GED)	637	27.11
Some College, no degree	425	18.09
Associate Degree	196	8.34
Bachelor's Degree	310	13.19
Master's Degree	61	2.60
Professional School Degree	22	0.94
Doctorate Degree	0	0.00
Households		
2013 Projection	1,430	
2008 Estimate	1,322	
2000 Census	1,148	
1990 Census	837	
Growth 2008-2013	8.17%	
Growth 2000-2008	15.16%	
Growth 1990-2000	37.16%	
2008 Est. Households by Household Type	1,322	
Family Households	918	69.44
Nonfamily Households	404	30.56
2008 Est. Group Quarters Population	13	
2008 Households by Ethnicity: Hispanic/Latino	72	5.45

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Households by Household Income	1,322	
Income Less than $15,000	175	13.24
Income $15,000 - $24,999	87	6.58
Income $25,000 - $34,999	125	9.46
Income $35,000 - $49,999	192	14.52
Income $50,000 - $74,999	337	25.49
Income $75,000 - $99,999	226	17.10
Income $100,000 - $149,999	130	9.83
Income $150,000 - $249,999	35	2.65
Income $250,000 - $499,999	13	0.98
Income $500,000 and more	2	0.15
2008 Est. Average Household Income	$63,657	
2008 Est. Median Household Income	$56,102	
2008 Est. Per Capita Income	$23,687	
2008 Est. Household Type, Presence Own Children	1,322	
Single Male Householder	176	13.31
Single Female Householder	173	13.09
Married-Couple Family, own children	336	25.42
Married-Couple Family, no own children	374	28.29
Male Householder, own children	52	3.93
Male Householder, no own children	24	1.82
Female Householder, own children	79	5.98
Female Householder, no own children	53	4.01
Nonfamily, Male Householder	35	2.65
Nonfamily, Female Householder	20	1.51
2008 Est. Households by Household Size	1,322	
1-person household	349	26.40
2-person household	390	29.50
3-person household	228	17.25
4-person household	173	13.09
5-person household	90	6.81
6-person household	59	4.46
7 or more person household	33	2.50
2008 Est. Average Household Size	2.70	

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Households by Presence of People*	1,322	
Households with 1 or more People under Age 18:		
Married-Couple Family	370	27.99
Other Family, Male Householder	57	4.31
Other Family, Female Householder	91	6.88
Nonfamily, Male Householder	3	0.23
Nonfamily, Female Householder	0	0.00
Households no People under Age 18:		
Married-Couple Family	340	25.72
Other Family, Male Householder	19	1.44
Other Family, Female Householder	41	3.10
Nonfamily, Male Householder	208	15.73
Nonfamily, Female Householder	193	14.60
2008 Est. Households by Number of Vehicles*	1,322	
No Vehicles	201	15.20
1 Vehicle	502	37.97
2 Vehicles	453	34.27
3 Vehicles	123	9.30
4 Vehicles	39	2.95
5 or more Vehicles	4	0.30
2008 Est. Average Number of Vehicles*	1.48	
Family Households		
2013 Projection	993	
2008 Estimate	918	
2000 Census	797	
1990 Census	627	
Growth 2008-2013	8.17%	
Growth 2000-2008	15.18%	
Growth 1990-2000	27.11%	

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Family Households by Household Income	918	
Income Less than $15,000	88	9.59
Income $15,000 - $24,999	43	4.68
Income $25,000 - $34,999	70	7.63
Income $35,000 - $49,999	106	11.55
Income $50,000 - $74,999	280	30.50
Income $75,000 - $99,999	188	20.48
Income $100,000 - $149,999	106	11.55
Income $150,000 - $249,999	29	3.16
Income $250,000 - $499,999	6	0.65
Income $500,000 and more	2	0.22
2008 Est. Average Family Household Income	$69,774	
2008 Est. Median Family Household Income	$63,568	
2008 Est. Families by Poverty Status*	918	
Income At or Above Poverty Level:		
Married-Couple Family, own children	334	36.38
Married-Couple Family, no own children	347	37.80
Male Householder, own children	46	5.01
Male Householder, no own children	7	0.76
Female Householder, own children	63	6.86
Female Householder, no own children	44	4.79
Income Below Poverty Level:		
Married-Couple Family, own children	7	0.76
Married-Couple Family, no own children	22	2.40
Male Householder, own children	20	2.18
Male Householder, no own children	3	0.33
Female Householder, own children	22	2.40
Female Householder, no own children	3	0.33
2008 Est. Pop Age 16+ by Employment Status*	2,763	
In Armed Forces	0	0.00
Civilian - Employed	1,758	63.63
Civilian - Unemployed	91	3.29
Not in Labor Force	914	33.08

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Civ Employed Pop 16+ Class of Worker*	1,758	
For-Profit Private Workers	1,368	77.82
Non-Profit Private Workers	29	1.65
Local Government Workers	51	2.90
State Government Workers	206	11.72
Federal Government Workers	16	0.91
Self-Emp Workers	85	4.84
Unpaid Family Workers	3	0.17
2008 Est. Civ Employed Pop 16+ by Occupation*	1,758	
Management, Business, and Financial Operations	206	11.72
Professional and Related Occupations	204	11.60
Service	762	43.34
Sales and Office	357	20.31
Farming, Fishing, and Forestry	19	1.08
Construction, Extraction and Maintenance	111	6.31
Production, Transportation and Material Moving	99	5.63
2008 Est. Pop 16+ by Occupation Classification*	1,758	
Blue Collar	210	11.95
White Collar	761	43.29
Service and Farm	787	44.77
2008 Est. Workers Age 16+ Transportation To Work*	1,738	
Drove Alone	1,156	66.51
Car Pooled	355	20.43
Public Transportation	0	0.00
Walked	135	7.77
Motorcycle	14	0.81
Bicycle	20	1.15
Other Means	26	1.50
Worked at Home	32	1.84
2008 Est. Workers Age 16+ by Travel Time to Work*	1,706	
Less than 15 Minutes	1,014	59.44
15 - 29 Minutes	560	32.83
30 - 44 Minutes	88	5.16
45 - 59 Minutes	13	0.76
60 or more Minutes	31	1.82
2008 Est. Average Travel Time to Work in Minutes*	14.92	

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total Place	%
2008 Est. Tenure of Occupied Housing Units	1,322	
Owner Occupied	666	50.38
Renter Occupied	656	49.62
2008 Occ Housing Units: Avg Length of Residence	10	
2008 Est. All Owner-Occupied Housing Values	666	
Value Less than $20,000	4	0.60
Value $20,000 - $39,999	1	0.15
Value $40,000 - $59,999	3	0.45
Value $60,000 - $79,999	0	0.00
Value $80,000 - $99,999	0	0.00
Value $100,000 - $149,999	21	3.15
Value $150,000 - $199,999	60	9.01
Value $200,000 - $299,999	158	23.72
Value $300,000 - $399,999	208	31.23
Value $400,000 - $499,999	89	13.36
Value $500,000 - $749,999	85	12.76
Value $750,000 - $999,999	15	2.25
Value $1,000,000 or more	22	3.30
2008 Est. Median All Owner-Occupied Housing Value	$341,388	
2008 Est. Housing Units by Units in Structure	1,549	
1 Unit Attached	24	1.55
1 Unit Detached	1,161	74.95
2 Units	19	1.23
3 to 19 Units	322	20.79
20 to 49 Units	4	0.26
50 or More Units	12	0.77
Mobile Home or Trailer	7	0.45
Boat, RV, Van, etc.	0	0.00

Pop-Facts: Demographic Snapshot Comparison Report

Place, (see appendix for geographies), aggregate

Description	Total *Place*	*%*
2008 Est. Housing Units by Year Structure Built	1,549	
Housing Units Built 1999 to 2008	272	17.56
Housing Unit Built 1995 to 1998	84	5.42
Housing Unit Built 1990 to 1994	229	14.78
Housing Unit Built 1980 to 1989	253	16.33
Housing Unit Built 1970 to 1979	75	4.84
Housing Unit Built 1960 to 1969	70	4.52
Housing Unit Built 1950 to 1959	134	8.65
Housing Unit Built 1940 to 1949	162	10.46
Housing Unit Built 1939 or Earlier	270	17.43
2008 Est. Median Year Structure Built**	1983	

*In contrast to Claritas Demographic Estimates, "smoothed" data items are Census 2000 tables made consistent with current year estimated and 5 year projected base counts.

**1939 will appear when at least half of the Housing Units in this reports area were built in 1939 or earlier.

Appendix: Area Listing

Area Name:

Type: List - Place Reporting Detail: Aggregate Reporting Level: Place

Geography Code	Geography Name	Geography Code	Geography Name
1543700	Lanai City CDP		

Project Information:

Site: 1

Order Number: 967151065

EXHIBIT B

Lana'i Sales and Active Listings
Single-Family, Multi-Family and Vacant Land

Lana'i Single-Family Sales, 2 Years Trailing

MLS #	List Date	Closing Date	Original Price	Sold Price	% Change	Address	Subdivision	District	Zone	Sec	Plat	Par	Land SQFT	Liv A SF	Beds	Baths	DOM
319676	8/9/2006	11/17/2006	$460,000	$300,000	-35%	1140 Olapa Street		Lanai	4	9	013	083	4482	1084	3	2	100
323993	4/17/2007	7/18/2007	$425,000	$335,000	-21%	1236 Lanai Ave		Lanai	4	9	013	006	3118	756	1	2	92
324504	5/17/2007	6/27/2007	$370,000	$340,000	-8%	928 Houston St		Lanai	4	9	005	083	3563	1084	2	1.5	41
323450	3/19/2007	7/2/2007	$368,000	$349,000	-5%	1006 Houston		Lanai	4	9	005	075	3164	582	2	1	105
328665	10/11/2007	12/28/2007	$360,000	$360,000	0%	904 Fraser Avenue		Lanai	4	9	005	033	2800	550	2	1	78
328237	12/7/2007	4/4/2008	$385,000	$380,000	-1%	235 Gay Street		Lanai	4	9	008	008	3750	1056	3	1	119
326419	8/27/2007	8/12/2008	$550,000	$400,000	-27%	343 13th Street		Lanai	4	9	004	096	5914	1092	3	2	351
321477	12/7/2006	3/16/2007	$432,000	$400,000	-7%	1014 Kohana Street		Lanai	4	9	012	004	4400	856	2	1	99
313216	8/22/2005	2/20/2007	$475,000	$400,000	-16%	1513 Ohahia St	Lalakaa	Lanai	4	9	016	034	5000	1008	3	1.5	547
323187	3/2/2007	5/23/2007	$415,000	$405,000	-2%	340 Kaele Street		Lanai	4	9	007	116	3413	596	2	1	82
324220	5/2/2007	6/21/2007	$425,000	$420,000	-1%	920 Fraser Avenue		Lanai	4	9	005	029	3068	780	2	1	50
323686	4/1/2007	7/6/2007	$447,000	$425,000	-5%	1504 Haalauna Street	Lalakaa Subdivision	Lanai	4	9	016	045	5000	1008	3	1.5	96
322271	1/16/2007	6/12/2007	$468,000	$425,000	-9%	403 Iliahi Street	Lalakaa	Lanai	4	9	019	064	6200	1106	2	1.5	147
319180	7/6/2006	11/17/2006	$442,000	$425,000	-4%	414 Mahana Place		Lanai	4	9	010	042	7006	746	2	1	134
322541	1/30/2007	3/30/2007	$429,000	$429,000	0%	331 Caldwell Avenue		Lanai	4	9	009	011	6523	875	3	1	59
329812	2/19/2008	7/10/2008	$600,000	$450,000	-25%	368 Iliahi Street	Olapua Woods	Lanai	4	9	019	030	6686	1594	3	1	142
326387	8/27/2007	12/12/2007	$480,000	$455,000	-5%	1494 Ohohia	Lalakoa III	Lanai	4	9	016	003	5000	1008	3	2	107
326350	8/25/2007	5/1/2008	$475,000	$455,000	-4%	1469 Haalauna Street	Lalakaa	Lanai	4	9	016	121	5239	1008	3	2	250
324058	4/21/2007	12/20/2007	$575,000	$460,000	-20%	223 Fifth Street		Lanai	4	9	009	044	7308	1506	4	2	243
318703	6/13/2006	3/8/2007	$525,000	$515,000	-2%	1016 Olapa Street		Lanai	4	9	012	008	7600	850	3	2	268
316395	2/1/2006	11/20/2006	$610,000	$515,000	-16%	244 Jacarando Place	Lanai	Lanai	4	9	008	030	6240	1200	3	2	292
324442	5/10/2007	9/5/2007	$525,000	$520,000	-1%	1320 Lanai Ave.		Lanai	4	9	013	001	3870	1735	4	3	118
327286	10/18/2007	1/23/2008	$565,000	$525,000	-7%	255 Nau Place	Olapua Woods	Lanai	4	9	019	006	7936	1204	4	2	97
323541	3/15/2007	3/23/2007	$525,000	$525,000	0%	325 Thirteenth		Lanai	4	9	004	023	5914	1092	3	2	8

Moderate Income

Above Moderate Income

Gap Income

Lana'i Multi-Family Sales, 2 Years Trailing

MLS #	Closing Date	Original Price	Sold Price	% Change	Address	Building Name	Unit	Bds	Bths	Liv-SF	View	DOM
328406	11/14/2007	$ 610,000	$ 610,000	0%	115 Kukui Circle	Villas at Koele I	12E	1	2	1323	Golf Course	16
321820	6/7/2007	$ 1,250,000	$ 1,250,000	0%	635 Kaunaoa Drive	Villas at Koele II	3C	2	2	1745	Golf Course	162
317284	7/31/2008	$ 1,995,000	$ 1,450,000	-27%	3 Polihua Way	Terraces Manele Bay V	10B	2	2.5	1972	Ocean	864
325338	10/17/2007	$ 1,750,000	$ 1,600,000	-9%	43 Polihua Way	Terraces Manele Bay V	9C	2	2.5	1972	Mountain/Ocean	112
322853	2/9/2007	$ 2,279,663	$ 2,279,663	0%	10A Uhaloa Pl	Palms at Manele I	7A	3	3	2345	Golf Course	0
318290	2/15/2007	$ 2,595,000	$ 2,395,000	-8%	55 Awehi Way	Terraces Manele Bay I	6D	2	2.5	1972	Ocean	274
321098	11/30/2007	$ 2,495,000	$ 2,495,000	0%	26B Uhaloa Place	Palms at Manele I	3B	3	3.5	2836	Ocean	378
318739	6/8/2007	$ 2,495,000	$ 2,495,000	0%	7 Polihua Way	Terraces Manele Bay V	10D	3	3.5	3385	Ocean	358
325091	4/30/2008	$ 2,595,000	$ 2,500,000	-4%	34B Uhaloa Place	Palms at Manele I	1B	3	3	2345	Ocean	321
321368	2/16/2007	$ 2,775,000	$ 2,775,000	0%	38A Uhaloa Place	Palms at Manele I	19A	4	4	2946	Ocean	76

Lana'i Land Sales, 2 Years Trailing

MLS #	List Date	Closing Date	Original Price	Sold Price	% Change	Price/Lnd-SF	Address	Zone	Sec	Plat	Par	Land Acres	Lnd-SF	DOM
320322	9/25/2006	4/10/2007	$ 370,000	$ 355,000	-4%	$53.23	309 Houston St.	4	9	007	027	0.1531	6669	197
322257	1/16/2007	7/13/2007	$ 725,000	$ 645,000	-11%	$30.50	170 Kaunaoa	4	9	020	002	0.5	21150	178
325928	8/2/2007	5/15/2008	$ 750,000	$ 715,000	-5%	$34.20	240 Kauna'oa Drive	4	9	020	008	0.48	20909	287
316540	2/8/2006	4/9/2007	$ 1,250,000	$ 750,000	-40%	$1.52	0 Government Road	4	9	003	023	11.291	491836	425
330869	4/8/2008	5/16/2008	$ 1,725,000	$ 1,515,000	-12%	$61.77	463 Hulapoe Drive	4	9	023	010	0.56	24527	38

Lana'i Single-Family Active Listings

MLS #	List Date	Original Price	List Price	% Change	Address	Subdivision	District	Zone	Sec	Plat	Par	Land SQFT	Liv A SF	Beds	Baths	DOM
330253	2/8/2008	$ 400,000	$ 295,000	-26%	1030 Olapa Street		Lanai	4	9	012	042	2901	721	2	1	284
332915	8/4/2008	$ 390,000	$ 390,000	0%	1315 Jasmine Dr		Lanai	4	9	004	058	3325	746	3	1	106
332410	7/7/2008	$ 395,000	$ 395,000	0%	554 Froser Ave.		Lanai	4	9	007	144	6829	980	3	1	134
327020	9/28/2007	$ 460,000	$ 410,000	-11%	253 Houston Place		Lanai	4	9	008	021	6250	1056	3	1	417
333046	8/10/2008	$ 441,000	$ 421,000	-5%	1444 Hoalauna		Lanai	4	9	016	129	5010	1008	3	1.5	100
330048	3/1/2008	$ 495,000	$ 495,000	0%	1118 Fraser Avenue		Lanai	4	9	005	006	6438	1177	3	2	262
326588	9/10/2007	$ 585,000	$ 498,000	-15%	303 Caldwell Avenue		Lanai	4	9	009	014	7220	846	3	2	435
329056	1/12/2008	$ 565,000	$ 520,000	-8%	1136 Gay Street		Lanai	4	9	005	004	6125	1300	3	2	311
334278	11/1/2008	$ 572,400	$ 572,400	0%	430 Jacaronda Street		Lanai	4	9	007	097	7080	1092	3	2.5	17
330334	3/14/2008	$ 642,000	$ 642,000	0%	942 Kahana St		Lanai	4	9	012	022	11349	1322	3	2	249
332446	7/7/2008	$ 895,000	$ 829,000	-7%	520 Jacaranda St		Lanai	4	9	007	091	6000	2942	6	5	134
332249	6/25/2008	$ 998,000	$ 910,000	-9%	648 Nani Street		Lanai	4	9	011	012	20601	1459	4	3	146

Maderate Income

Abave Moderate Income

Gap Income

Lana'i Multi-Family Active Listings

MLS #	Original Price	List Price	% Change	Address	Building Name	Unit	Bds	Bths	Liv-SF	View	DOM
329271	$ 775,000	$ 649,000	-16%	135 Kukui Loop	Villas at Koele I	14B	1	2	1360	Golf Course	301
330396	$ 900,000	$ 900,000	0%	635 Kauna'oa Drive	Villas at Koele II	3D	3	1	1360	Mountain	246
328830	$ 1,750,000	$ 1,600,000	-9%	645 Kauna'oa Drive	Villas at Koele II	4C	3	3	2576	Golf Course	319
331045	$ 1,695,000	$ 1,650,000	-3%	645 Kauna'oa Drive	Villas at Koele II	4B	3	3	2660	Golf Course	213
333763	$ 1,699,000	$ 1,699,000	0%	43 Awehi Way	Terraces Manele Bay I	5B	2	2	1564	Ocean	49
332607	$ 1,748,000	$ 1,700,000	-3%	37 Polihua Way	Terraces Manele Bay V	9B	2	2	1564	Ocean	124
330405	$ 1,800,000	$ 1,800,000	0%	635 Kauna'oa Drive	Villas at Koele II	3B	3	3	2450	Mountain	246
333229	$ 2,295,000	$ 2,295,000	0%	97 Kapiha'a Place	Terraces Manele Bay III	4D	3	3.5	3208	Mountain/Ocean	85
330875	$ 2,300,000	$ 2,300,000	0%	26A Uhaloa Place	Palms at Manele I	3A	3	3	2345	Ocean	223
331575	$ 2,475,000	$ 2,475,000	0%	30B Uhaloa Place	Palms at Manele I	2B	3	3	2345	Ocean	181
331573	$ 2,525,000	$ 2,525,000	0%	22A Uhaloa Place	Palms at Manele I	4A	3	3.5	2835	Ocean	181
332873	$ 2,795,000	$ 2,795,000	0%	65 Polihua Place	Terraces Manele Bay IV	11C	4	4	2757	Ocean	109
332505	$ 3,150,000	$ 3,150,000	0%	47 Awehi Way	Terraces Manele Bay I	5D	3	3	2891	Ocean	130

Lana'i Land Active Listings

MLS #	List Date	Original Price	List Price	% Change	Price/Lnd-SF	Address	Zone	Sec	Plat	Par	Land Acres	Lnd-SF	DOM
332874	8/3/2008	$ 498,000	$ 498,000	0%	$61.85	534 Kualua	4	9	015	030	0.184848	8052	107
328399	12/17/2007	$ 700,000	$ 700,000	0%	$32.80	220 Kaunaoa Drive	4	9	020	006	0.49	21344	337
333220	8/25/2008	$ 995,000	$ 995,000	0%	$2.02	0 Government	4	9	003	023	11.291	491836	85
329190	1/18/2008	$ 1,725,000	$ 1,725,000	0%	$66.00	477 Hulopoe Drive	4	9	023	009	0.6	26136	305
325521	7/11/2007	$ 1,795,000	$ 1,795,000	0%	$65.05	505 Hulopoe Drive	4	9	023	007	0.63	27593	496
319097	7/3/2006	$ 1,995,000	$ 1,995,000	0%	$69.48	525 Hulopo'e Drive	4	9	023	006	0.659	28713	869
329148	1/16/2008	$ 2,345,000	$ 2,345,000	0%	$56.67	260 Hulopoe Drive	4	9	022	022	0.95	41382	307
333505	9/15/2008	$ 5,500,000	$ 5,500,000	0%	$58.02	220 Mauna Lei Drive	4	9	017	014	2.176	94787	64

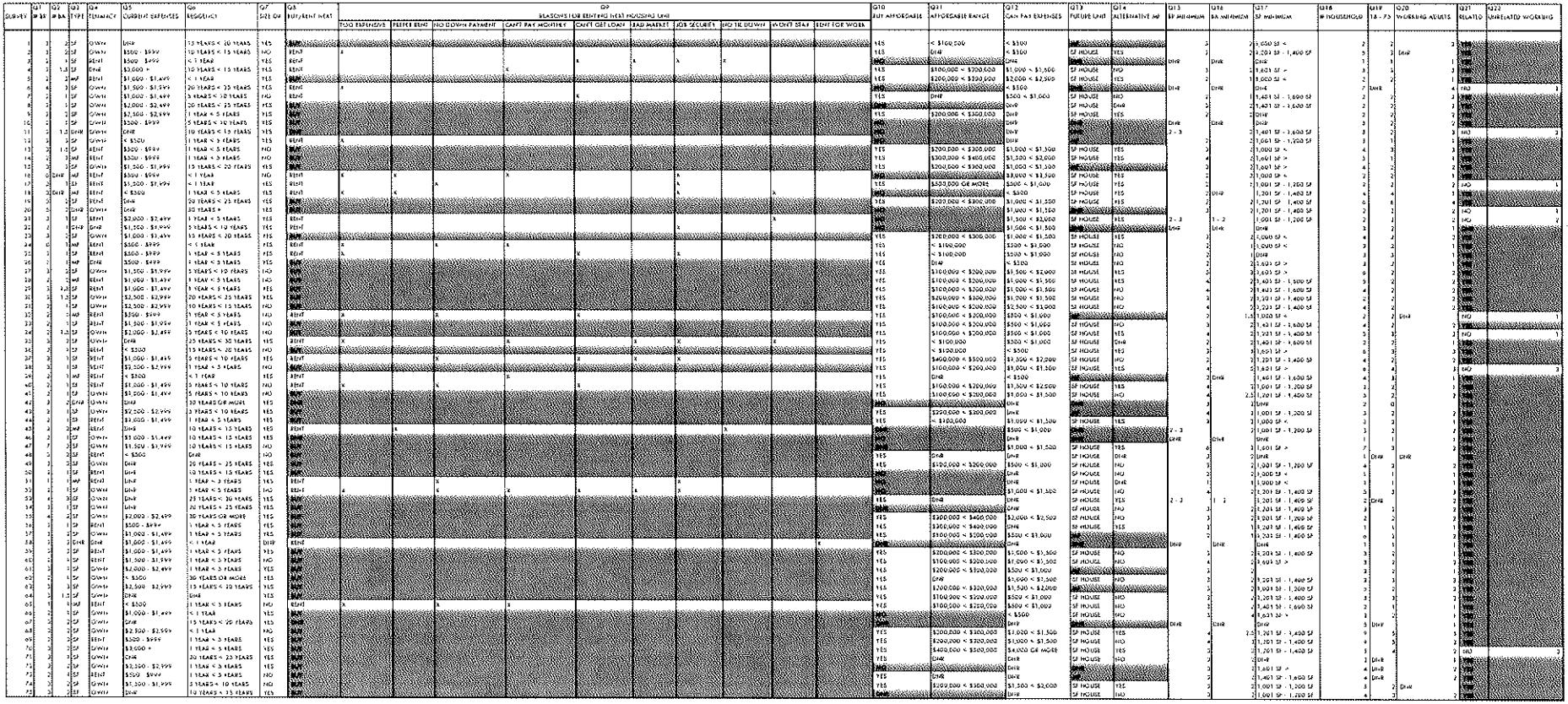
EXHIBIT C

Copy of Lana'i Housing Survey
and Summary of Results

Lana'i Housing Survey

Thank you for taking the time to complete this survey. The results will be used to plan for housing needs on the Island of Lana'i. **Only one survey per household is needed.**

1. How many bedrooms in your current home? _____
2. How many bathrooms in your current home? _____
3. Is your current home a **single-family house**, or a **townhouse/condominium/apartment?** (circle one)
4. Do you rent or own your current home? **own/rent** (circle one)
5. What is the total monthly mortgage or rent for your current home? Include any utility payments, and maintenance fees. _____
6. How long have you lived in your current home? _____
7. Is your current home large enough for the number of people living there? **yes/no** (circle one)
8. Would you prefer to buy or rent your next home? **buy/rent** (circle one)
9. If you chose "rent" for Question 8, what are your main reason(s) for renting a home? (circle all that apply)
   A. **too expensive** B. **prefer to rent** C. **can't afford down payment**
   D. **can't afford monthly payment** E. **can't qualify for loan** F. **market is bad**
   G. **worried about job security** H. **don't want to be tied down**
   I. **won't stay long enough** J. **other** _____
10. If there were homes available that you could afford, would you want to buy one? **yes/no** (circle one)
11. If you chose "yes" for Question 10, what price range would you consider "affordable"? _____
12. About how much can you afford to pay each month for all housing costs, including utilities, and maintenance fees? _____
13. If you plan on buying your next home, would you be most likely to buy a **single-family house** or a **townhouse/condo/apartment?** (circle one)
14. If you chose "single-family house" for Question 13, but couldn't find a house in your price range, would you be willing to buy a townhouse/condo/apartment? **yes/no** (circle one)
15. If you were to buy a new home or rent a different home, how many bedrooms would you need? _____
16. If you were to buy a new home or rent a different home, how many bathrooms would you need? _____
17. What is the smallest size home you would be willing to live in? (circle one)
    A. **1,000 square feet or less** B. **1,001-1,200 square feet** C. **1,201-1,400 square feet**
    D. **1,401-1,600 square feet** E. **1,601 square feet or more**
18. Including yourself, how many people live in your household? _____
19. What are the ages of the people living in your household? _____
20. Of the adults in your household, how many are working? _____
21. Are all the people in your household related by blood, marriage, or adoption? **yes/no** (circle one)
22. If you chose "no" for Question 21, how many unrelated working adults are in your household? _____



ADDENDUM

DEFINITIONS

The purpose of this Glossary is to assist the reader in understanding specific terminology used in this report.

Appraisal (noun) the act or process of estimating value; an estimate of value. (adjective) of or pertaining to appraising and related functions, e.g. appraisal practice, appraisal services.

Binding Requirement All or part of a standards rule of the Uniform Standards of Professional Appraisal Practice (USPAP) from which departure is not permitted (See Departure Provision).

Cash Equivalent A price expressed in terms of cash, as distinguished from a price expressed totally or partly in terms of the face amounts of notes or other securities that cannot be sold at their face amounts.

Counseling Providing competent, disinterested, and unbiased advice and guidance an diverse problems in the broad field of real estate; may involve any or all aspects of the business such as merchandising, leasing, management, acquisition/disposition planning, financing, development, cost-benefit studies, feasibility analysis, and similar services. Counseling services are often associated with evaluation, but they are beyond the scope of appraisal.

Discounting The procedure used to convert periodic income and reversions inta present value; based on the assumption that benefits received in the future are worth less than the same benefits received now.

Extraordinary Assumption An assumption, directly related to a specific assignment, which, if found to be false, could alter the appraiser's opinians or conclusions. Extraordinary assumptians presume as fact otherwise uncertain information about physical, legal, or economic characteristics of the subject property; or about conditions external to the property such as market conditions or trends; or about the integrity of data used in an analysis. An extraordinary assumption may be used in an assignment only if:

- It is required to properly develop credible opinions and conclusions;
- The appraiser has a reasonable basis for the extraordinary assumption;
- Use af the extraordinary assumption results in a credible analysis; and
- The appraiser complies with the disclosure requirements set farth in USPAP for extraordinary assumptions.

Fair Value The cash price that might reasonably be anticipated in a current sale under all conditions requisite to a fair sale. A fair sale means that buyer and seller are each acting prudently, knowledgeably, and under no necessity to buy or sell-, i.e., other than in a forced or liquidatian sale. The appraiser should estimate the cash price that might be received upon exposure to the open market for a reasonable time, considering the property type and local market conditions. ***When a current sale is unlikely (i.e., when it is unlikely that the sale can be completed within 12 months) the appraiser must discount all cash flows generated by the property to obtain the estimate of fair value.*** These cash flows include, but are not limited to, those arising from ownership, development, operating, and sale of the property. The discount applied

shall reflect the appraiser's judgment of what a prudent, knowledgeable purchase under o necessity to buy would be willing ta pay to purchase the property in a current sale.

Fee Simple Estate — Absolute ownership encumbered by any other interest or restate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police pawer, and escheat.

Hawaiian Terms — The Hawaiian wards "mauka" and "makai" are commonly used in the islands as indicators of direction. The word "mauka" means toward the mountain, and "makai" means toward the ocean.

Highest and Best Use — The reasonably probable and legal use of vacant land or an improved property, which is physically passible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum profitability.

Highest and Best Use of Land or a Site as Though Vacant — The use of a property based on the assumption that a parcel of land is vacant or can be made vacant through demalition of any improvements.

Highest and Best Use of Property as Improved — The use that should be made of a property as it exists.

Hypothetical Condition — That which is contrary to what exists, but is supposed for the purpase of analysis. Hypothetical conditions assume conditions contrary to known facts about physical, legal, or economic characteristics of the subject property; or about conditions external to the property, such as market conditions or trends; or abaut the integrity of data used in an analysis. A hypothetical condition may be used in an assignment only if:

- Use of the hypothetical condition is clearly required for legal purposes, for purposes of reasonable analysis, or for purposes of comparison;
- Use of the hypothetical condition results in a credible analysis; and
- The appraiser complies with the disclosure requirements set forth in USPAP for hypothetical conditions

Leased Fee Estate — An ownership interest held by a landlord with the right of use and occupancy conveyed by lease others; the rights of lessor or the leased fee owner and leased fee are specified by contract terms contained within the lease

Leasehold Estate — The right to use and occupy real estate for a stated term and under certain conditions; conveyed by a lease.

Market Rent — The rental income that a property would most probably command in the open market.

Market Value — Market value is the major focus of most real property appraisal assignments. Both economic and legal definitions of market value have been developed and refined. Continual refinement is essential to the growth of the appraisal

profession. The current economic definitian of market value can be stated as follaws:

"The mast probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress."

The current economic definition of "market value" as stated in the Uniform Standards of Professional Practice, published by The Appraisal Foundation in 1990, is as follows:

"The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is nat affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing af title from seller to buyer under conditions whereby:

1. buyer and seller are typically motivated.

2. both parties are well informed or well advised, and acting in what they consider their best interests;

3. a reasonable time is allowed for exposure in the open market;

4. payment is made in terms of cash in United States dollars or in terms of financial arrangements comparable thereto; and

5. the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale."

Prospective Market Value Upon Completion of Construction

The prospective future value of a property on the date that construction is completed, based upon market conditions forecast to exist as of the completion date.

Prospective Value Estimate

A forecast of the value expected at a specified future date. A prospective value estimate is most frequently sought in connection with real estate projects that are propased, under construction, or under conversion to a new use, or those that have not achieved sellout or a stabilized level of lang-term occupancy at the time the appraisal report is written.

Report

Any communication, written or oral, of an appraisal, review, or consulting service that is transmitted to the client upon completion of an assignment. The types of written reports listed below apply to real property appraisals:

Self-Contained Appraisal Repart: A written report prepared under Standards Rule 2-2(a) of the Uniform Standards of Professional Appraisal Practice.

Summary Appraisal Report: A written repart prepared under Standards Rule 2-2(b) or 8-2(b).

Restricted Use Appraisal Report: A written repart prepared under Standards Rule 2-2(c), 8-2(c), or 10-2(b).

Uniform Standards of Professional Appraisal Practice

Current standards af the appraisal profession, developed far appraisers and the users of appraisal services; the USPAP deal with the procedures to be followed in develaping an appraisal, analysis, or opinion and the manner in which an appraisal, analysis, or opinion is communicated. The USPAP are endorsed by the Appraisal Institute and other professional appraisal organizations.

LIMITING AND CONTINGENT CONDITIONS
ACM Consultants, Inc.

LIMITING AND CONTINGENT CONDITIONS: The certification of the Consultant appearing in the appraisal report is subject to the following conditions and to such other specific and limiting conditions as are set forth by the Consultant in the report. By this notice, all persons and firms reviewing, utilizing or relying on the report in any manner bind themselves to accept these assumptions and limiting conditions. Do not use this report if you do not so accept. These conditions are a part of the appraisal report, they are a preface to any certification, definition, fact or analysis, and are intended to establish as a matter of record that the Consultant's function is to provide a present market value indication for the subject property based upon the Consultant's observation as to the subject property and real estate market. This appraisal report is an economic study to estimate value as defined in it. It is not an engineering, construction, legal or architectural study nor survey and expertise in these areas, among others, is not implied.

1. CONFIDENTIALITY. The contents of the appraisal are confidential. Release of this appraisal by ACM Consultants, Inc. to you is limited to and solely for your business use only. Any further release of this appraisal by you or any of your agents is strictly prohibited and you shall accept the risk and liability for any such release without the previous written consent of ACM Consultants, Inc. Further, you shall indemnify and defend ACM Consultants, Inc. from any claims arising out of any such unauthorized disclosure.

2. LIMIT OF LIABILITY. The liability of ACM Consultants, Inc. and employees and affiliated independent contractors is limited to the fee actually received by Consultant (total per appraisal). Further, there is no accountability, obligation, or liability to any third party. If this report is placed in the hands of anyone other than client, the client shall make such party aware of all limiting conditions and assumptions of the assignment and related discussions. The Consultant is in no way to be responsible for any costs incurred to discover or correct any deficiencies of any type present in the property; physically, financially, and/or legally. In the case of limited partnerships or syndication offerings or stock offerings in real estate, client agrees that in case of lawsuit (brought by lender, partner or part owner in any form of ownership, tenant, or any other party), ony and all awards, settlements of any type in such suit, regardless of outcome, client will hold Consultant harmless in any such action.

3. INFORMATION USED. No responsibility is assumed for accuracy of information furnished by work of or work by others, the client, his designee, or public records. We are not liable for such information or the work of possible subcantroctors. The comparable date relied upon in this report has been confirmed with one or more parties familiar with the transaction or from affidavit or other source though reasonable; all are considered appropriate for inclusion to the best of our factual judgment and knowledge. An impractical and uneconomic expenditure of time would be required in attempting to furnished unimpeachable verification in all instances, particularly as to engineering and market-related information. It is suggested that the client consider independent verification as a prerequisite to any transaction involving sale, lease, or other significant commitment of funds of subject property.

4. TESTIMONY, CONSULTATION, COMPLETION OF CONTRACT FOR APPRAISAL SERVICES. The contract for appraisal, consultation or analytical service is fulfilled, and the total fee is payable upon completion of the report.

   The Consultant(s) or those assisting in preparation of the report will not be asked or required to give testimony in court or hearing because of having made the appraisal, in full or in part, nor engage in post appraisal consultation with client or third parties except under separate and special arrangement and at additional fee. If testimony or deposition is required because of subpoena, the client shall be responsible for any additional time, fees, and charges regardless of issuing party.

5. LEGALITY OF USE. The appraisal is based on the premise that, there is full compliance with all applicable federal, state and local environmental regulations and laws unless otherwise stated in the report; further, that all applicable zoning, building, use regulations and restrictions of all types have been complied with unless otherwise stated in the report; further, it is assumed that all required licenses, consents, permits, or other legislative or administrative authority, local , state, federal and/or private entity or organization have been or can be obtained or renewed for any use considered in the value estimate.

6. COMPONENT VALUES. The distribution of the total valuation in this report between land and improvements applies only under the existing program of utilization. The separate valuations for land and building must not be used in conjunction with any other appraisal and are invalid if so used.

7. AUXILIARY AND RELATED STUDIES. No environmental or impact studies, special market study or analysis, highest and best use analysis or feasibility study has been requested or made unless otherwise specifically stated in an agreement for services or in the report.

8. DOLLAR VALUES, PURCHASING POWER. The market value estimated, and the costs used, are as of the date of the estimate of value. All dollar amounts are based on the purchasing power and price of the dollar as of the date of the value estimate.

9. INCLUSIONS. Furnishings and equipment or personal property or business operations except as specifically indicated and typically considered as a part of real estate, have been disregarded with only the real estate being considered in the value estimate unless otherwise stated.

10. ENVIRONMENTAL DISCLAIMER. The value estimated in this report is based on the assumption that the property is not negatively affected by the existence of hazardous substances or detrimental environmental conditions. The Consultant is not an expert in the identification of hazardous substances or detrimental environmental conditions. The Consultant's routine inspection of and inquiries about the subject property did not develop any information that indicated any apparent significant hazardous substances or detrimental environmental conditions which would affect the property negatively. It is possible that tests and inspections made by a qualified hazardous substance and environmental expert would reveal the existence of hazard material and environmental conditions on or around the property that would negatively affect its value.

11. LEGAL, ENGINEERING, FINANCIAL, STRUCTURAL, OR MECHANICAL NATURE, HIDDEN COMPONENTS, SOIL. The Consultant and/or firm has no responsibility for matters legal in character or nature, nor of any architectural, structural, mechanical, or engineering nature. No opinion is rendered as to the title, which is presumed to be good and merchantable. The property is appraised as if free and clear, unless otherwise stated in particular parts of the report.

    The legal description is assumed to be correct as used in this report as furnished by the client, his designee, or as derived by the Consultant.

Note that no advice is given regarding mechanical equipment or structural integrity or adequacy, no soils and potential for settlement, drainage, and such (seek assistance from qualified architect and/or engineer) nor matters concerning liens, title status, and legal marketability (seek legal assistance), and such. The lender and owner should inspect the property before any disbursement of funds; further it is likely that the lender or owner may wish to require mechanical or structural inspections by a qualified and licensed contractor, civil or structural engineer, architect, or other expert.

The Consultant has inspected as far as possible, by observation, the land and the improvements; however, it was not possible to personally observe conditions beneath the soil or hidden structurally or by other components. We have not critically inspected mechanical components within the improvements and no representations are made herein as to these matters unless specifically stated and considered in the report. The value estimate considers there being no such conditions that would cause a loss of value. The land or the soil of the area being appraised appears firm, however, subsidence in the area is unknown. The Consultant(s) do not warrant against this condition or occurrence of problems arising from soil conditions.

The appraisal is based on there being no hidden, unapparent, or apparent conditions of the property site, subsoil, or structures or toxic material which would render it more or less valuable. The Consultant and firm have no responsibility for any such conditions or for any expertise or engineering to discover them. All mechanical components are assumed to be in operable condition and status standard for properties of the subject type. Conditions of heating, cooling, ventilation, electrical and plumbing equipment is considered to be commensurate with the conditions of the balance of the improvements unless otherwise stated. No judgment may be made by us as to adequacy of insulation, type of insulation, or energy efficiency of the improvements or equipment which is assumed standard for subject and type.

If the Consultant has not been supplied with a termite inspection, survey or occupancy permit, no responsibility or representation is assumed or made for costs associated with obtaining same or for any deficiencies discovered before or after they are obtained. No representation or warranties are made concerning obtaining the above mentioned items.
The Consultant has no responsibility for any costs or consequences arising due to the need, or the lack of need for flood hazard insurance. An Agent for the Federal Flood Insurance Program should be contacted to determine the actual need for Flood Hazard Insurance.

12. PROPOSED IMPROVEMENTS, CONDITIONED VALUE. Improvements proposed, if any, on or off-site, as well as any repairs required are considered, for purposes of the appraisal to be completed in good and workmanlike manner according to information submitted and/or considered by the Consultant(s). In cases of proposed construction, the appraisal is subject to change upon inspection of property after construction is completed. This estimate of market value is as of the date shown, as proposed, as if completed and operating at levels shown and projected. On all appraisals, subject to satisfactory completion, repairs, or alterations, the appraisal report and value conclusion are contingent upon completion of the improvements in a workmanlike manner.

13. VALUE CHANGE, DYNAMIC MARKET, INFLUENCES, ALTERATION OF ESTIMATE BY CONSULTANT. The estimated market value, which is defined in the report, is subject to change with market changes over time; value is highly related to exposure, time, promotional effort, terms, motivation, and conditions surrounding the offering. The value estimate considers the productivity and relative attractiveness of the property physically and economically in the marketplace.

    Appraisal report and value estimate subject to change if physical or legal entity or financing is different than that envisioned in this report.

14. EXHIBITS. The sketches and maps in this report are included to assist the reader in visualizing the property and are not necessarily to scale. Various photos, if any, are included for the same purpose as of the date of the photos. Site plans are not surveys unless shown from separate surveyor. All documents, materials, photographs, negatives, and other items provided to or obtained by the Consultant becomes the property of the Consultant unless other arrangements have been previously made therefore.

15. CHANGES, MODIFICATION. The Consultant(s) and/or officers of ACM Consultants, Inc., reserve the right to alter statements, analysis, conclusion or any value estimate in the appraisal if there becomes known to us facts pertinent to the appraisal process which were unknown to us when the report was completed.

16. DISCLOSURE. Disclosure of the contents of the appraisal report is governed by the Bylaws and Regulations of the professional appraisal organizations with which the Consultant is affiliated. Neither all, nor any part of the content of the report, or copy thereof (including conclusions as to the property value, the identity of the Consultant, professional designations, reference to any professional appraisal organizations, or the firm with which the Consultant is connected, shall be used for any purpose by anyone but the client specified in the report, without the previous written consent of the Consultant; nor shall it be conveyed by anyone to the public through advertising, public relations, news sales, or other media, without the written consent and approval of the Consultant. The Consultant may not divulge the material (evaluation) contents of the report, analytical findings or conclusions, or give a copy of the report to anyone other than the client or his designee as specified in writing except as may be required by the Appraisal Institute as they may request in confidence for ethics enforcement, or by a court of law or body with the power of subpoena.

17. CONTINUING EDUCATION. The Appraisal Institute conducts a voluntary program of continuing education for its designated members. As of the date of this report, Glenn Kunihisa has completed the requirements of the continuing education program of the Appraisal Institute.

    ACCEPTANCE OF, AND/OR USE OF THIS APPRAISAL REPORT BY CLIENT OR ANY THIRD PARTY CONSTITUTES ACCEPTANCE OF THE ACM CONSULTANTS, INC., CERTIFICATION, LIMITING AND CONTINGENT CONDITIONS. CONSULTANT LIABILITY EXTENDS ONLY TO STATED CLIENT, NOT SUBSEQUENT PARTIES OR USERS OF ANY TYPE, and the total liability of Consultant(s) and firm is limited to the amount of fee received by Consultant.

APPRAISAL QUALIFICATIONS

Glenn K. Kunihisa, MAI, CRE

STATE LICENSING

State Certified General Appraiser,
State of Hawaii, License No. CGA 39, July 17, 1991
Expiration: December 31, 2007

PROFESSIONAL AFFILIATIONS

Member, Appraisal Institute, MAI Designation, Hawaii Chapter No. 67
Member, The Counselors of Real Estate, CRE Designation, Hawaii Chapter
Member, International Right of Way Association
Appraiser-Realtor, National Association of Realtors, Maui Board of Realtors

PROFESSIONAL INVOLVEMENT

Former Education Chairperson – Hawaii Chapter of the Appraisal Institute – 2004 and 2005
Former Island of Maui Representative – Hawaii Chapter of the Appraisal Institute
Former Multiple Listing Service (MLS) Committee Member – Realtors Association of Maui

COMMUNITY AFFILIATIONS

St. Anthony Parish School Board
Board Member, 1995 to Present
Board President, 1997 and 1998
Alii Community Care, Inc. – A non-profit corporation
Former Board Member 2004 to 2006

EMPLOYMENT

President, ACM Consultants, Inc. - May, 1997 to present

Previously associated with the following:
ACM, Real Estate Appraisers, Inc. - 1986 to 1997
A&B Commercial Company; a division of Alexander & Baldwin, Inc. - 1979 to 1985
Bank of Hawaii - 1976 to 1979

GENERAL EDUCATION

University of Hawaii at Manoa
Master of Business Administration (MBA) - Executive MBA Program V, 1988
Bachelor of Business Administration (BBA), 1976
Iolani School, 1971

LEGAL

Qualified as an expert witness in the Secand Circuit Court of the State of Hawaii
Experienced in real estate arbitration in the State of Hawaii

APPRAISAL EDUCATION

Appraisal Institute

Seminar	*Uniform Appraisal Standards for Federal Land Acquisitions* Honolulu, Hawaii – December, 2006
Seminar	*California Conservation Easements* Sacramento, California – November, 2005
Course 400	*7-Hour National USPAP Update Course* Honolulu, Hawaii – October, 2005
Seminar	*Case Studies in Limited Partnership and Partial Interest Valuation* Honolulu, Hawaii – May, 2005

Seminar	*Appraisal Consulting: A Solutions Approach for Professionals* Honolulu, Hawaii – February, 2005
Seminar	*Real Estate Finance, Value and Investment Performance* Honolulu, Hawaii – February 2005
Seminar	*Fannie Mae Residential Presentation* Honolulu, Hawaii - July 2004
Seminar	*Subdivision Analysis* Chicago, Illinois - August 2003
Seminar	*Supporting Capitalization Rates* Chicago, Illinois - August 2003
Seminar	*The Technology Assisted Appraiser* Chicago, Illinois - August 2003
Seminar	*Scope of Work: Expanding Your Range of Services* Chicago, Illinois - August 2003
Course 400	*National Uniform Standards of Professional Practice* Honolulu, Hawaii - May 2003
Course 420	*Business Practices and Ethics* Honolulu, Hawaii - May 2003
Seminar	*The Private Conservation Market* Honolulu, Hawaii - July 2002
Seminar	*Finance Reporting Valuations Parts I and II* Honolulu, Hawaii - July 2002
Seminar	*Future of Appraisal Profession from a Global Perspective* Honolulu, Hawaii - July 2002
Seminar	*Appraisal Office Management* Honolulu, Hawaii - July 2002
Course 540	*Report Writing* Denver, Colorado - December 2000
Seminar	*Partial Interests: Theory and Case Law* Las Vegas, Nevada - July 2000
Seminar	*Easement Valuation* Las Vegas, Nevada - July 2000
Seminar	*Bridging the Gap: Marketability Discounts for Real Estate Interests* Las Vegas, Nevada - July 2000
Course 430	*Standards of Professional Practice, Part C* Honolulu, Hawaii - September 1999
Seminar	*Litigation Skills for the Appraiser: An Overview* Honolulu, Hawaii - May 1998
Seminar	*Special Purpose Properties* Honolulu, Hawaii - September 1997
Seminar	*Highest and Best Use Applications* Honolulu, Hawaii - September 1997
Seminar	*Detrimental Conditions* Honolulu, Hawaii - July 1997
Seminar	*The Appraiser As Expert Witness* Honolulu, Hawaii - August 1995
Seminar	*How to Appraise FHA-Insured Property* Los Angeles, California - January 1995
Seminar	*Understanding Limited Appraisals and Reporting Options* Honolulu, Hawaii - August 1994

Seminar	*Valuation of Leasehold Interests* Honolulu, Hawaii – May 1993
Seminar	*Valuation of Leased Fee Interests* Honolulu, Hawaii - May 1993
Seminar	*Valuation Considerations: Appraising Non-Profits* Boston, Massachusetts - July 1992
Seminar	*Americans With Disabilities Act* Boston, Massachusetts - July 1992
Seminar	*Valuation in Today's Capital and Financing Markets* Honolulu, Hawaii - June 1992
Seminar	*Arbitration Principles, Procedures and Pitfalls* Honolulu, Hawaii - June 1992
Seminar	*Institutional Real Estate in the 1990's* Hanolulu, Hawaii - June 1992
Seminar	*FIRREA and its Impact on Appraisers* Honolulu, Hawaii - June 1992
Course 410/420	*Standards of Professional Practice, Parts A & B* Honolulu, Hawaii - April 1991

The American Society of Farm Managers and Rural Appraisers

Seminar	Agricultural Lease Valuation Honolulu, Hawaii – March 2006

Maui Coastal Land Trust

Seminar	*Understanding the New Tax Incentives: Conservation Easements & Other Charitable Contributions* Wailuku, Hawaii – June 2007

Society of Real Estate Appraisers

Course 101	*Introduction to Appraising Real Property* Dallas, Texas - 1987
Course 102	*Applied Residential Property Valuation* Honolulu, Hawaii - July 1990
Course 201	*Principles of Income Property Appraising* Chicago, Illinois - 1987
Course 202	*Applied Income Property Valuation* San Diego, Califarnia - 1988
Seminar	*Professional Practice and the Society of Real Estate Appraisers* Hanolulu, Hawaii - 1988
Seminar	*Appraisal Standards Seminar - Federal Home Loan Bank Board Guidelines, Regulations and Policies* Honolulu, Hawaii - April 1988

American Institute of Real Estate Appraisers

Seminar	*Rates, Ratios and Reasonableness* Honolulu, Hawaii - 1989
Seminar	*Discounted Cash Flow Analysis* Honolulu, Hawaii - 1989
Seminar	*Highest and Best Use* Honolulu, Hawaii - 1989
Seminar	*Capitalization Overview - Part A* Honolulu, Hawaii – 1990

Seminar *Capitalization Overview - Part B*
Honolulu, Hawaii - 1990
Seminar *Accrued Depreciation*
Honolulu, Hawaii - 1990

International Right of Way Association
Course 101 *Appraisal*
Las Vegas, Nevada - October, 1998
Course 101 *Negotiation*
Las Vegas, Nevada - October 1998

National Business Institute, Inc.
Seminar *Commercial Real Estate Leasing In Hawaii*
Honolulu, Hawaii - 1989

American Arbitration Association
Seminar *Real Estate Dispute Resolution - Mediation and Arbitration*
Kahului, Maui, Hawaii - October, 1990

APPRAISAL QUALIFICATIONS

Shane M. Fukuda

STATE LICENSING

State Certified General Appraiser
State of Hawaii, License No. CGA-810, July 1, 2007
Expiration: December 31, 2007

PROFESSIONAL AFFILIATIONS

None

EMPLOYMENT

Staff Appraiser
ACM Consultants, Inc.
October 2004 to Present

Previously associated with the following:

Dollar Thrifty Automotive Group, Inc.
1994 to 2004
Positions held: Rental Agent; Lead Rental Agent; Station Manager; Senior Statian Manager

GENERAL EDUCATION

Maui Community College, 1989-1990

Henry Perrine Baldwin High School, 1989

APPRAISAL EDUCATION

Appraisal Institute

Course 320 *General Applications*
San Diego, California – July 2006

Course 310 *Basic Income Capitalization*
San Diego, California – July 2006

Course 101 *Basic Appraisal Procedures*
Denver, Colorado – April 2005

Course 100 *Basic Appraisal Principles*
Denver, Colorado – April 2005

Lincoln Graduate Center

Course 405 *Residential Sales Comparison & Income Approaches*
Honolulu, Hawaii – November 2006

Course 404 *Residential Appraiser Site Valuation & Cost Approach*
Honolulu, Hawaii – November 2006

Course 403 *Residential Market Analysis & Highest & Best Use*
Honolulu, Hawaii – November 2006

Course 772 *National USPAP Course*
Honolulu, Hawaii – October 2006

Course 772 *National USPAP Course*
Honolulu, Hawaii – January 2005

MISCELLANEOUS EDUCATION

REALM Business Solutions Argus 12.0
Honolulu, Hawaii – July 2005

APPENDIX G.

Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT
LANAI CITY AFFORDABLE HOUSING

LANAI CITY, LANAI, HAWAII

FINAL

October 16, 2009

Prepared for:

Munekiyo & Hiraga, Inc
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
501 Sumner Street, Suite 521
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Honolulu • Wailuku • Hilo, Hawaii

TRAFFIC IMPACT ANALYSIS REPORT
LANAI CITY AFFORDABLE HOUSING

Lanai City, Lanai, Hawaii

FINAL

Prepared for

Munekiyo & Hiraga, Inc.

Prepared by
Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku, Hawaii

October 16, 2009

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APPENDICES

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
CONTINUING THE ENGINEERING PRACTICE FOUNDED BY H. A. R. AUSTIN IN 1934

KENNETH K. KUROKAWA, P.E.
TERRANCE S. ARASHIRO, P.E.
DONOHUE M. FUJII, P.E.
STANLEY T. WATANABE
IVAN K. NAKATSUKA, P.E.

TRAFFIC IMPACT ASSESSMENT REPORT

LANAI CITY AFFORDABLE HOUSING

Lanai City, Lanai, Hawaii

I. INTRODUCTION

This report documents the findings of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. (ATA) to evaluate the potential traffic impacts resulting from the proposed Lanai City Affordable Housing Project a single-family and multi-family development. Hereinafter, the Lanai City Affordable Housing Project shall be referred to as the "Project".

A. Location

The Project is situated on approximately 73 acres of vacant land on the west side of Lanai City, Lanai, which is more specifically identified as TMK: (2) 4-9-002:058. The Project will occupy 65 acres of the parcel, while the remainder of the parcel will be subdivided out and dedicated to the State of Hawaii Department of Education. The proposed Project site is located west of Fraser Avenue and north of the Lanai High/Elementary School. Figure 1 shows the location of the Project.

B. Project Description

The Project proposes to construct 239 single-family units and two (2) multi-family lots containing a total of 173 units.

For the purpose of this study, it is assumed that the Project will be constructed in two (2) phases as shown in Figure 2. Phase I of the Project is anticipated to be completed in the Year 2017 and will include the extension of 5th

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OFFICES IN:
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WAILUKU, MAUI, HAWAII
HILO, HAWAII

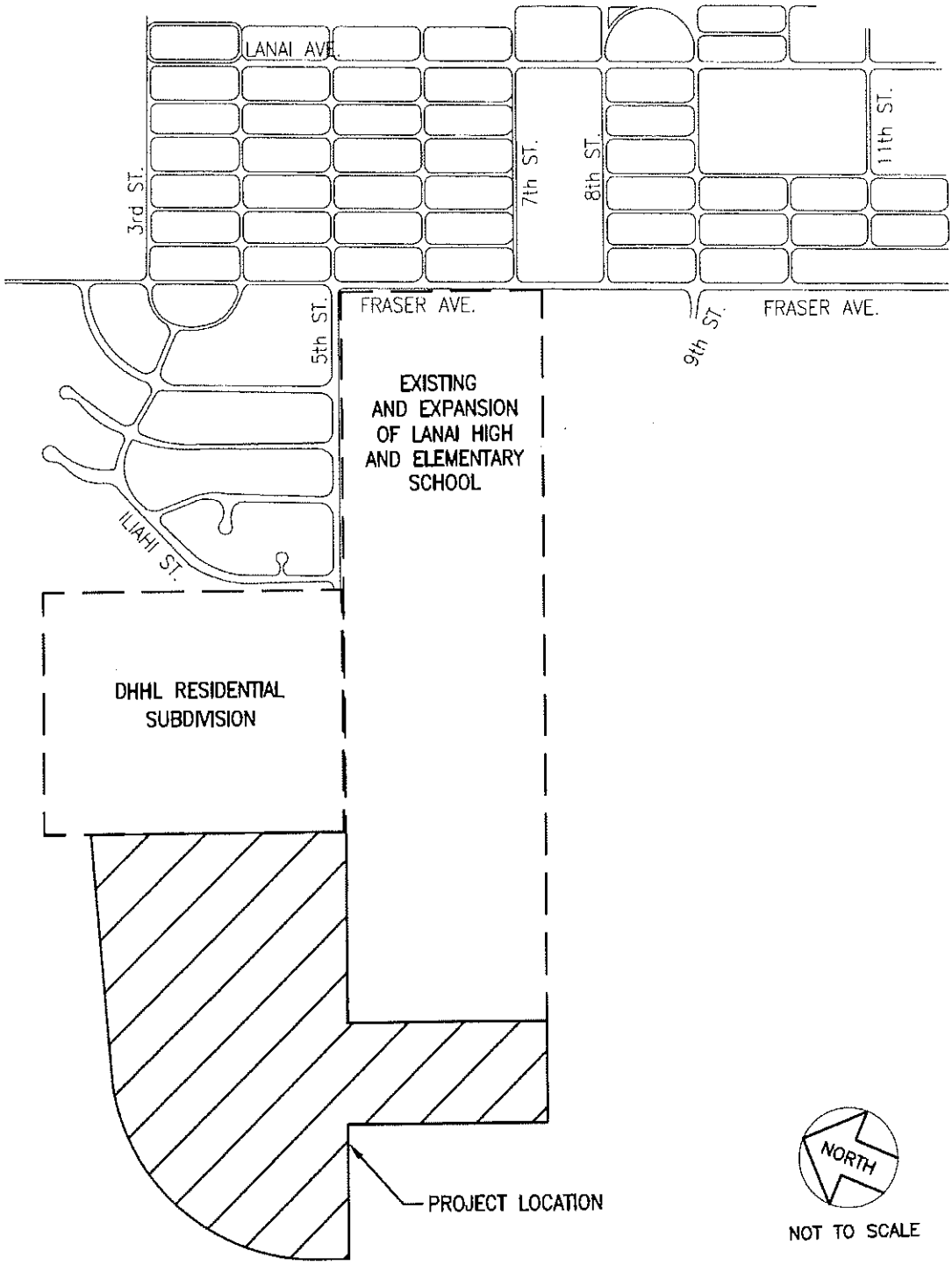
Street and other supporting streets within the development. A total of 58 single-family units and 23 multi-family units will be constructed as part of Phase I. Phase II of the Project is anticipated to be completed by the Year 2026 which will include further extension of 5th Street, and additional support streets within the development. Phase II will include 181 single family units and 150 multi-family units.

At the completion of the Project, there will be four (4) proposed access points to the Project site. The primary Project access points will all be from 5th Street. An additional access to the Project via a proposed by-pass road with a connection to 9th Street, however, will not be implemented with the Project. See Figure 2 for the Project site plan.

C. Study Methodology

This study will address the following:

1. Existing traffic operating conditions at key locations within the study area.
2. Traffic Projections for Base Year 2017 and 2026 (without the Project) includes traffic generated by a defacto growth rate and the other known developments in the vicinity of the Project that are currently under construction as well as new/future developments that are expected to affect traffic demand and operations within the study area.
3. Identification of potential traffic mitigation measures for the Base Year 2017 and 2026 Traffic.
4. Trip generation and trip generation for the proposed Project.
5. Determination of the impact of Project-generated traffic.
6. Recommendations for roadway improvements or other mitigative measures, as appropriate, to reduce or eliminate the adverse impacts resulting from traffic generated by the Project.

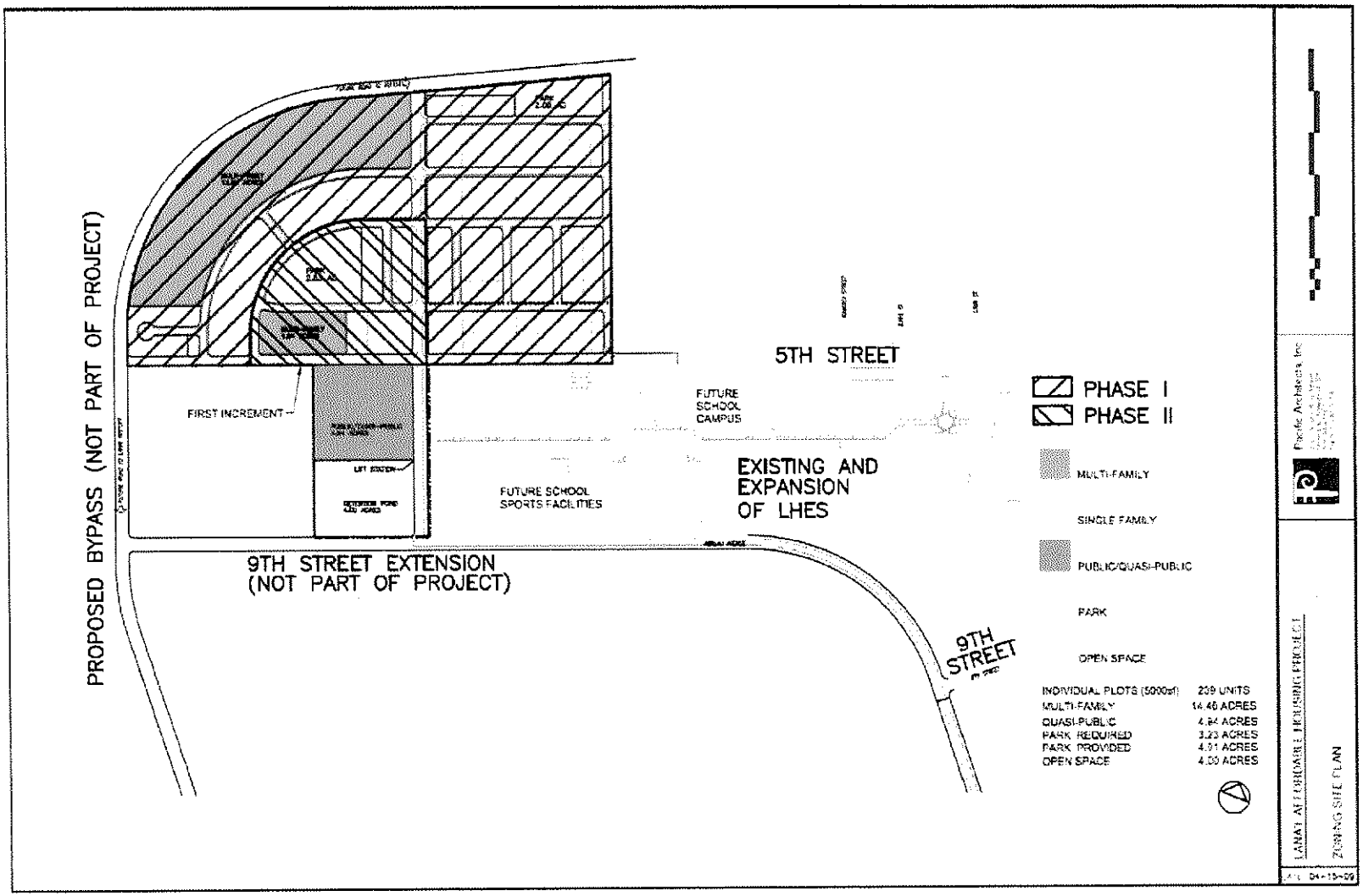


LANAI AFFORDABLE HOUSING

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

PROJECT LOCATION

FIGURE 1



LANAI AFFORDABLE HOUSING

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
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FIGURE 2

SITE PLAN

II. EXISTING CONDITIONS

A. Roadway System

The following are brief descriptions of the existing roadway network in the vicinity of the Project:

5th Street is a two-lane, east-west, County roadway located on the north side of Lanai City. 5th Street is a half mile long road that begins at Alapa Street on the east side of Lanai City and terminating at Iliahi Street on the west side of Lanai City. 5th Street is a connector road that provides a link between the two (2) major north-south roads (Lanai Avenue and Fraser Avenue). Lanai City, Lanai High & Elementary School (LHES), is located at the southwest corner of the 5th Street/Fraser Avenue, and 5th Street also has various residential housing units and intersects various subdivision streets along its length. 5th Street will be extended west past Iliahi Street to provide access to the Project. The posted speed limit on 5th Street is 25 mph. All intersections along 5th Street except Fraser Avenue and Lanai Avenue are two-way stop-controlled intersections with the intersecting street being the stop-controlled approach. The 5th Street/Fraser Avenue and the 5th Street/Lanai Avenue Intersections are two-way stop-controlled intersections with 5th Street being stop-controlled approach.

Fraser Avenue is a two-lane, primary north-south, County roadway located on the west side of Lanai City. Fraser Avenue generally serves traffic traveling from the north side of Lanai City to the south side of Lanai City and Kaumalapau Highway providing access to various residential homes, County buildings, parks and LHES. The posted speed limit on Fraser Street is 25 mph. All intersections along Fraser Avenue are two-way stop-controlled intersections with the intersecting street being the stop-controlled approach, with the exception of its intersection with Kaumalapau Highway in which Fraser Avenue is the stop-controlled approach.

Lanai Avenue is a two-lane, primary north-south, County roadway located on the east side of Lanai City. Lanai Avenue generally serves traffic traveling from the north side of Lanai City and/or the Lodge at Koele to the south side of Lanai City and to Kaumalapau Highway providing access to two (2) hotels, a City park, as well as various residential homes and commercial businesses. The

posted speed limit on Lanai Avenue is 25 mph. All intersections along Lanai Avenue are two-way stop-controlled intersections with the intersecting street being the stop-controlled approach, with the exception of its intersection with Kaumalapau Highway in which Lanai Avenue is the stop-controlled approach.

Figure 3 shows the existing lane configuration at the study intersections.

B. Existing Traffic Volumes

The hourly turning movement data utilized in this report were collected on Tuesday, September 23, 2008.

Based on the proximity to the Project site, the following intersections were studied:

- Fraser Avenue/5th Street (Unsignalized)
- Lanai Avenue/5th Street (Unsignalized)

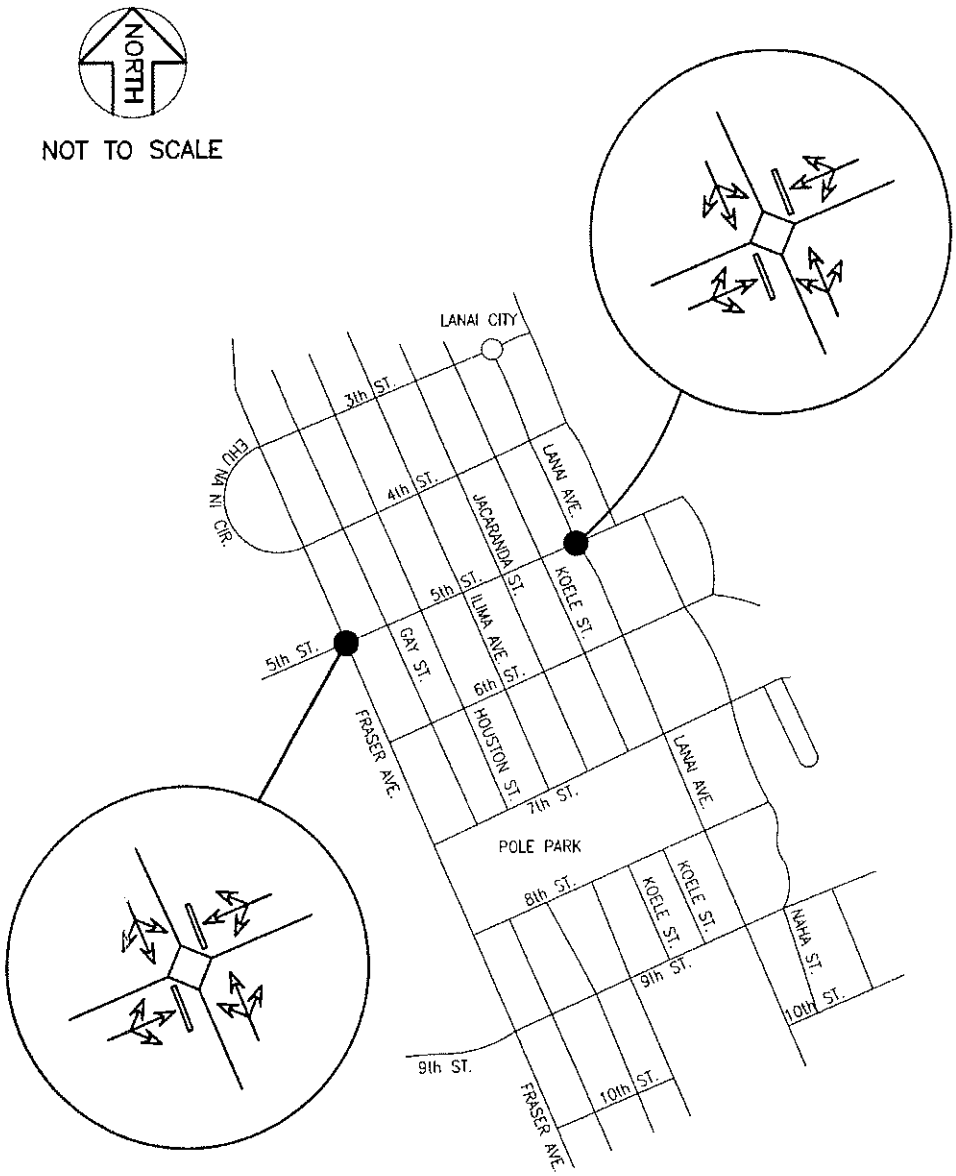
Based on traffic count data, the peak hours of traffic of traffic were determined to be from 7:15 AM to 8:15 AM and 2:45 PM to 3:45 PM on the weekdays. The traffic count data is provided in Appendix A.

C. Existing Traffic Conditions Analysis and Observations

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual – Special Report 209 (HCM), dated 2000, methods for calculating volume to capacity ratios, delays and corresponding Levels of Service were utilized in this study. LOS definitions for signalized intersections are provided in Appendix B.

Methodology

Analyses for the Project intersections were performed using the traffic analysis software Synchro, which is able to prepare Highway Capacity Manual (HCM) reports. The reports contain quantitative delay results, as based on intersection lane geometry, signal timing, and hourly traffic volume.



LEGEND:

◇ – UNSIGNALIZED INTERSECTION

– LANE CONFIGURATION

– STOP-CONTROLLED APPROACH

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 3
	EXISTING LANE CONFIGURATION	

Field Observations

During the AM peak hour of traffic, queuing of traffic was observed to be minimal at the Fraser Avenue/5th Street Intersection and any queuing in excess of two (2) or three (3) cars was the result of vehicles waiting on pedestrians crossing the street. Pedestrians at this period of the day were generally observed to be school children and their parents walking to school. One (1) to two (2) vehicles queuing resulting from commuters traveling to work was observed to be minimal.

The LHES school parking and student drop off driveway is located off of Fraser Street approximately 150 feet south of its intersection with 5th Street. During the AM peak hour of traffic, it was observed that approximately four (4) to five (5) vehicles occasionally queued in the southbound direction on Fraser Avenue at the LHES driveway.

During the PM peak hour of traffic, opposite of the AM peak hour of traffic, it was observed that approximately three (3) to four (4) vehicles occasionally queued in the northbound direction on Fraser Avenue at the LHES driveway. Queues are caused by pedestrian traffic accessing LHES.

Results of Intersection Analysis

The analysis and observations described below are based on prevailing conditions during the time at which the data was collected. Hereinafter, observations that are expressed as ongoing and current shall represent the conditions that prevailed at the time at which the data was collected.

Fraser Avenue/5th Street Intersection

The Fraser Avenue/5th Street Intersection operates at LOS B on the westbound stop-controlled approach during the AM and PM peak hour of traffic. All other movements at this intersection operate at LOS A during the AM and PM peak hours of traffic.

Lanai Avenue/5th Street Intersection

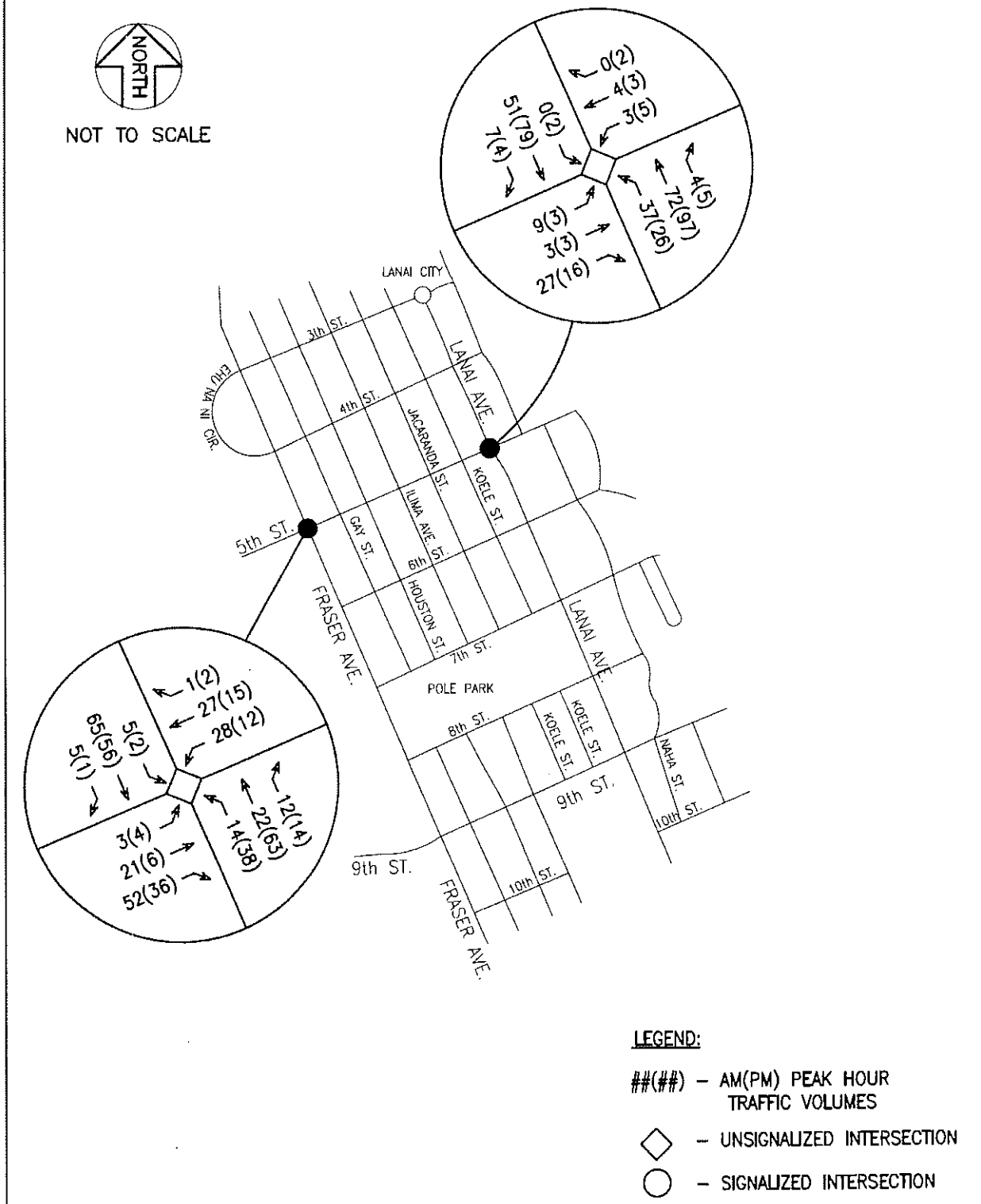
The Lanai Avenue/5th Street intersection operates at LOS B on the westbound stop-controlled approach during the AM and PM peak hours of traffic.

All other movements at this intersection operate at LOS A during the AM and PM peak hours of traffic.

Figure 4 shows the existing traffic volumes and Table 1 shows the level-of-service summary table.

Table 1: LOS for Existing Conditions

	AM Peak Hour of Traffic			PM Peak Hour of Traffic		
	delay	LOS	v/c ratio	delay	LOS	v/c ratio
Fraser Avenue/5th Street						
EB LT/TH/RT	9.5	A	0.09	9.2	A	0.06
WB LT/TH/RT	10.6	B	0.09	10.7	B	0.05
Lanai Avenue/5th Street						
EB LT/TH/RT	9.3	A	0.05	9.3	A	0.03
WB LT/TH/RT	10.5	B	0.01	10.3	B	0.02



LEGEND:

##(##) – AM(PM) PEAK HOUR TRAFFIC VOLUMES

◇ – UNSIGNALIZED INTERSECTION

○ – SIGNALIZED INTERSECTION

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 4
	EXISTING TRAFFIC VOLUMES	

III. BASE YEAR SCENARIOS

The Year 2017 and 2026 were selected as the Base Years to reflect the Project Phase I and Phase II projected completion years, respectively. Base Years 2017 and 2026 Projections were formulated by applying a defacto growth rate and adding the trip generation of other known developments, as described in the following sections.

A. Defacto Growth Rate

Traffic volumes obtained from the State Department of Transportation (SDOT) 24 hour traffic counts done in past years yielded a growth factor of 0.01 percent per year. Therefore, as a conservative estimate, a defacto growth rate of 0.5 percent per year was applied to the existing 2008 traffic volumes resulting in a defacto growth rate of 4.6 percent for Year 2017 and 9.4 percent for Year 2026 being applied to existing traffic volumes. In addition, traffic volumes generated by the other known developments that are expected to be completed and occupied by the Year 2017 and Year 2026 were utilized to estimate the Base Year 2017 and 2026 traffic volumes. The following section describes the other known developments.

B. Traffic Forecasts for Other Known Developments

Other known developments that are proposed to be completed by the Year 2017 and/or the Year 2026 are the Department of Hawaiian Homelands (DHHL) residential subdivision development and the LHES expansion. The following describes the other known developments:

- At the time this report was prepared, the DHHL residential subdivision development was in the early planning stages and assumed to be completed by Year 2017. Per conversations with DHHL, the DHHL subdivision Project will include approximately 125 single family lots, three (3) lots over 8 acres for Kapuna (elderly) housing and possibly a sewer pump station. The DHHL subdivision Project is adjacent and to the east of the Project. Proposed access to the DHHL subdivision Project is along 5th Street west of Fraser Street. Peak hour vehicular trips for were estimated by applying appropriate trip generation rates obtained from the Trip Generation, 8th Edition, published by the Institute of

Transportation Engineers (ITE) and trip distribution is determined utilizing the existing traffic volumes.

- In accordance with the Traffic Impact Report for the Proposed High & Elementary School, dated January 2009 and prepared by Wilson Okamoto Corporation, buildout of the LHES expansion Project will consist of the following:
  - Elementary school (320 students)
  - Middle school (170 students)
  - High school (210 students)
  - Preschool (40 students)
  - Community college (40 students)
  - New support facilities including administration buildings, library, cafeteria, auditorium, athletic fields and facilities, faculty housing, and parking areas.

  The LHES expansion will extend 5th Street along its boundaries and includes nine (9) new driveways and relocation of the Fraser Street driveway further south. It is anticipated that the LHES expansion will be completed by Year 2028. Trip generation and trip distribution for the LHES expansion project were obtained from the Traffic Impact Report for the Proposed High & Elementary School.

Table 2 shows the trip generation rates for the DHHL subdivision Project. Table 3 shows the peak hour trips generated by the DHHL subdivision Project and the LHES expansion.

Table 2: DHHL Subdivision Project Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak hour of Traffic		PM Peak hour of Traffic	
		Trips Rate	% Entering	Trip Rate	% Entering
DHHL Single Family Detached Housing (210)	Units	0.75	25%	1.01	63%
DHHL Residential Planned Unit Development (270)*	Acres	2.88	22%	4.05	65%

Table 3: Other Known Developments Land Uses and Trip Generation

		AM Peak hour of Traffic			PM Peak hour of Traffic		
Land Use (ITE Code)	Independent Variable	Enter (vph)	Exit (vph)	Total (vph)	Enter (vph)	Exit (vph)	Total (vph)
DHHL Single Family Detached Housing (210)	125 Units	25	74	99	81	48	129
DHHL Residential Planned Unit Development (270)*	8 Acres	3	9	12	17	8	25
LHES (From Wilson Okomoto Report)	140 Students	63	33	96	64	46	110

vph = vehicle per hour

A Residential Planned Unit Development land use type (ITE Code 270) was utilized to determine the number of trips generated for the proposed Kapuna housing since the number of units to be provided was unknown. A Senior Adult Housing land use type (ITE Code 252) would be more appropriate; however, data given is based on the number of dwelling units.

C. Planned Roadway Project

The Lanai City and Koele Village Master Plan does include the layout for a proposed by-pass road, however the timeframe on the actual need and construction for the bypass road is unknown.

D. Base Year 2017 (WITHOUT Project) Traffic and Analysis

The following are conditions of the study intersections due to the defacto growth rate and other known developments, and not due to the proposed Project.

Fraser Avenue/5th Street Intersection

The Fraser Avenue/5th Street intersection will continue to operate at LOS B or better during both the AM and PM peak hours of traffic.

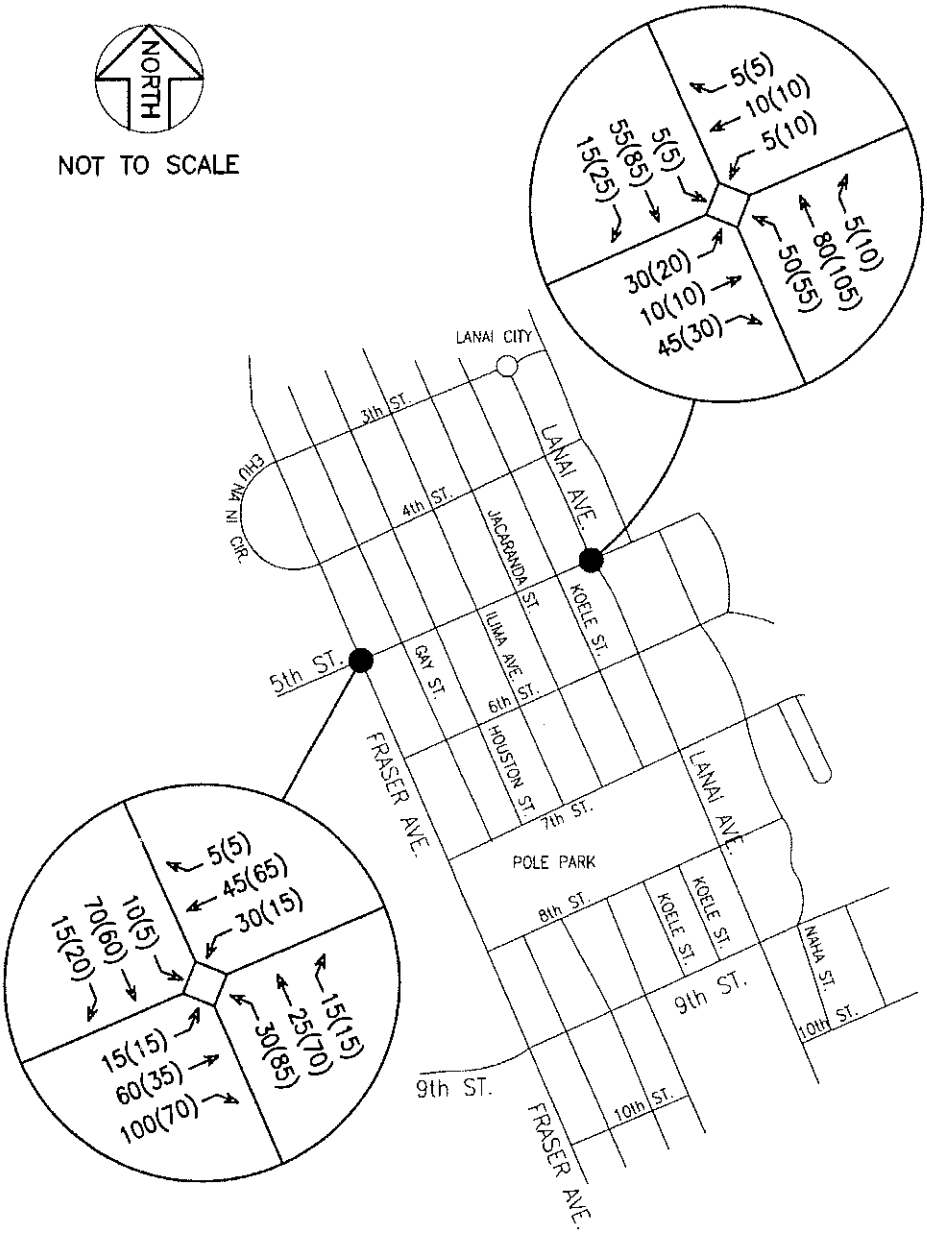
Lanai Avenue/5th Street Intersection

The Lanai Avenue/5th Street intersection will continue to operate at LOS B or better during both the AM and PM peak hours of traffic.

Table 4 shows the level-of-service for Base Year 2017 and Figure 5 shows the projected traffic volumes for Year 2017.

Table 4: LOS for Base Year 2017 without Project

	AM Peak Hour of Traffic			PM Peak Hour of Traffic		
	delay	LOS	v/c ratio	delay	LOS	v/c ratio
Fraser Avenue/5th Street						
EB LT/TH/RT	10.8	B	0.23	11.2	B	0.18
WB LT/TH/RT	12.1	B	0.15	13.4	B	0.18
Lanai Avenue/5th Street						
EB LT/TH/RT	10.2	B	0.12	10.7	B	0.09
WB LT/TH/RT	10.7	B	0.03	11.5	B	0.05



LEGEND:

##(##) – AM(PM) PEAK HOUR TRAFFIC VOLUMES

◇ – UNSIGNALIZED INTERSECTION

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	BASE YEAR 2017 TRAFFIC VOLUMES	5

E. Base Year 2026 (WITHOUT Project) Traffic and Analysis

The following are conditions of the study intersections due to the defacto growth rate and other known developments, and not due to the proposed Project.

Fraser Avenue/5th Street

The Fraser Avenue/5th Street intersection will operate at LOS C or better during the AM and PM peak hours of traffic. Fraser Avenue will continue to operate as free flowing roadway.

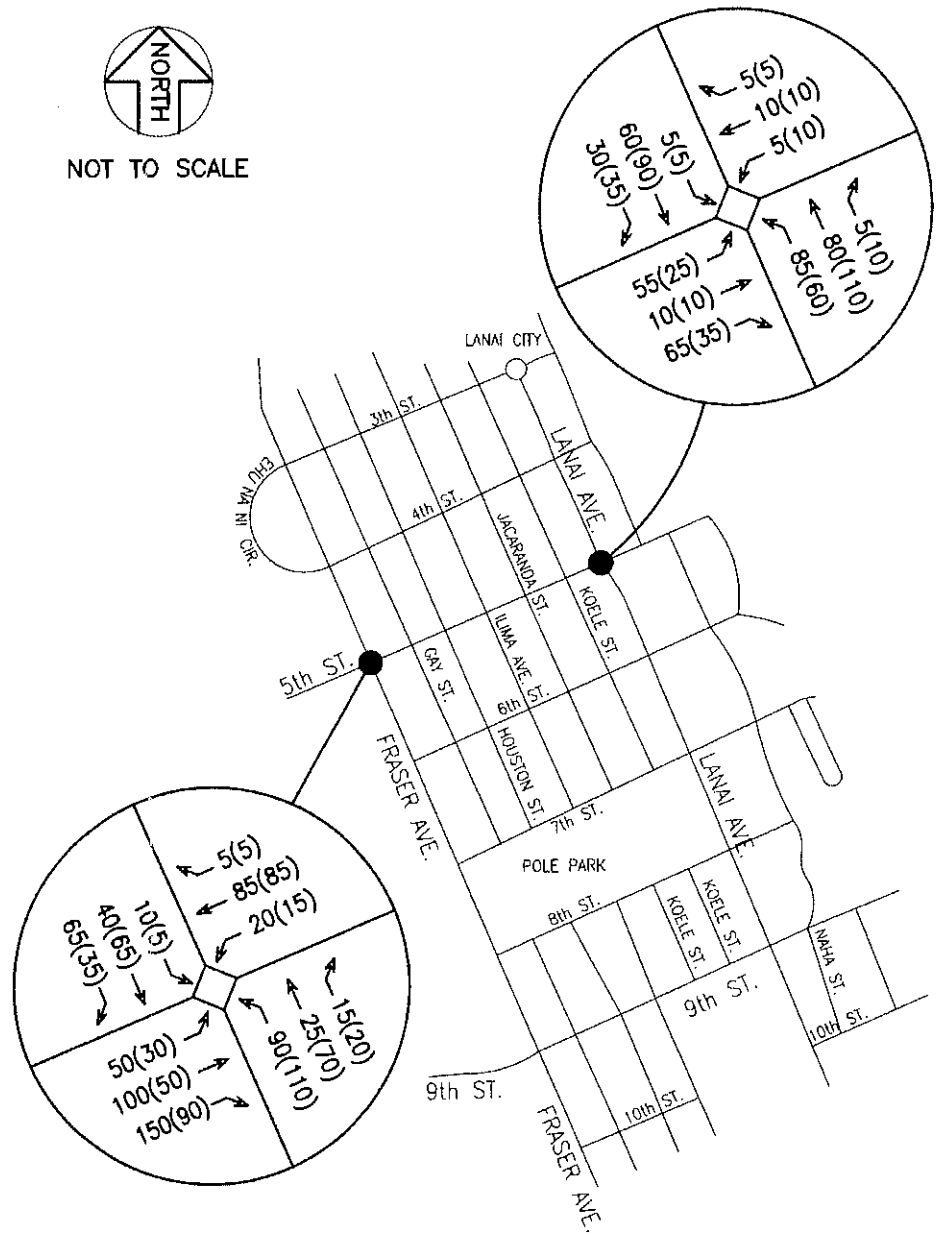
Lanai Avenue/5th Street

The Lanai Avenue/5th Street intersection will continue to operate at LOS B or better during the AM and PM peak hours of traffic. Lanai Avenue will continue to operate as free flowing roadway.

Table 5 shows the LOS for Base Year 2026 and Figure 6 shows the traffic volumes and level of service for Year 2026.

Table 5: LOS for Base Year 2026 Without Project

	AM Peak Hour of Traffic			PM Peak Hour of Traffic		
	delay	LOS	v/c ratio	delay	LOS	v/c ratio
Fraser Avenue/5th Street						
EB LT/TH/RT	15.2	C	0.48	13.3	B	0.30
WB LT/TH/RT	15.3	C	0.26	15.6	C	0.25
Lanai Avenue/5th Street						
EB LT/TH/RT	11.5	B	0.20	11.0	B	0.11
WB LT/TH/RT	11.7	B	0.04	11.9	B	0.05



LEGEND:

##(##) – AM(PM) PEAK HOUR TRAFFIC VOLUMES

◇ – UNSIGNALIZED INTERSECTION

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 6
	BASE YEAR 2026 TRAFFIC VOLUMES	

IV. PROJECT GENERATED TRAFFIC

A. Trip Generation

Trip generation estimates the total number of trips produced by a given land use. Trip rates contained in the nationally published ITE, Trip Generation, 8th Edition were used to estimate the number of trips generated by the Project. Table 6 shows these trip rate formulas used and Table 7 shows the number of peak hour trips that are expected to be generated by the Project.

Table 6: Project Trip Generation Rates

Land Use (ITE Code)	Independent Variable	AM Peak Hour of Traffic		PM Peak Hour of Traffic	
		Trips Rate	% Entering	Trip Rate	% Entering
Single Family Detached Housing (210)	Units	a	25%	b	63%
Residential Condo/Townhouse (230)	Units	c	17%	d	67%

a: T = 0.70(X) + 9.74
b: Ln(T) = 0.90 Ln(X) + 0.51
c: Ln(T) = 0.80 Ln(X) + 0.26
d: Ln(T) = 0.82 Ln(X) + 0.32

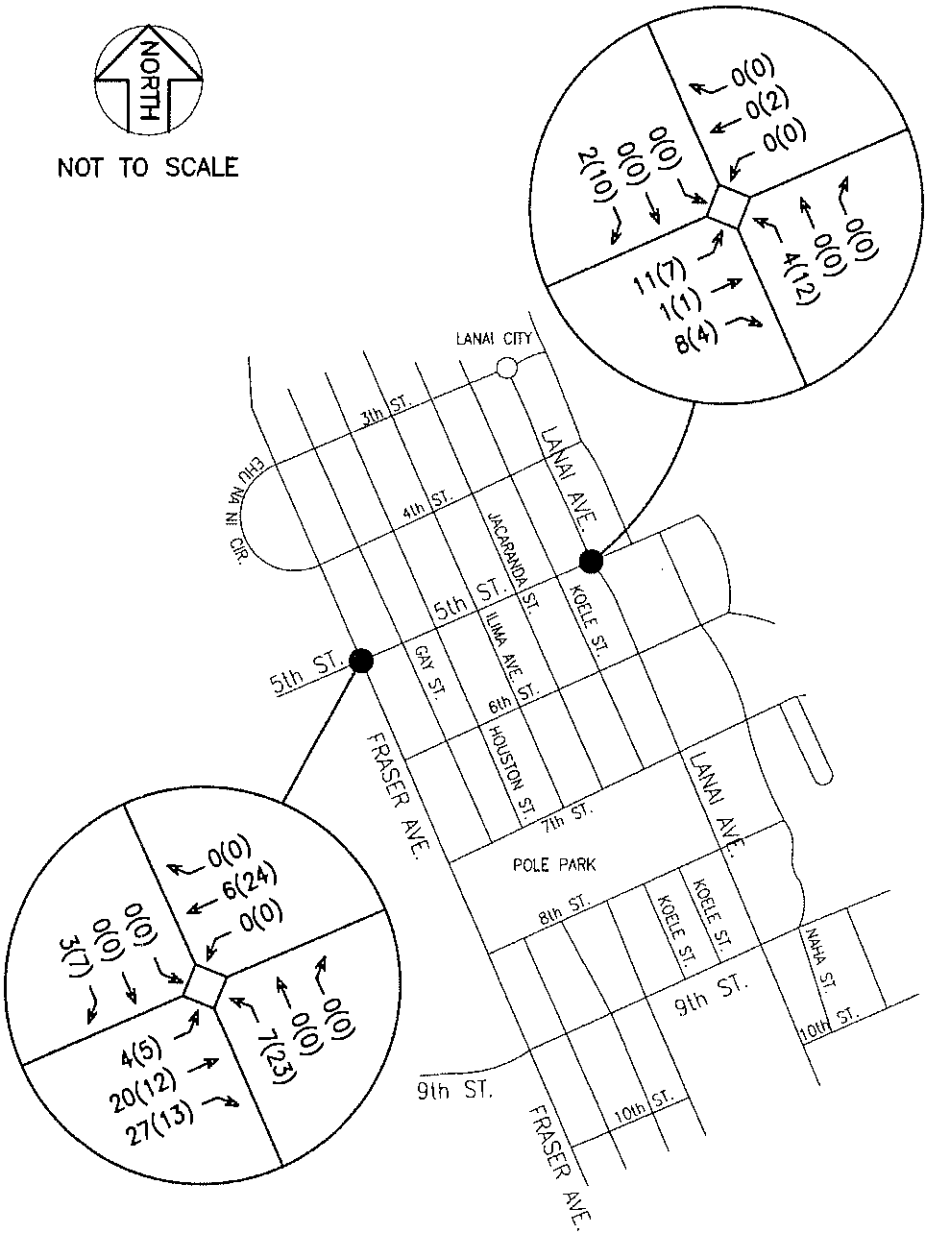
Table 7: Project Land Use and Trip Generation

			AM Peak Hour of Traffic			PM Peak Hour of Traffic		
	Land Use (ITE Code)	Independent Variable	Enter (vph)	Exit (vph)	Total	Enter (vph)	Exit (vph)	Total
YEAR 2017	Single Family Detached Housing (210)	58 Units	13	38	51	41	24	65
	Residential Condo/Townhouse (230)	23 Units	3	13	16	13	6	19
	Phase I Total		*26*	*52*	*78*	*54*	*30*	*84*
YEAR 2026	Single Family Detached Housing (210)	239 Units	45	134	179	146	85	231
	Residential Condo/Townhouse (230)	173 Units	14	67	81	64	31	95
	Phase I and II Total		*59*	*201*	*260*	*210*	*116*	*326*

vph = vehicle per hour

B. Trip Distribution

The Project generated trips were distributed based on the location of the Project and the existing traffic volumes. Due to the proposed location of the entrances of the Project along 5th Street, 100 percent of the project generated trips are anticipated to utilize the Fraser Avenue/5th Street Intersection. Figure 7 shows the Project generated traffic with Phase I of the Project and Figure 8 shows the Project generated traffic with Phase I and Phase II of the Project.

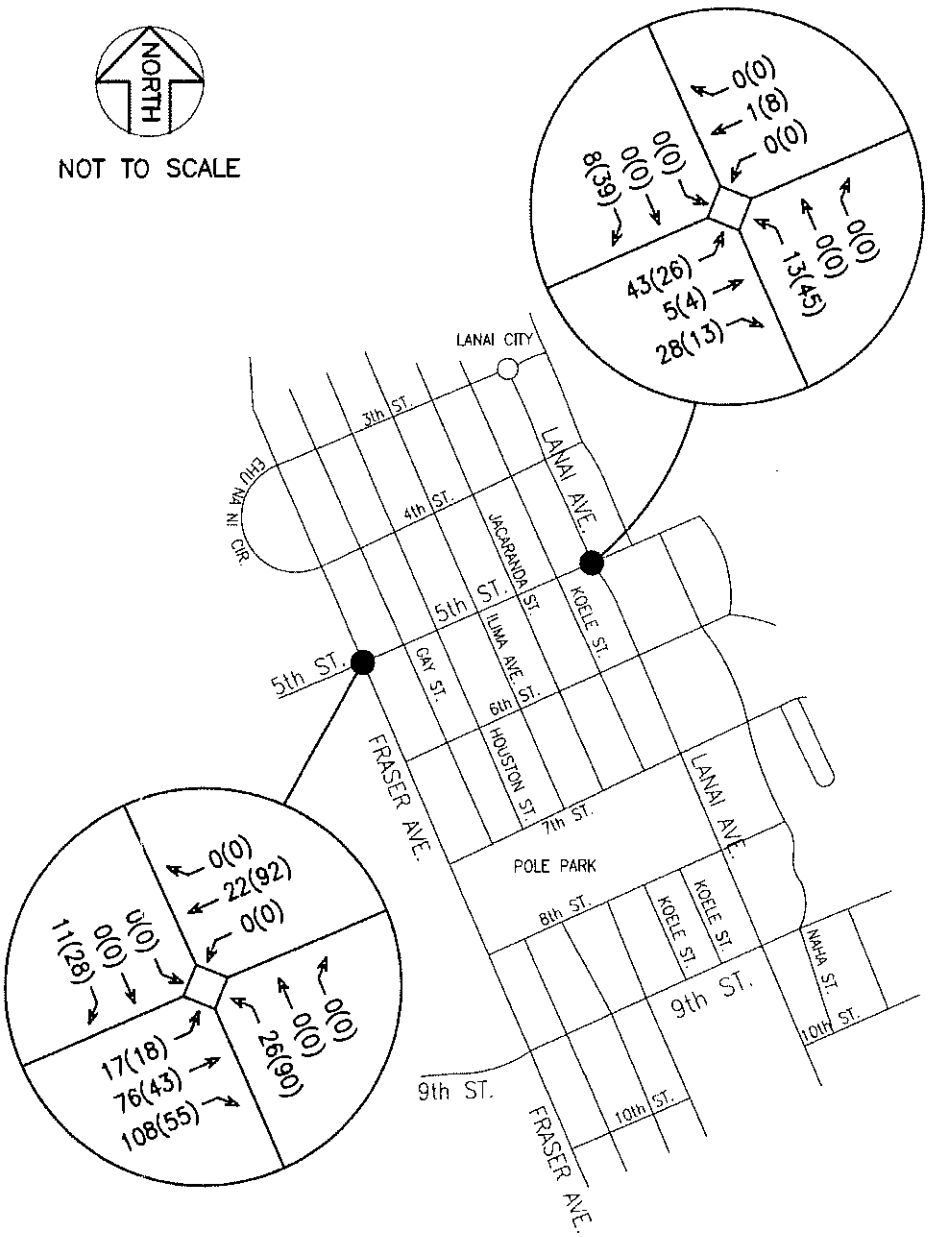


LEGEND:

##(##) – AM(PM) PEAK HOUR TRAFFIC VOLUMES

◇ – UNSIGNALIZED INTERSECTION

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	PHASE I PROJECT GENERATED TRAFFIC	7



LEGEND:

##(##) – AM(PM) PEAK HOUR TRAFFIC VOLUMES

◇ – UNSIGNALIZED INTERSECTION

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII PHASE I AND II PROJECT GENERATED PROJECT	FIGURE 8

C. Future Year 2017 (WITH Project) Traffic and Analysis

Traffic generated by the Project was added to the Base Year 2017 traffic volumes to estimate traffic volumes for the Year 2017 with the Project.

Fraser Avenue/5th Street Intersection

The westbound approach to the Fraser Avenue/5th Street Intersection operates at LOS B during the AM peak hour of traffic and LOS C during the PM peak hour of traffic. All other movements operate at LOS B or better during the AM and PM peak hours of traffic.

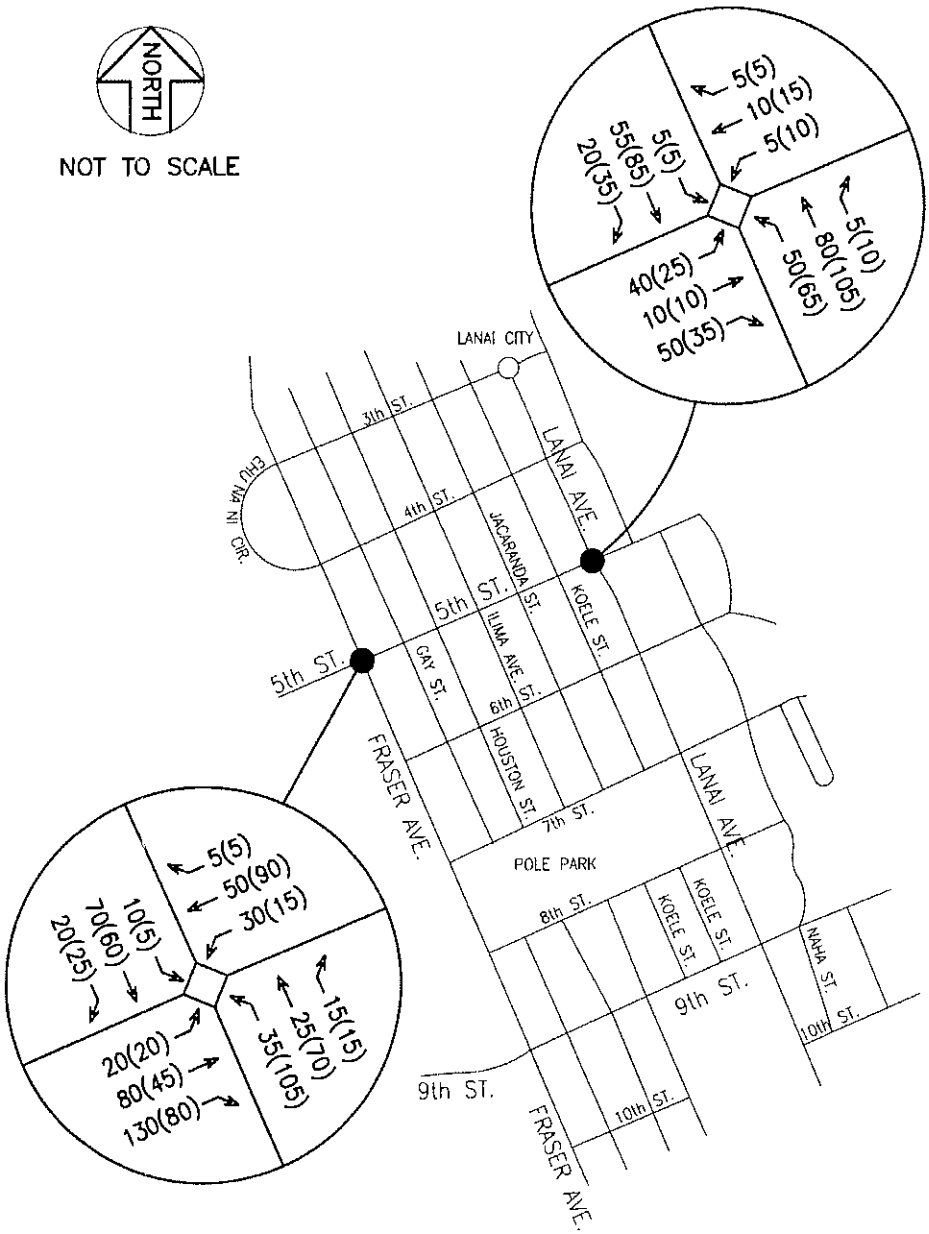
Lanai Avenue/5th Street Intersection

All approaches from 5th Street to Lanai Avenue will continue to operate at LOS B during both the AM and PM peak hours of traffic.

Figure 9 shows the Future Year 2017 traffic volumes with the Project and Table 8 show the level-of-service with the Project.

Table 8: LOS for Future Year 2017 with Project

	AM Peak Hour of Traffic			PM Peak Hour of Traffic		
	delay	LOS	v/c ratio	delay	LOS	v/c ratio
Fraser Avenue/5th Street						
EB LT/TH/RT	11.6	B	0.31	12.3	B	0.24
WB LT/TH/RT	12.8	B	0.17	15.1	C	0.25
Lanai Avenue/5th Street						
EB LT/TH/RT	10.5	B	0.14	11.0	B	0.11
WB LT/TH/RT	10.8	B	0.03	12.1	B	0.06



LEGEND:

##(##) – AM(PM) PEAK HOUR TRAFFIC VOLUMES

◇ – UNSIGNALIZED INTERSECTION

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 9
	FUTURE YEAR 2017 TRAFFIC VOLUMES	

D. Future Year 2026 (WITH Project) Traffic and Analysis

Traffic generated by the Project was added to the Base Year 2026 traffic volumes to estimate traffic volumes for the Year 2026 with the Project.

Fraser Avenue/5th Street Intersection

As a result of the growth factor, the DHHL subdivision project, the proposed expansion of LHES, and the Project, an approximate 260 percent increase in traffic volumes are projected during the AM and PM peak hours of traffic at the Fraser Avenue/5th Street intersection. With the significant increase in traffic volumes, the 5th Street eastbound and westbound approaches to Fraser Avenue will operate at LOS E during the AM and PM peak hours of traffic. All other movements will operate at LOS C or better during both the AM and PM peak hours of traffic.

Due to the high volume on the eastbound right-turn movement (260 vehicles and 145 vehicles during the AM and PM peak hours of traffic, respectively), restriping the eastbound approach to provide a shared eastbound left-turn/through lane and an exclusive right-turn lane will allow the intersection to operate at LOS C or better during the AM peak hour of traffic. However, during the PM peak hour of traffic the eastbound left-turn/through and westbound approach will continue to operate at LOS E.

To mitigate the LOS E conditions, an all-way stop-control at the Fraser Avenue/5th Street intersection is studied. Per the Manual on Uniform Traffic Control Devices (MUTCD), an all-way stop-control is warranted when the total vehicular volume from the major street approach averages 300 vehicles per hour for any eight (8) hours of an average day and the total vehicular, pedestrian, bicycle volume from the minor street approach averages 200 vehicles per hour for the same eight (8) hours. The AM and PM peak hour of traffic projected volumes exceed the major street vehicular volume requirement of 300 vehicles per hour and the minor street vehicular volume requirement of 200 vehicles per hour. Therefore, an all-way stop-control at the intersection may be warranted, however, a warrant study should be performed to study the eight (8) hour

vehicular volumes at the appropriate time. As an all-way stop-control and restriped eastbound approach (shared left-turn/through lane and an exclusive right-turn lane) the intersection will operate at LOS C or better during the AM and PM peak hours of traffic.

Alternatively, since the other known development's and the Project's access is proposed off of 5th Street, trips generated from these developments are concentrated at the Fraser Avenue/5th Street intersection, as mentioned in Section III.C., the Lanai Village and Koele Master Plan proposes a bypass road in which a second connection can be made at 9th Street. If the bypass road is constructed by Year 2026, a secondary connection would provide an alternate route and restriping of the eastbound approach and an all-way stop-control may not be needed.

Table 9 shows the LOS at the Fraser Avenue/5th Street intersection.

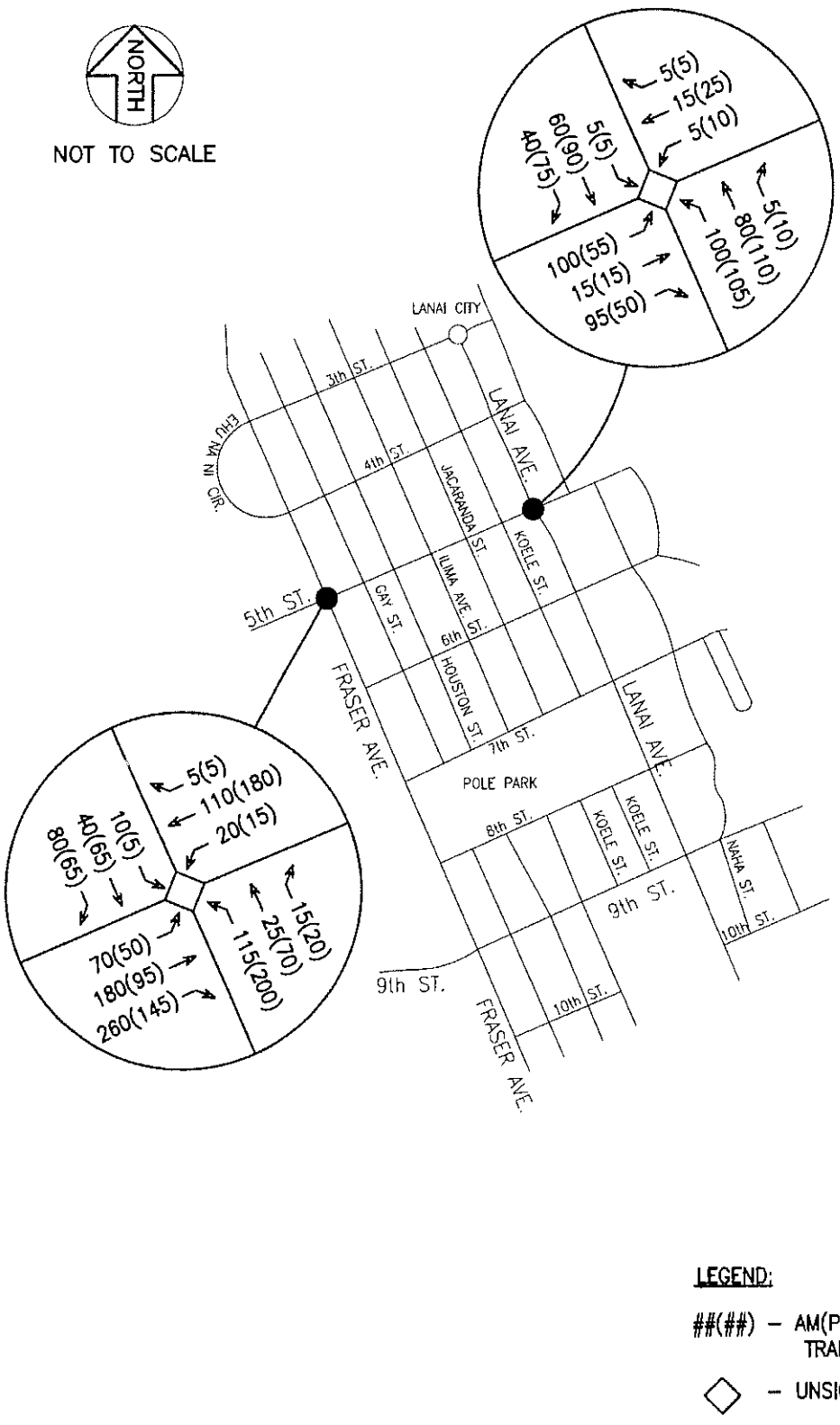
Lanai Avenue/5th Street

With the Project generated trips, the Lanai Avenue/5th Street intersection will operate at LOS C or better during both the AM and PM peak hours of traffic.

Table 9 shows the LOS with the Project and Figure 10 shows the Future Year 2026 traffic volumes with the Project.

Table 9: LOS for Future Year 2026 with Project

	AM Peak Hour of Traffic			PM Peak Hour of Traffic		
	delay	LOS	v/c ratio	delay	LOS	v/c ratio
WITHOUT MITIGATION						
Fraser Avenue/5th Street						
EB LT/TH/RT	40.5	E	0.89	49.0	E	0.84
WB LT/TH/RT	22.1	C	0.41	43.0	E	0.72
Lanai Avenue/5th Street						
EB LT/TH/RT	13.8	B	0.36	13.8	B	0.24
WB LT/TH/RT	12.5	B	0.05	14.2	B	0.09
WITH RESTRIPED EASTBOUND APPROACH						
Fraser Avenue/5th Street						
EB LT/TH	24.3	C	0.60	47.5	E	0.68
EB RT	10.2	B	0.29	9.6	A	0.17
WB LT/TH/RT	22.1	C	0.41	43.0	E	0.72
WITH ALL-WAY STOP-CONTROL						
Fraser Avenue/5th Street						
EB LT/TH	12.0	B	-	10.8	B	-
EB RT	9.9	A	-	9.1	A	-
WB LT/TH/RT	10.4	B	-	12.3	B	-
NB LT/TH/RT	11.1	B	-	14.5	B	-
SB LT/TH/RT	10.1	B	-	10.5	B	-



LEGEND:

##(##) – AM(PM) PEAK HOUR TRAFFIC VOLUMES

◇ – UNSIGNALIZED INTERSECTION

LANAI AFFORDABLE HOUSING	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE
	FUTURE YEAR 2026 TRAFFIC VOLUMES	10

V. SUMMARY AND RECOMMENDATIONS

A. Summary

Currently, the Fraser Avenue/5th Street and Lanai Avenue/5th Street intersections vehicles experience minimal delays at the stop controlled approaches. As the population of Lanai continues to grow and housing opportunities increase, an increase in traffic volumes in Lanai City will gradually increase as a natural consequence of these factors. Buildout of the Project, Year 2026 will consist of 239 single family units and 173 multi-family units and is projected to generate approximately 260 trips during the AM peak hour of traffic and 326 trips during the PM peak hour of traffic. Access to the Project is proposed off of 5th Street.

As a result of the Project and other developments in the surrounding vicinity that also proposes access off of 5th Street, the Fraser Avenue/5th Street Intersection is projected to increase in traffic volumes approximately 260 percent during the AM and PM peak hours of traffic. With the projected increase in traffic volumes at the Fraser Avenue/5th Street intersection, analyses show that restriping the eastbound approach (providing a shared left-turn/through lane and an exclusive right-turn lane) will improve the intersection during the AM peak hour of traffic, but, minimally improve the intersection during the PM peak hour of traffic. As a result, an all-way stop-control was studied at the intersection and analyses show that the intersection operates at LOS B or better during both the AM and PM peak hours of traffic. Per the MUTCD, an all-way stop-control is warranted utilizing data over an eight (8) hour period. In the case of the Fraser Avenue/5th Street intersection, the projected volumes during the AM and PM peak hours of traffic exceed the required minimum vehicular volumes to warrant an all-way stop-control. It is recommended that a warrant study should be done prior to installation of an all-way stop-control to verify that it is warranted at the Fraser Avenue/5th Street intersection at the appropriate time.

Alternatively, since the other known development's and the Project's access is proposed off of 5th Street, trips generated from these developments are concentrated at the Fraser Avenue/5th Street intersection, as mentioned in Section III.C., the Lanai Village and Koele Master Plan proposes a bypass road

in which a second connection can be made at 9th Street. If the bypass road is constructed by Year 2026, a secondary connection would provide an alternate route and restriping of the eastbound approach and an all-way stop-control may not be needed

B. Recommendations

The following are recommendations of the traffic study that would be needed by Year 2026:

- Restripe the Fraser Avenue/5th Street intersection eastbound approach to provide a shared left-turn/through lane and an exclusive right-turn lane.
- Perform an all-way stop-control warrant at the Fraser Avenue/5th Street intersection.

If the proposed bypass road providing an alternate route is constructed and a secondary connection is provided for the Project, DHHL subdivision project, and LHES, improvements to Fraser Avenue/5th Street intersection may not be needed.

REFERENCES

1. Institute of Transportation Engineers, Trip Generation, 7th Edition, 1997

2. Institute of Transportation Engineers, Trip Generation Handbook, and ITE Recommended Practice, 2001

3. Transportation Research Board, Highway Capacity Manual, 2000

4. Wilson Okamoto Corporation, Traffic Impact Report for Lanai High & Elementary School, January 2009.

APPENDICES

APPENDIX A

TRAFFIC COUNT DATA

Austin, Tsutsumi and Associates

501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
ph: 533-3646 Fax: 526-1267

File Name : Fraser - 5th AM
Site Code : 00000000
Start Date : 9/23/2008
Page No : 1

Groups Printed- Unshifted - Bank 1

	Fraser From North				5th From East				Fraser From South				5th From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
06:15	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
06:30	0	3	0	0	1	1	0	0	0	4	2	1	8	5	0	1	26
06:45	0	13	0	0	0	2	0	0	0	7	0	2	10	3	0	2	39
Total	0	16	0	0	1	3	0	1	0	12	2	3	18	8	0	3	67
07:00	0	10	1	3	0	3	3	0	0	3	3	6	10	2	1	8	53
07:15	0	8	3	2	1	0	6	3	2	4	1	19	11	3	0	13	76
07:30	2	25	1	0	0	6	6	0	3	5	3	25	19	2	1	18	116
07:45	1	22	1	0	0	14	10	0	4	9	6	23	13	9	1	13	126
Total	3	65	6	5	1	23	25	3	9	21	13	73	53	16	3	52	371
08:00	2	10	0	0	0	7	6	0	3	4	4	13	9	7	1	6	72
Grand Total	5	91	6	5	2	33	31	4	12	37	19	89	80	31	4	61	510
Apprch %	4.7	65	5.6	4.7	2.9	47.1	44.3	5.7	7.6	23.6	12.1	56.7	45.5	17.6	2.3	34.7	
Total %	1	17.8	1.2	1	0.4	6.5	6.1	0.8	2.4	7.3	3.7	17.5	15.7	6.1	0.8	12	
Unshifted	5	91	6	5	2	33	31	4	12	37	19	89	80	31	4	61	510
% Unshifted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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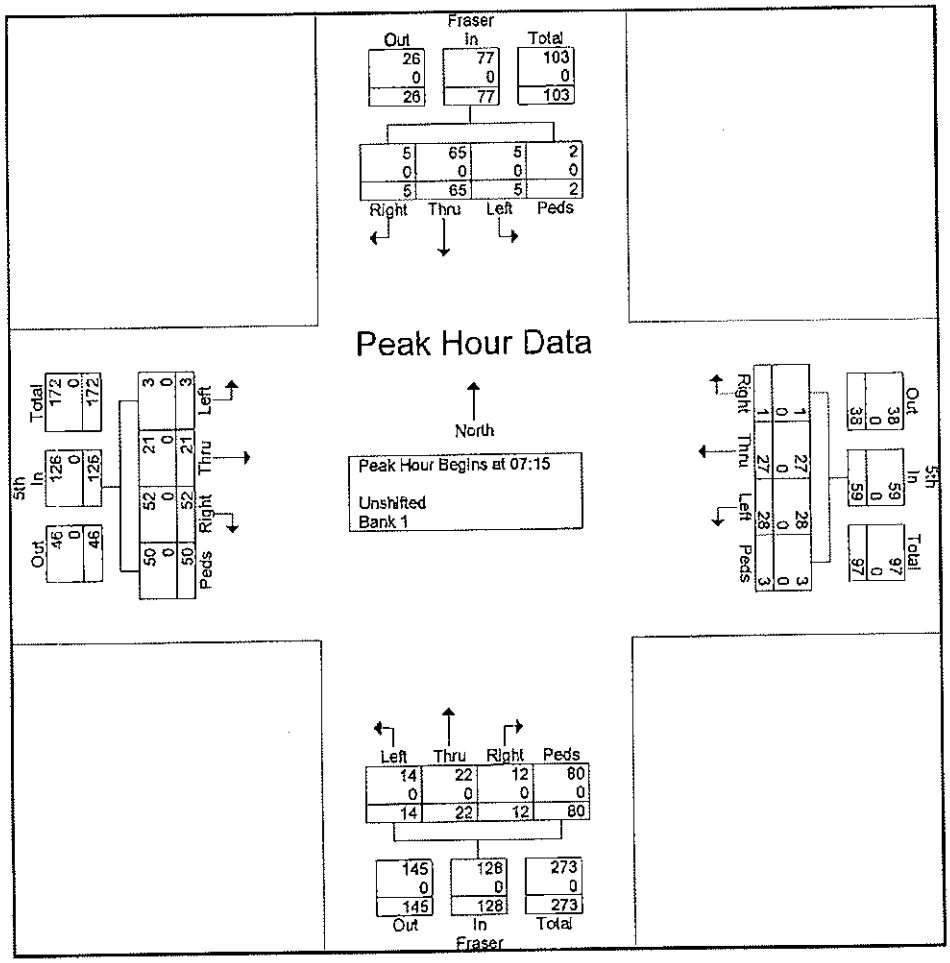
	Fraser From North					5th From East					Fraser From South					5th From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 to 08:00 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	0	8	3	2	13	1	0	6	3	10	2	4	1	19	26	11	3	0	13	27	76
07:30	2	25	1	0	28	0	6	6	0	12	3	5	3	25	36	19	2	1	18	40	116
07:45	1	22	1	0	24	0	14	10	0	24	4	9	6	23	42	13	9	1	13	36	126
08:00	2	10	0	0	12	0	7	6	0	13	3	4	4	13	24	9	7	1	6	23	72
Total Volume	5	65	5	2	77	1	27	28	3	59	12	22	14	80	128	52	21	3	50	126	390
% App. Total	6.5	84.4	6.5	2.6		1.7	45.8	47.5	5.1		9.4	17.2	10.9	62.5		41.3	16.7	2.4	39.7		
PHF	.625	.650	.417	.250	.688	.250	.482	.700	.250	.615	.750	.611	.583	.800	.762	.684	.583	.750	.694	.788	.774
Unshifted	5	65	5	2	77	1	27	28	3	59	12	22	14	80	128	52	21	3	50	126	390
% Unshifted																					
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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File Name : Lanai - 5th AM
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Groups Printed- Unshifted - Bank 1

	Lanai From North				5th From East				Lanai From South				5th From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
06:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2
06:30	0	13	0	0	1	0	2	0	0	5	1	0	3	0	1	0	26
06:45	0	16	0	0	0	0	2	2	0	10	2	0	4	0	1	0	37
Total	0	29	0	0	1	0	4	2	0	15	4	0	7	0	2	1	65
07:00	1	10	0	0	0	0	0	0	2	8	3	0	2	1	0	0	27
07:15	0	12	0	0	0	0	1	0	1	15	7	0	6	1	2	0	45
07:30	2	12	0	2	0	2	1	2	1	20	9	0	5	0	1	0	57
07:45	2	16	0	2	0	1	0	0	2	28	11	0	10	2	5	0	79
Total	5	50	0	4	0	3	2	2	6	71	30	0	23	4	8	0	208
08:00	3	11	0	0	0	1	1	0	0	9	10	2	6	0	1	0	44
Grand Total	8	90	0	4	1	4	7	4	6	95	44	2	36	4	11	1	317
Apprch %	7.8	88.2	0	3.9	6.2	25	43.8	25	4.1	64.6	29.9	1.4	69.2	7.7	21.2	1.9	
Total %	2.5	28.4	0	1.3	0.3	1.3	2.2	1.3	1.9	30	13.9	0.6	11.4	1.3	3.5	0.3	
Unshifted	8	90	0	4	1	4	7	4	6	95	44	2	36	4	11	1	317
% Unshifted	100	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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File Name : Lanai - 5th AM
Site Code : 00000000
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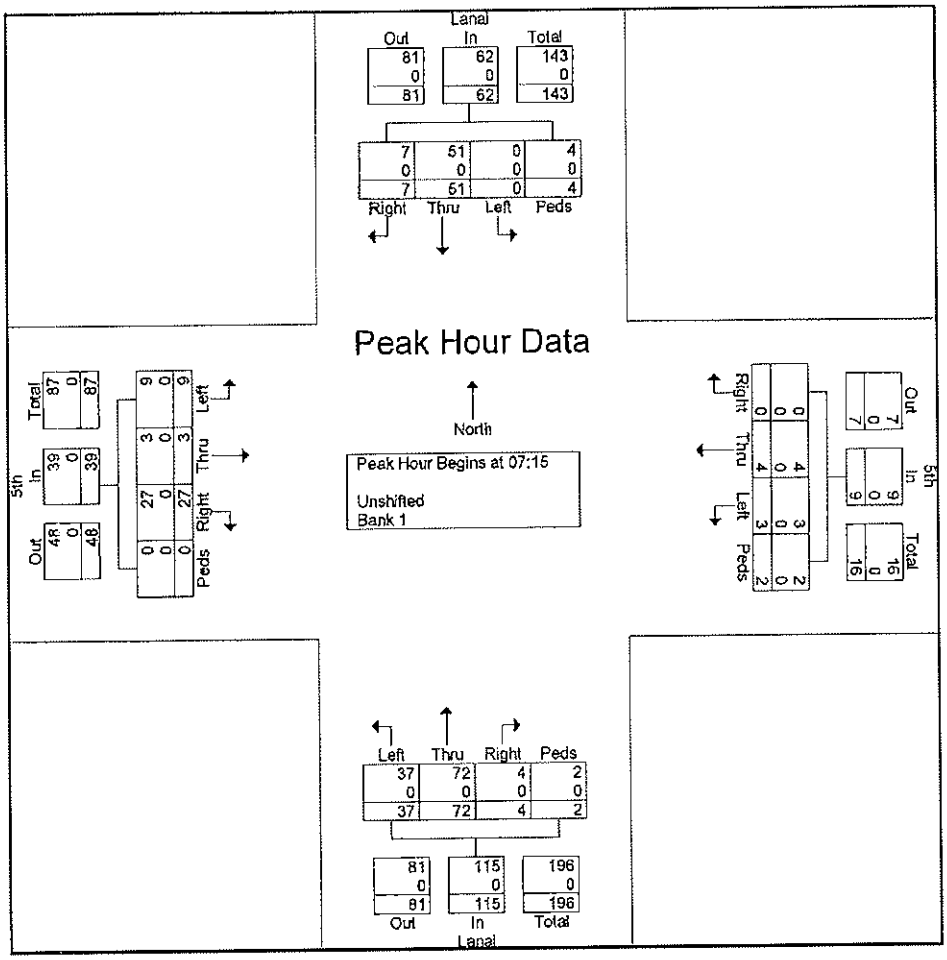
	Lanai From North					5th From East					Lanai From South					5th From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:15 to 08:00 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	0	12	0	0	12	0	0	1	0	1	1	15	7	0	23	6	1	2	0	9	45
07:30	2	12	0	2	16	0	2	1	2	5	1	20	9	0	30	5	0	1	0	6	57
07:45	2	16	0	2	20	0	1	0	0	1	2	28	11	0	41	10	2	5	0	17	79
08:00	3	11	0	0	14	0	1	1	0	2	0	9	10	2	21	6	0	1	0	7	44
Total Volume	7	51	0	4	62	0	4	3	2	9	4	72	37	2	115	27	3	9	0	39	225
% App. Total	11.3	82.3	0	6.5		0	44.4	33.3	22.2		3.5	62.6	32.2	1.7		69.2	7.7	23.1	0		
PHF	.583	.797	.000	.500	.775	.000	.500	.750	.250	.450	.500	.643	.841	.250	.701	.675	.375	.450	.000	.574	.712
Unshifted	7	51	0	4	62	0	4	3	2	9	4	72	37	2	115	27	3	9	0	39	225
% Unshifted																					
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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File Name : Fraser - 5th PM
Site Code : 00000000
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Groups Printed- Unshifted - Bank 1

	Fraser From North				5th From East				Fraser From South				5th From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
13:15	0	3	1	3	1	5	2	0	0	8	9	0	14	4	0	2	52
13:30	0	13	0	1	0	6	3	0	1	7	17	3	10	2	0	6	69
13:45	1	11	2	0	1	3	2	0	2	5	4	2	14	8	0	8	63
Total	1	27	3	4	2	14	7	0	3	20	30	5	38	14	0	16	184
14:00	1	10	0	1	1	4	5	0	3	14	5	17	12	1	1	21	96
14:15	0	11	0	0	0	4	1	0	2	20	5	7	8	2	2	10	72
14:30	1	14	0	0	0	5	1	0	3	19	10	0	10	1	0	3	67
14:45	0	14	0	0	0	2	4	0	5	16	11	3	13	1	1	5	75
Total	2	49	0	1	1	15	11	0	13	69	31	27	43	5	4	39	310
15:00	0	16	1	0	1	6	2	0	2	20	10	5	3	2	0	9	77
15:15	0	12	0	0	0	2	4	0	5	11	9	6	9	2	2	5	67
15:30	1	14	1	1	1	5	2	1	2	16	8	1	11	1	1	4	70
15:45	2	14	0	0	0	5	2	0	2	16	9	2	11	2	0	7	72
Total	3	56	2	1	2	18	10	1	11	63	36	14	34	7	3	25	286
16:00	1	15	0	2	0	4	2	1	2	19	21	1	8	0	1	4	81
16:15	0	11	1	0	1	4	1	0	2	18	9	2	9	2	2	0	62
Grand Total	7	158	6	8	6	55	31	2	31	189	127	49	132	28	10	84	923
Apprch %	3.9	88.3	3.4	4.5	6.4	58.5	33	2.1	7.8	47.7	32.1	12.4	52	11	3.9	33.1	
Total %	0.8	17.1	0.7	0.9	0.7	6	3.4	0.2	3.4	20.5	13.8	5.3	14.3	3	1.1	9.1	
Unshifted	7	158	6	8	6	55	31	2	31	189	127	49	132	28	10	84	923
% Unshifted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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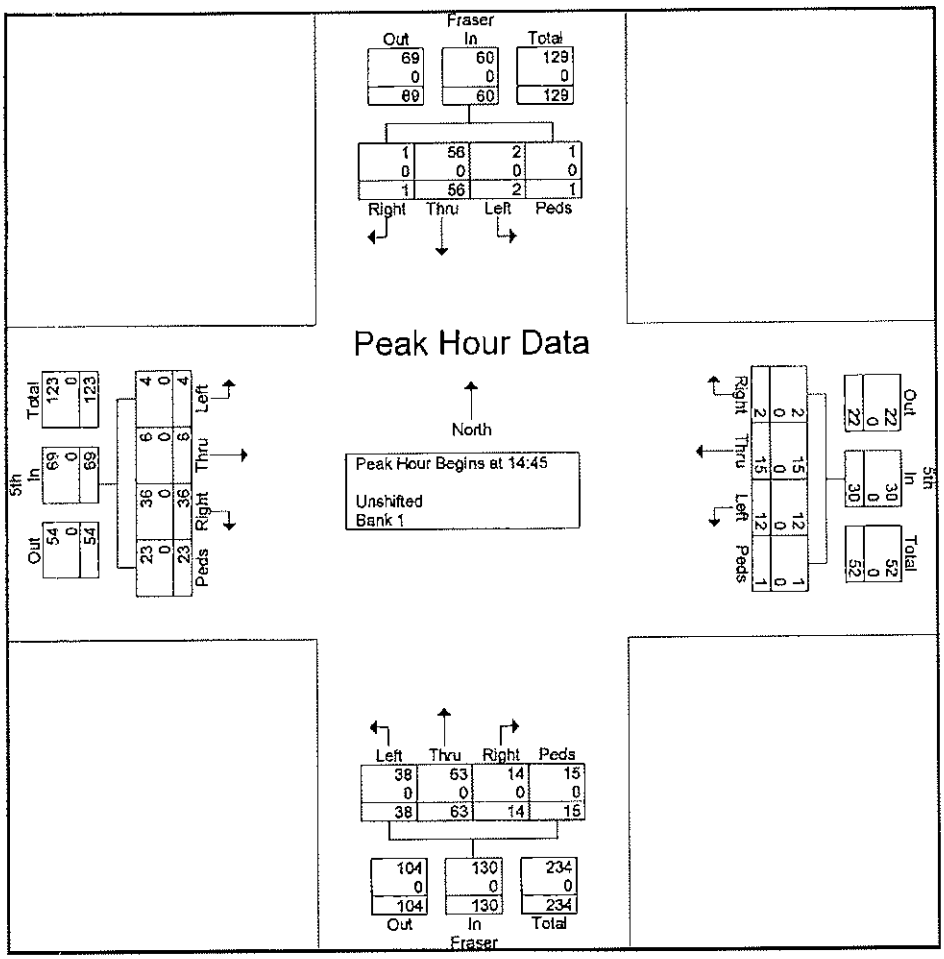
	Fraser From North					5th From East					Fraser From South					5th From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 14:45 to 15:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 14:45																					
14:45	0	14	0	0	14	0	2	4	0	6	5	16	11	3	35	13	1	1	5	20	75
15:00	0	16	1	0	17	1	6	2	0	9	2	20	10	5	37	3	2	0	9	14	77
15:15	0	12	0	0	12	0	2	4	0	6	5	11	9	6	31	9	2	2	5	18	67
15:30	1	14	1	1	17	1	5	2	1	9	2	16	8	1	27	11	1	1	4	17	70
Total Volume	1	56	2	1	60	2	15	12	1	30	14	63	38	15	130	36	6	4	23	69	289
% App. Total	1.7	93.3	3.3	1.7		6.7	50	40	3.3		10.8	48.5	29.2	11.5		52.2	8.7	5.8	33.3		
PHF	.250	.875	.500	.250	.882	.500	.625	.750	.250	.833	.700	.788	.864	.625	.878	.692	.750	.500	.639	.863	.938
Unshifted	1	56	2	1	60	2	15	12	1	30	14	63	38	15	130	36	6	4	23	69	289
% Unshifted																					
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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File Name : Lanai - 5th PM
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Start Date : 9/23/2008
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Groups Printed- Unshifted - Bank 1

	Lanai From North				5th From East				Lanai From South				5th From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
13:15	0	14	1	0	1	1	1	0	0	13	3	0	5	0	3	0	42
13:30	0	16	0	0	0	0	0	0	1	13	7	0	2	0	0	0	39
13:45	1	11	2	0	0	1	1	2	1	20	5	0	9	0	3	0	56
Total	1	41	3	0	1	2	2	2	2	46	15	0	16	0	6	0	137
14:00	2	25	2	0	1	1	3	0	0	26	5	4	2	0	1	0	72
14:15	3	9	0	0	0	0	0	0	4	33	4	0	3	1	0	0	57
14:30	1	22	0	0	1	0	1	0	1	24	3	0	2	0	2	0	57
14:45	0	14	0	0	2	1	2	0	1	17	5	0	4	1	1	0	48
Total	6	70	2	0	4	2	6	0	6	100	17	4	11	2	4	0	234
15:00	0	25	1	1	0	0	1	0	2	22	7	0	2	1	0	0	62
15:15	1	18	1	0	0	2	1	0	0	21	6	0	6	1	2	0	59
15:30	3	22	0	0	0	0	1	0	2	37	8	0	4	0	0	0	77
15:45	2	22	0	0	0	1	5	0	3	26	4	1	6	1	1	0	72
Total	6	87	2	1	0	3	8	0	7	106	25	1	18	3	3	0	270
16:00	2	10	2	0	0	0	1	1	0	19	6	0	1	0	2	0	44
16:15	2	14	1	0	0	1	0	6	0	27	4	0	4	1	2	0	62
Grand Total	17	222	10	1	5	8	17	9	15	298	67	5	50	6	17	0	747
Apprch %	6.8	88.8	4	0.4	12.8	20.5	43.6	23.1	3.9	77.4	17.4	1.3	68.5	8.2	23.3	0	
Total %	2.3	29.7	1.3	0.1	0.7	1.1	2.3	1.2	2	39.9	9	0.7	6.7	0.8	2.3	0	
Unshifted	17	222	10	1	5	8	17	9	15	298	67	5	50	6	17	0	747
% Unshifted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0	100
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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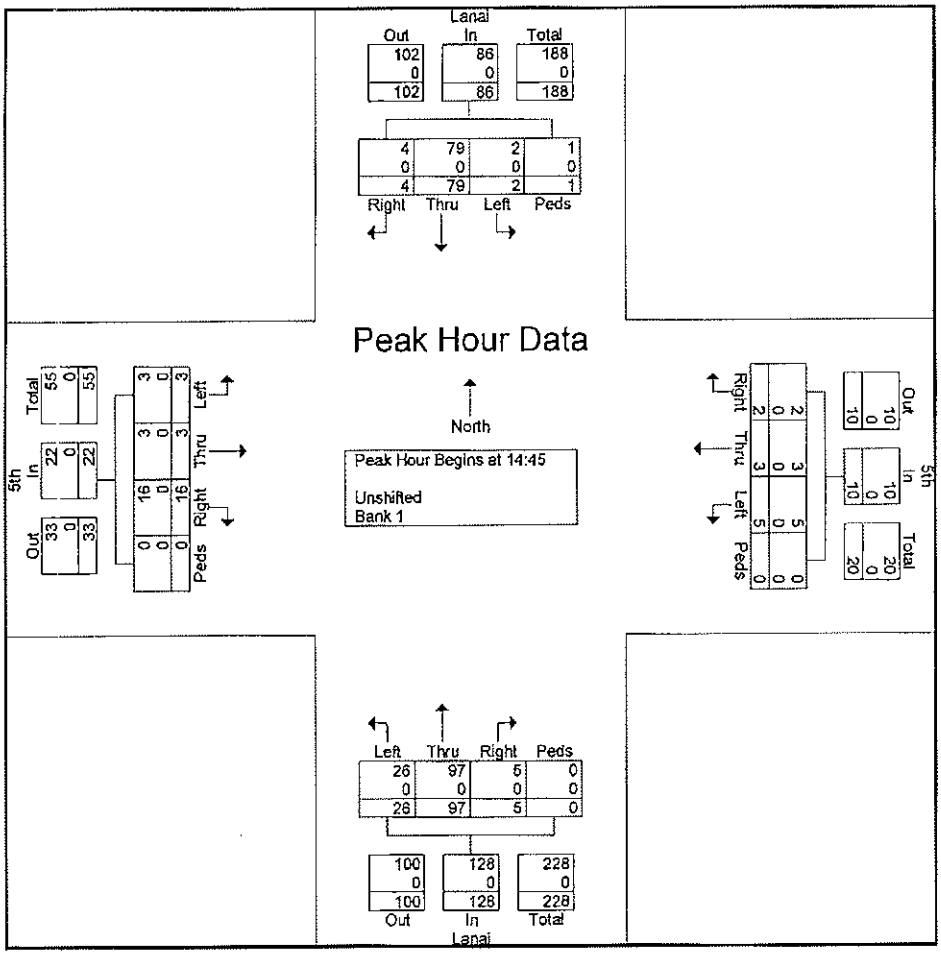
	Lanai From North					5th From East					Lanai From South					5th From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 14:45 to 15:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 14:45																					
14:45	0	14	0	0	14	**2**	1	**2**	0	5	1	17	5	0	23	4	**1**	1	0	6	48
15:00	0	**25**	**1**	**1**	**27**	0	0	1	0	1	**2**	22	7	0	31	2	1	0	0	3	62
15:15	1	18	1	0	20	0	**2**	1	0	3	0	21	6	0	27	**6**	1	**2**	0	**9**	59
15:30	**3**	22	0	0	25	0	0	1	0	1	2	**37**	**8**	0	**47**	4	0	0	0	4	**77**
Total Volume	4	79	2	1	86	2	3	5	0	10	5	97	26	0	128	16	3	3	0	22	246
% App. Total	4.7	91.9	2.3	1.2		20	30	50	0		3.9	75.8	20.3	0		72.7	13.6	13.6	0		
PHF	.333	.790	.500	.250	.796	.250	.375	.625	.000	.500	.625	.655	.813	.000	.681	.667	.750	.375	.000	.611	.799
Unshifted	4	79	2	1	86	2	3	5	0	10	5	97	26	0	128	16	3	3	0	22	246
% Unshifted																					
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



APPENDIX B

LEVEL OF SERVICE CRITERIA

APPENDIX B – LEVEL OF SERVICE (LOS) CRITERIA

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 2000)

The level of service criteria for unsignalized intersections is defined as the average total delay, in seconds per vehicle. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for Two-Way Stop-Controlled Intersections

Level of Service	Average Total Delay (sec/veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

LEVEL OF SERVICE CRITERIA FOR ALL-WAY STOP-CONTROLLED INTERSECTIONS (HCM 2000)

The all-way stop-controlled intersection is a special type of unsignalized intersection, where vehicles on all approaches are required to stop before entering the intersection. Generally, the sequence of entry into the intersection is on a "first come, first serve basis", according to order of arrival at the intersection. In theory, if vehicles arrive at two or more of the approaches at the same time, then according the "rules of the road", the vehicle to the right is allowed to proceed first. However, it has been observed that two-lane AWSC intersections often operate on a virtual 2-phase patterns, where North-South streams alternate right-of-way with East-West streams. Multilane AWSC intersections generally operate in 4 phases, where each approach will take up a single phase. The table, shown below, identifies the Level of Service and corresponding average stopped delay for all-way stop-controlled intersections.

Level of Service Criteria for AWSC Intersections

Level of Service	Average Total Delay (sec/veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	21	52	28	27	1	14	22	12	5	65	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	23	57	30	29	1	15	24	13	5	71	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	161	152	73	213	148	30	76			37		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	161	152	73	213	148	30	76			37		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	97	94	96	96	100	99			100		
cM capacity (veh/h)	771	730	988	678	734	1044	1523			1574		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	83	61	52	82
Volume Left	3	30	15	5
Volume Right	57	1	13	5
cSH	891	708	1523	1574
Volume to Capacity	0.09	0.09	0.01	0.00
Queue Length 95th (ft)	8	7	1	0
Control Delay (s)	9.5	10.6	2.2	0.5
Lane LOS	A	B	A	A
Approach Delay (s)	9.5	10.6	2.2	0.5
Approach LOS	A	B		

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	23.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	9	3	27	3	4	0	37	72	4	0	51	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	3	29	3	4	0	40	78	4	0	55	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	222	222	59	251	224	80	63			83		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222	222	59	251	224	80	63			83		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	97	100	99	100	97			100		
cM capacity (veh/h)	715	659	1006	666	657	980	1540			1515		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	8	123	63
Volume Left	10	3	40	0
Volume Right	29	0	4	8
cSH	887	661	1540	1515
Volume to Capacity	0.05	0.01	0.03	0.00
Queue Length 95th (ft)	4	1	2	0
Control Delay (s)	9.3	10.5	2.6	0.0
Lane LOS	A	B	A	
Approach Delay (s)	9.3	10.5	2.6	0.0
Approach LOS	A	B		

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	22.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	4	6	36	12	15	2	38	63	14	2	56	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	7	39	13	16	2	41	68	15	2	61	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	235	232	61	267	225	76	62			84		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	235	232	61	267	225	76	62			84		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	96	98	98	100	97			100		
cM capacity (veh/h)	689	649	1004	640	655	985	1541			1513		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	50	32	125	64
Volume Left	4	13	41	2
Volume Right	39	2	15	1
cSH	903	664	1541	1513
Volume to Capacity	0.06	0.05	0.03	0.00
Queue Length 95th (ft)	4	4	2	0
Control Delay (s)	9.2	10.7	2.6	0.3
Lane LOS	A	B	A	A
Approach Delay (s)	9.2	10.7	2.6	0.3
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	24.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	3	16	5	3	2	26	97	5	2	79	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	3	17	5	3	2	28	105	5	2	86	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	261	260	88	276	259	108	90			111		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261	260	88	276	259	108	90			111		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	98	99	99	100	98			100		
cM capacity (veh/h)	677	632	970	651	632	946	1505			1479		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	24	11	139	92
Volume Left	3	5	28	2
Volume Right	17	2	5	4
cSH	857	688	1505	1479
Volume to Capacity	0.03	0.02	0.02	0.00
Queue Length 95th (ft)	2	1	1	0
Control Delay (s)	9.3	10.3	1.6	0.2
Lane LOS	A	B	A	A
Approach Delay (s)	9.3	10.3	1.6	0.2
Approach LOS	A	B		

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	23.5%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2017 WITHOUT Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	15	60	100	30	45	5	30	25	15	10	70	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	65	109	33	49	5	33	27	16	11	76	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	236	215	84	348	215	35	92			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236	215	84	348	215	35	92			43		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	90	89	93	93	99	98			99		
cM capacity (veh/h)	660	664	975	488	664	1037	1502			1565		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	190	87	76	103
Volume Left	16	33	33	11
Volume Right	109	5	16	16
cSH	811	596	1502	1565
Volume to Capacity	0.23	0.15	0.02	0.01
Queue Length 95th (ft)	23	13	2	1
Control Delay (s)	10.8	12.1	3.3	0.8
Lane LOS	B	B	A	A
Approach Delay (s)	10.8	12.1	3.3	0.8
Approach LOS	B	B		

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	30	10	45	5	10	5	50	80	5	5	55	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	11	49	5	11	5	54	87	5	5	60	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	288	280	68	332	285	90	76			92		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	288	280	68	332	285	90	76			92		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	95	99	98	99	96			100		
cM capacity (veh/h)	632	604	995	566	600	968	1523			1502		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	22	147	82
Volume Left	33	5	54	5
Volume Right	49	5	5	16
cSH	778	652	1523	1502
Volume to Capacity	0.12	0.03	0.04	0.00
Queue Length 95th (ft)	10	3	3	0
Control Delay (s)	10.2	10.7	2.9	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.2	10.7	2.9	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	28.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	15	35	70	15	65	5	85	70	15	5	60	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	38	76	16	71	5	92	76	16	5	65	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	364	76	451	367	84	87			92		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	364	76	451	367	84	87			92		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	93	92	96	87	99	94			100		
cM capacity (veh/h)	478	527	985	430	526	975	1509			1502		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	130	92	185	92
Volume Left	16	16	92	5
Volume Right	76	5	16	22
cSH	711	519	1509	1502
Volume to Capacity	0.18	0.18	0.06	0.00
Queue Length 95th (ft)	17	16	5	0
Control Delay (s)	11.2	13.4	4.0	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.2	13.4	4.0	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	20	10	30	10	10	5	55	105	10	5	85	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	11	33	11	11	5	60	114	11	5	92	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	367	361	106	394	370	120	120			125		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	367	361	106	394	370	120	120			125		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	98	97	98	98	99	96			100		
cM capacity (veh/h)	557	541	948	520	535	932	1468			1462		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	65	27	185	125
Volume Left	22	11	60	5
Volume Right	33	5	11	27
cSH	698	577	1468	1462
Volume to Capacity	0.09	0.05	0.04	0.00
Queue Length 95th (ft)	8	4	3	0
Control Delay (s)	10.7	11.5	2.7	0.4
Lane LOS	B	B	A	A
Approach Delay (s)	10.7	11.5	2.7	0.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2026 WITHOUT Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	50	100	150	20	85	5	90	25	15	10	40	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	109	163	22	92	5	98	27	16	11	43	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	383	340	79	549	367	35	114			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	383	340	79	549	367	35	114			43		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	80	83	93	82	99	93			99		
cM capacity (veh/h)	467	540	982	298	521	1037	1475			1565		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	326	120	141	125
Volume Left	54	22	98	11
Volume Right	163	5	16	71
cSH	674	468	1475	1565
Volume to Capacity	0.48	0.26	0.07	0.01
Queue Length 95th (ft)	66	25	5	1
Control Delay (s)	15.2	15.3	5.4	0.7
Lane LOS	C	C	A	A
Approach Delay (s)	15.2	15.3	5.4	0.7
Approach LOS	C	C		

Intersection Summary			
Average Delay	10.8		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	55	10	65	5	10	5	85	80	5	5	60	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	11	71	5	11	5	92	87	5	5	65	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	378	370	82	443	383	90	98			92		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	378	370	82	443	383	90	98			92		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	98	93	99	98	99	94			100		
cM capacity (veh/h)	539	523	978	456	514	968	1495			1502		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	141	22	185	103
Volume Left	60	5	92	5
Volume Right	71	5	5	33
cSH	693	562	1495	1502
Volume to Capacity	0.20	0.04	0.06	0.00
Queue Length 95th (ft)	19	3	5	0
Control Delay (s)	11.5	11.7	4.0	0.4
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	11.7	4.0	0.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	30	50	90	15	85	5	110	70	20	5	65	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	54	98	16	92	5	120	76	22	5	71	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	478	438	90	552	446	87	109			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	478	438	90	552	446	87	109			98		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	88	90	95	80	99	92			100		
cM capacity (veh/h)	393	470	968	341	465	972	1482			1495		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	185	114	217	114
Volume Left	33	16	120	5
Volume Right	98	5	22	38
cSH	616	453	1482	1495
Volume to Capacity	0.30	0.25	0.08	0.00
Queue Length 95th (ft)	31	25	7	0
Control Delay (s)	13.3	15.6	4.5	0.4
Lane LOS	B	C	A	A
Approach Delay (s)	13.3	15.6	4.5	0.4
Approach LOS	B	C		

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	25	10	35	10	10	5	60	110	10	5	90	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	11	38	11	11	5	65	120	11	5	98	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	394	389	117	427	402	125	136			130		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	394	389	117	427	402	125	136			130		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	96	98	98	99	95			100		
cM capacity (veh/h)	533	520	935	489	511	926	1448			1455		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	27	196	141
Volume Left	27	11	65	5
Volume Right	38	5	11	38
cSH	676	550	1448	1455
Volume to Capacity	0.11	0.05	0.05	0.00
Queue Length 95th (ft)	9	4	4	0
Control Delay (s)	11.0	11.9	2.8	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.0	11.9	2.8	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2017 WITH Phase I of the Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	20	80	130	30	50	5	35	25	15	10	70	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	87	141	33	54	5	38	27	16	11	76	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	253	228	87	405	231	35	98			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253	228	87	405	231	35	98			43		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	87	85	92	92	99	97			99		
cM capacity (veh/h)	636	650	972	416	647	1037	1495			1565		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	250	92	82	109
Volume Left	22	33	38	11
Volume Right	141	5	16	22
cSH	798	552	1495	1565
Volume to Capacity	0.31	0.17	0.03	0.01
Queue Length 95th (ft)	34	15	2	1
Control Delay (s)	11.6	12.8	3.6	0.8
Lane LOS	B	B	A	A
Approach Delay (s)	11.6	12.8	3.6	0.8
Approach LOS	B	B		

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	40	10	50	5	10	5	50	80	5	5	55	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	11	54	5	11	5	54	87	5	5	60	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	291	283	71	340	291	90	82			92		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	291	283	71	340	291	90	82			92		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	98	95	99	98	99	96			100		
cM capacity (veh/h)	629	602	992	555	595	968	1516			1502		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	109	22	147	87
Volume Left	43	5	54	5
Volume Right	54	5	5	22
cSH	766	646	1516	1502
Volume to Capacity	0.14	0.03	0.04	0.00
Queue Length 95th (ft)	12	3	3	0
Control Delay (s)	10.5	10.8	2.9	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	10.8	2.9	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	20	45	80	15	90	5	105	70	15	5	60	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	49	87	16	98	5	114	76	16	5	65	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	457	410	79	514	416	84	92			92		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	457	410	79	514	416	84	92			92		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	90	91	96	80	99	92			100		
cM capacity (veh/h)	407	489	982	373	486	975	1502			1502		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	158	120	207	98
Volume Left	22	16	114	5
Volume Right	87	5	16	27
cSH	651	477	1502	1502
Volume to Capacity	0.24	0.25	0.08	0.00
Queue Length 95th (ft)	24	25	6	0
Control Delay (s)	12.3	15.1	4.5	0.4
Lane LOS	B	C	A	A
Approach Delay (s)	12.3	15.1	4.5	0.4
Approach LOS	B	C		

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	25	10	35	10	15	5	65	105	10	5	85	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	11	38	11	16	5	71	114	11	5	92	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	397	389	111	427	402	120	130			125		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397	389	111	427	402	120	130			125		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	96	98	97	99	95			100		
cM capacity (veh/h)	525	518	942	488	509	932	1455			1462		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	33	196	136
Volume Left	27	11	71	5
Volume Right	38	5	11	38
cSH	672	542	1455	1462
Volume to Capacity	0.11	0.06	0.05	0.00
Queue Length 95th (ft)	10	5	4	0
Control Delay (s)	11.0	12.1	3.0	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.0	12.1	3.0	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2026 WITH Phase I and II of the Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	70	180	260	20	110	5	115	25	15	10	40	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	196	283	22	120	5	125	27	16	11	43	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	459	402	87	774	438	35	130			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459	402	87	774	438	35	130			43		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	60	71	85	74	99	91			99		
cM capacity (veh/h)	381	487	972	144	465	1037	1455			1565		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	554	147	168	141
Volume Left	76	22	125	11
Volume Right	283	5	16	87
cSH	621	355	1455	1565
Volume to Capacity	0.89	0.41	0.09	0.01
Queue Length 95th (ft)	271	49	7	1
Control Delay (s)	40.5	22.1	5.9	0.6
Lane LOS	E	C	A	A
Approach Delay (s)	40.5	22.1	5.9	0.6
Approach LOS	E	C		

Intersection Summary			
Average Delay	26.5		
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	100	15	95	5	15	5	100	80	5	5	60	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	16	103	5	16	5	109	87	5	5	65	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	418	408	87	516	427	90	109			92		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	418	408	87	516	427	90	109			92		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	97	89	99	97	99	93			100		
cM capacity (veh/h)	497	492	972	385	480	968	1482			1502		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	228	27	201	114
Volume Left	109	5	109	5
Volume Right	103	5	5	43
cSH	637	506	1482	1502
Volume to Capacity	0.36	0.05	0.07	0.00
Queue Length 95th (ft)	41	4	6	0
Control Delay (s)	13.8	12.5	4.4	0.4
Lane LOS	B	B	A	A
Approach Delay (s)	13.8	12.5	4.4	0.4
Approach LOS	B	B		

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	180	260	20	110	5	115	25	15	10	40	80
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	196	283	22	120	5	125	27	16	11	43	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	459	402	87	774	438	35	130			43		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459	402	87	774	438	35	130			43		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	60	71	85	74	99	91			99		
cM capacity (veh/h)	381	487	972	144	465	1037	1455			1565		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	272	283	147	168	141
Volume Left	76	0	22	125	11
Volume Right	0	283	5	16	87
cSH	452	972	355	1455	1565
Volume to Capacity	0.60	0.29	0.41	0.09	0.01
Queue Length 95th (ft)	97	30	49	7	1
Control Delay (s)	24.3	10.2	22.1	5.9	0.6
Lane LOS	C	B	C	A	A
Approach Delay (s)	17.1		22.1	5.9	0.6
Approach LOS	C		C		

Intersection Summary			
Average Delay	13.7		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	70	180	260	20	110	5	115	25	15	10	40	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	196	283	22	120	5	125	27	16	11	43	87

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	272	283	147	168	141
Volume Left (vph)	76	0	22	125	11
Volume Right (vph)	0	283	5	16	87
Hadj (s)	0.17	-0.67	0.04	0.12	-0.32
Departure Headway (s)	5.8	5.0	5.7	5.9	5.5
Degree Utilization, x	0.44	0.39	0.23	0.28	0.22
Capacity (veh/h)	598	702	588	554	590
Control Delay (s)	12.0	9.9	10.4	11.1	10.1
Approach Delay (s)	10.9		10.4	11.1	10.1
Approach LOS	B		B	B	B

Intersection Summary			
Delay	10.8		
HCM Level of Service	B		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	50	95	145	15	180	5	200	70	20	5	65	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	103	158	16	196	5	217	76	22	5	71	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	742	649	106	848	674	87	141			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	742	649	106	848	674	87	141			98		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	64	69	83	90	39	99	85			100		
cM capacity (veh/h)	151	329	948	158	318	972	1442			1495		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	315	217	315	147
Volume Left	54	16	217	5
Volume Right	158	5	22	71
cSH	375	300	1442	1495
Volume to Capacity	0.84	0.72	0.15	0.00
Queue Length 95th (ft)	194	131	13	0
Control Delay (s)	49.0	43.0	5.9	0.3
Lane LOS	E	E	A	A
Approach Delay (s)	49.0	43.0	5.9	0.3
Approach LOS	E	E		

Intersection Summary				
Average Delay	26.8			
Intersection Capacity Utilization	63.2%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	55	15	50	10	20	5	105	110	10	5	90	75
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	16	54	11	22	5	114	120	11	5	98	82
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	519	508	139	565	543	125	179			130		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	519	508	139	565	543	125	179			130		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	96	94	97	95	99	92			100		
cM capacity (veh/h)	417	428	910	372	409	926	1396			1455		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	130	38	245	185
Volume Left	60	11	114	5
Volume Right	54	5	11	82
cSH	541	431	1396	1455
Volume to Capacity	0.24	0.09	0.08	0.00
Queue Length 95th (ft)	23	7	7	0
Control Delay (s)	13.8	14.2	4.0	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	13.8	14.2	4.0	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

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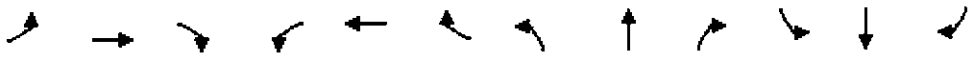
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	50	95	145	15	180	5	200	70	20	5	65	65
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	103	158	16	196	5	217	76	22	5	71	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	742	649	106	848	674	87	141			98		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	742	649	106	848	674	87	141			98		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	64	69	83	90	39	99	85			100		
cM capacity (veh/h)	151	329	948	158	318	972	1442			1495		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	158	158	217	315	147
Volume Left	54	0	16	217	5
Volume Right	0	158	5	22	71
cSH	233	948	300	1442	1495
Volume to Capacity	0.68	0.17	0.72	0.15	0.00
Queue Length 95th (ft)	107	15	131	13	0
Control Delay (s)	47.5	9.6	43.0	5.9	0.3
Lane LOS	E	A	E	A	A
Approach Delay (s)	28.5		43.0	5.9	0.3
Approach LOS	D		E		

Intersection Summary			
Average Delay	20.3		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	50	95	145	15	180	5	200	70	20	5	65	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	103	158	16	196	5	217	76	22	5	71	71

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	158	158	217	315	147
Volume Left (vph)	54	0	16	217	5
Volume Right (vph)	0	158	5	22	71
Hadj (s)	0.21	-0.67	0.03	0.13	-0.25
Departure Headway (s)	6.5	5.6	6.0	5.8	5.8
Degree Utilization, x	0.28	0.24	0.36	0.51	0.23
Capacity (veh/h)	519	599	553	582	554
Control Delay (s)	10.8	9.1	12.3	14.5	10.5
Approach Delay (s)	10.0		12.3	14.5	10.5
Approach LOS	A		B	B	B

Intersection Summary			
Delay	12.0		
HCM Level of Service	B		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

APPENDIX H.

Preliminary Engineering and Drainage Report

PRELIMINARY

ENGINEERING STUDY

FOR THE

LANA'I CITY AFFORDABLE HOUSING PROJECT

PREPARED FOR:

COUNTY OF MAUI
DEPARTMENT OF HOUSING AND HUMAN CONCERNS
2200 MAIN STREET, SUITE 546
WAILUKU, HI 96793

PREPARED BY:

OKAHARA & ASSOCIATES, INC.
200 KOHOLA STREET
HILO, HI 96720-4323

JULY 2009

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SECTION 1 - EXECUTIVE SUMMARY

The purpose of this study is to provide a conceptual look at the infrastructure needed to serve the proposed Lana'i City Affordable Housing Project, and to determine any potential problems that may occur. The following is a brief summary of the findings contained within this report.

The closest sewer line to the project site is a sewer line from the Waialua Annex Subdivision that traverses through the school property. It is at a higher elevation than the project site, therefore a sewer lift station will be required. The closest manhole along this line is on 5th Street, however, the eight-inch piping downstream of that manhole does not have the capacity to convey the design load of the proposed development. Therefore, the connecting manhole will be near the proposed 9th Street Extension, where the pipe size increases to 10-inches. An implementation plan may need to be developed for the expansion of the existing wastewater treatment plant, however, it cannot be determined if or when this would be needed.

Domestic water supply to Lana'i City is currently being distributed by the 2MG Lana'i City Reservoir, with the 0.75MG Koele Reservoir as a back-up. A PRV located along 9th Street, and an altitude valve located near the Cavendish Golf Course regulates the water pressure within Lana'i City. Currently, static pressures within the project area would range from 103 psi to 120 psi. A preliminary look at the system during peak hour and fire flow shows favorable results with respect to pressures and velocities within the pipeline. As more information about the other developments in the area are gathered, a more extensive look at the system will be done.

Development of this project will produce a 50-year peak hour runoff increase of 137.75 cfs. The 4.00 acres set aside for a retention pond will hold a six foot deep trapezoidal basin that will have the volume capacity to retain this increase. Existing on-site runoff iexits the southeast portion of the site and eventually ends up in an area known as "Mississippi." Any overflow of the proposed retention basin will also be directed to the "Mississippi," therefore the drainage patterns in the area will be preserved.

SECTION 2 - INTRODUCTION

2.1 PURPOSE

The purpose of this Engineering Study is to provide support and guidelines for the eventual design of the domestic water, wastewater, and drainage systems for the proposed Lana'i City Affordable Housing Project. It is intended to provide a conceptual layout of the entire system at full build-out to ensure continuity with the existing infrastructure, as well as to provide coordination with other planned developments in the area.

2.2 DESCRIPTION

The proposed Lana'i City Affordable Housing Project is centrally located on the Island of Lana'i, near the northwest corner of Lana'i City. It is bounded to the east by future phases of the Department of Hawaiian Home Lands (DHHL) Lana'i Residence Lots Subdivision, and to the south and east by the proposed Lana'i High and Elementary School Expansion. Currently, this Project is within a portion of Tax Map Key (2) 4-09-002:058, however, this parcel is in the process of being subdivided into two separate parcels, with the Department of Education (DOE) receiving 42 acres for the school expansion, and the Lana'i City Affordable Housing Project comprising the remaining 73 acres. Also, due to the fact that the subject parcel is landlocked, either the extension of 5th Street (through DHHL lands), the extension of 9th Street (through Castle & Cooke lands), or both will need to be considered for access (see Figures 1 - 3).

The conceptual layout for this Project includes: 239 single family lots (29.15 total acres); 14.48 acres designated for multi-family units; 4.94 acres designated for public/quasi-public uses; 4.91 acres of park space; 4.00 acres for a retention basin; and approximately 15.52 acres for street right-of-ways (see Figure 4).

2.3 CLIMATE

The climate of the Island of Lana'i is greatly influenced by the topography of the land, which is dominated by Mount Lanaihale (3379 ft. summit elevation). Lana'i City has a mean annual rainfall of approximately 38.7 inches, and has temperatures ranging from a mean annual high of 75.7°F, to a mean annual low of 62.7°F (see Table 1).

2.4 TOPOGRAPHY

The eastern area of the site slopes in a westerly direction, and the western area of the site slopes in an easterly direction, creating a valley within the site, which slopes to the southeast. Onsite elevations range from a high of approximately 1,547 feet near the northeast corner,

to low of approximately 1,508 feet at the southern boundary, with localized grades ranging from 0 to 10%. The Iwiole Gulch lies to the north of the site (see Figure 5).

2.5 SCOPE AND LIMITATIONS

The following standards, documents, and limitations were used to define the parameters of this Engineering Study:

- "Design Standards of the Department of Wastewater Management, Volume I", Department of Wastewater Management, City and County of Honolulu, State of Hawaii, July 1993.
- An extensive study of the existing sewer system within Lana'i City is not a part of this report. However, the path from the Lana'i City Affordable Housing Project to the wastewater treatment plant will be examined.
- Information on the existing sewer system within Lana'i City was taken from "Construction Plans for Lanai Sewerage System, Lanai City, Lanai, Hawaii, Job No. 82-30, Federal Project No. C-150061-02", approved July 1982, and from "Construction Plans for Land Court Application, Waialua Annex Subdivision", by M & E Pacific, Inc, approved January 1992.
- SewerCAD® Version V5.6 by Bentley is the modeling software used for the analysis contained within this report.
- Although this is a private water system, the County of Maui Department of Water Supply Standards will be followed.
- An extensive study of the existing sewer system within Lana'i City is not a part of this report.
- The existing waterlines were taken from plans and drawings as supplied by Castle & Cooke, LLC, and represents the best information available to date.
- Existing water usage was taken from the Final Draft of the "Lanai Water Use and Development Plan" by R.M. Towill Corp. dated July 12, 2006.
- WaterCAD® Version V8 EX Edition by Bentley is the modeling software used for the analysis contained within this report.
- "Title MC-15, Department of Public Works and Waste Management, Subtitle 01, Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui"

SECTION 3 - WASTEWATER

3.1 EXISTING SEWER INFRASTRUCTURE

The existing sewer system within Lana'i City is comprised of vitrified clay, ductile iron and PVC pipes, ranging in size from eight- through fifteen-inches in diameter. The closest sewer line to the project site is a vitrified clay pipe servicing the Waialua Annex Subdivision, and Phases 1 and 2a of the Lana'i Residence Lots. This sewer line begins at sewer manhole SMH-A11, located along 5th Street, and heads in a southeasterly direction with an eight-inch diameter pipe for approximately 1,645 feet. The pipe is then increased to a ten-inch diameter pipe for approximately 1,020 feet, and increased again to a twelve-inch diameter pipe for approximately 340 feet before it connects to the main sewer trunk line which leads to the wastewater treatment plant.

Existing flows within this line was estimated by taking the hydraulic data from the Waialua Annex Subdivision Plans, and adding design flows values (350 gallons per day per dwelling) for the Lana'i Residence Lots Subdivision. The resultant peak flow at SMH-A11 was computed to be 0.332 million gallons per day (MGD), which puts the existing eight-inch sewer line at 45% of capacity. With only 165 single family units connected at this point, it is evident that the full build-out of the Lana'i City Affordable Housing Project will have to connect to this line when the line size increases to the ten-inch pipe (see Figure 6).

3.2 ON-SITE SEWER

Per Maui County Standards, design sewer flows for a single family dwelling is 350 gallons per day, and design flows for a multi-family dwelling is 255 gallons per day. For the areas designated as multi-family, a density of twelve units per acre was used, which computed to a total of 174 multi-family units in addition to the 239 single family units. Therefore, at full build-out, the design average flow for this project will be approximately 0.135 MGD, and the design peak flow will be approximately 0.655 MGD. To accommodate these flows, eight to ten inch PVC pipes would probably be adequate depending on the slopes available.

As mentioned earlier, the on-site low point is at approximately 1,508 feet in elevation, while the invert of the existing sewer manhole adjacent to the nearest ten-inch pipe is at approximately 1548.7 feet. Therefore, a sewer lift station and associated force main will be required. This force main will be approximately 3,200 feet in length, and will connect to manhole SMH-A5. The capacity of the ten-inch sewer line downstream of this manhole is approximately 2.126 MGD, therefore, even at full build-out, this sewer line will be utilized at 63% capacity.

3.3 OFF-SITE SEWER

The Lana'i High and Elementary School Expansion, as well as the future phases of the Lana'i Residence Lots Subdivision will face the same problems as the Lana'i City Affordable Housing Project in that both of those projects will also be at a lower elevation that the Waialua Annex Sewer Line. It may be beneficial to all parties involved to have one sewer lift station designed to service all three projects, but timing, cost, and other complications may make that difficult. Preliminary discussions have taken place, however, at this time it remains unresolved.

3.3 WASETWATER TREATMENT PLANT

The existing Lana'i City Wastewater Treatment Plant has a capacity of approximately 0.500 MGD, while the current usage is at approximately 0.297 MGD. County of Maui regulations state that when actual sewer usage exceeds 75% of the WTP's capacity, an implementation plan needs to be performed, and when the actual usage exceeds 90% of capacity, the plan needs to be initiated. The proposed 0.135 MGD generated by this project will theoretically bring the sewer usage to 0.432 MGD, or 86% of capacity, however, action needs to be taken only when actual usage exceeds the certain thresholds. The Lana'i City Affordable Housing Project is targeted to existing Lana'i City residents, in which case the system sewage load will remain relatively constant. Because of this, if or when these thresholds are passed cannot be determined.

SECTION 4 - DOMESTIC WATER

4.1 EXISTING WATER INFRASTRUCTURE

The existing water infrastructure on Lana'i is a private system owned by Lana'i Company, Inc. Although this is a private system, Maui County Standards will be followed wherever possible. Service to the Lana'i City area consists of two reservoirs: the Koele Reservoir (0.75 MG. spillway elevation of 2,057 feet), and the Lana'i City Reservoir (2.0MG, spillway elevation of 1,980 feet - see Figure 7).

4.1.1 Koele Reservoir

The existing Koele Reservoir is located just east of the Experience at Koele Golf Course. It is currently being fed by Well #8, and will be also fed by Well #3 when it gets back on line.

One leg of this system connects to Kaunaoa Drive and travels down the road serving the Villas at Koele along the way as well as residential dwellings along Kaunaoa Drive. This line then tees off at Ninth Street and connects to a pressure reducing valve (PRV) (elevation of 1,754 feet, 44 psi outlet setting). This PRV is normally closed and serves as an emergency backup for Lana'i City.

The other leg of this system travels down towards the Lalakoa Subdivision, and heads away from Lana'i City in a southeasterly direction. This waterline eventually hits a tee, with one leg servicing the Palawai Basin, and the other leg traveling to the Hii Reservoir (0.50 MG, spillway elevation of 1,823 feet). The Koele leg at this tee has a valve that is normally closed, and is used as an emergency backup for the Hii Reservoir.

4.1.2 Lana'i City Reservoir

The Lana'i City Reservoir is located near the eastern edge of the Koele Project District. It is currently being fed by Well #6.

This system provides service to the Lodge at Koele, and services Lana'i City through a PRV (assumed elevation of 1,670 feet, 50 psi outlet setting) located along 9th Street, and an altitude valve (elevation of 1,725 feet, 26 psi outlet setting) located near the Cavendish Golf Course. Under normal operating conditions, the Lana'i City Reservoir will provide service to the Lana'i City Affordable Housing Project, with the Koele Reservoir serving as a back-up water supply.

4.1.3 System Pressure

Maui County Water Supply Standards state that the maximum static pressure within the distribution system shall not exceed 125 psi. Using the PRV and altitude valve settings noted above, the pressure within the Lana'i City Affordable Housing Project

is expected to range from a low of 103 psi (at elevation 1,547 feet) to a high of 120 psi (at elevation 1,508 feet). While this is within the Maui County requirements, high pressure fittings or other mitigative measures should be considered. It is also possible to lower the settings of the PRV and altitude valve, however, this could have a negative effect to the residents of Lanai City, therefore, extreme care should be taken.

4.1 ON-SITE DOMESTIC WATER

The Project will be serviced by extending the existing eight-inch water line within 5th Street. Maui County regulations require that any development greater than 100 parcels needs a second feed into the system. If this requirement is to be followed, the proposed 9th Street extension may need to be utilized as the second connection route.

A complete analysis of this system is pending due to the other developments in the area. Preliminary findings show that both peak hour flow and fire flow shows favorable pressure and velocity values within the pipe. A complete write-up of the analysis will be provided when the additional information is available.

SECTION 5 - DRAINAGE

5.1 ON-SITE DRAINAGE

The existing Lana'i City Affordable Housing Project is situated such that there is a low valley running through the approximate middle of the site. The topography of the area indicates that nearly all of the on-site runoff generated collects at this valley and exits the site in a southeasterly direction. The runoff then flows past the wastewater treatment plant, and collects in an area known as "Mississippi," which acts as a natural retention basin. Iwiole Gulch is located just to the north of the project site, however, very little runoff is directed to that location. Therefore, in the effort to keep the drainage patterns in the area constant, the site shall be designed and graded to discharge a vast majority of the runoff to the southeast.

5.1.1 Drainage Calculations

Maui County Standards dictate the method used to calculate runoff according to the area the project encompasses. The lana'i City Affordable Housing Project covers well under 100 acres, therefore, the Rational Method was used where:

$$Q = C\ I\ A\ ; \quad \text{where}$$

Q = Runoff (cfs)
C = Runoff Coefficient
I = Rainfall Intensity (in/hr)
A = Area (acres)

The runoff coefficient is determined by the imperviousness of the ground, and ranges from zero (totally pervious) to one (totally impervious). The rainfall intensity is determined from a combination of rainfall isopluvial maps for the various occurrence intervals and the time of concentration (the time it takes for the entire drainage area to reach the outfall point).

5.1.1a Runoff Coefficient (C)

The soil types found on the existing site as determined by the Soil Conservation Service's "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii" are the Lahaina Series and Waihuna Series.

The Lahaina Series (LaA, LaB, LaC), which covers approximately forty-five percent (45%) of the project area, developed from materials weathered from igneous rock. A typical section of this soil type shows a 15-inch layer of medium acidic dark reddish-brown silty clay, followed by 45-inches of slightly acidic silty clay and silty clay loam, over soft weathered igneous rock. This soil is moderately permeable, with a slight erosion hazard and slow runoff.

The Waihuna Series (WoA), which covers approximately thirty-four percent

(34%) of the project area, formed in old fine-textured alluvium A typical section of this soil type shows an 18-inch layer of medium acidic dark brown sticky and plastic clay, followed by 45-inches of dark brown sticky and plastic clay and silty clay, over soft weathered pebbles and stones. This soil is moderately permeable, with a slight erosion hazard and slow runoff.

The natural ground surface was assumed to be of heavy soil with grades averaging two (2%) to seven (7%) percent, which gives an existing runoff coefficient of 0.22.

A post-development runoff coefficient value of 0.518 was determined using the, the following built-up values:

Single Family Lots	0.50
Multi-Family Areas	0.75
Public/Quasi-Public Area	0.70
Open Space	0.25
Pavement	0.95

Both the 5th Street and 9th Street Extensions were included.

5.1.1b Rainfall Intensity (I)

Isopluvial maps for 10-, and 50-year 1-hour rainfall were used. Table 4 of the Maui County Drainage Standards were used to approximate the time of concentration, which equated to approximately one hour for the existing condition, and twenty minutes for the post development condition, which resulted in the following:

Existing I_{10}	2.10
Post-Dev I_{10}	3.45
Existing I_{50}	2.75
Post Dev I_{50}	4.50

5.1.1c Runoff (Q)

Taking the runoff coefficient and rainfall intensity values from above, along with a project area of 79.89 acres (which includes the 5th and 9th Street extensions), the following runoff quantities are produced:

Existing Q_{10}	36.91 cfs
Post-Dev Q_{10}	142.66 cfs
ΔQ_{10}	105.76 cfs
Existing Q_{50}	48.33 cfs
Post Dev Q_{50}	186.08 cfs
ΔQ_{50}	137.75 cfs

5.1.2 Retention Basin

Maui County Standards require that the excess runoff generated by any development be retained on-site. Because this project is less than 100 acres, the 50-year one-hour

recurrence interval was used as the design storm. In this case, the excess runoff value is 137.75 cfs, which equates to a one hour volume of 496,000 cubic feet. Therefore, the retention basin needs to be able to hold a volume of 496,000 cubic feet of runoff, with no credit given for percolation into the ground. A six foot deep trapezoidal basin with a top area of 3.26 acres and 2H:1V side slopes will fit in the 4.00 acres allotted for the retention basin, and will be able to hold the required volume including two feet of freeboard. The total volume of this basin is actually 800,000 cubic feet. An overflow pipe will be provided to allow any runoff exceeding this volume to discharge to the natural outfall point.

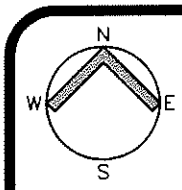
5.2 OFF-SITE DRAINAGE

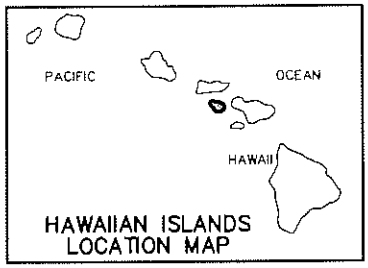
Currently, off-site runoff is entering the project site from the proposed Lana'i Residence Lots and the Lana'i High and Elementary School Extension parcels. As each project is developed, the runoff entering the site should be diminished, however, in the interim, mitigative measures may need to be implemented in the case that either or both projects are delayed.

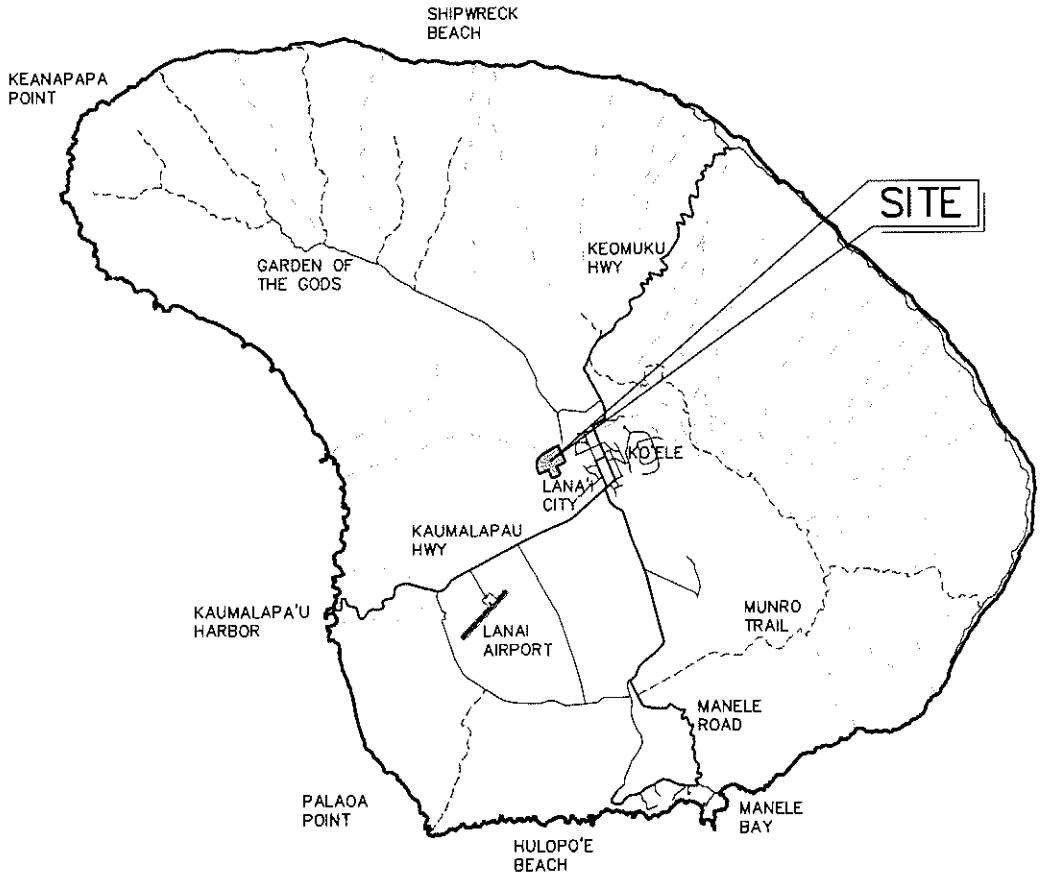
Using the Rational Method as described above, it was calculated that the 50-year runoff currently entering the site from the Lana'i Residence Lots and the Lana'i High and Elementary School Expansion parcels are approximately 24 cfs and 14 cfs respectively. While these are not extremely large quantities, it could cause roadway flooding and place extra burden on the on-site drainage structures. Therefore, ditches, berms, culverts, or a combination of these should be considered to direct this runoff away from the site, or allow it to pass through safely and effectively.

APPENDIX:

FIGURES AND TABLES







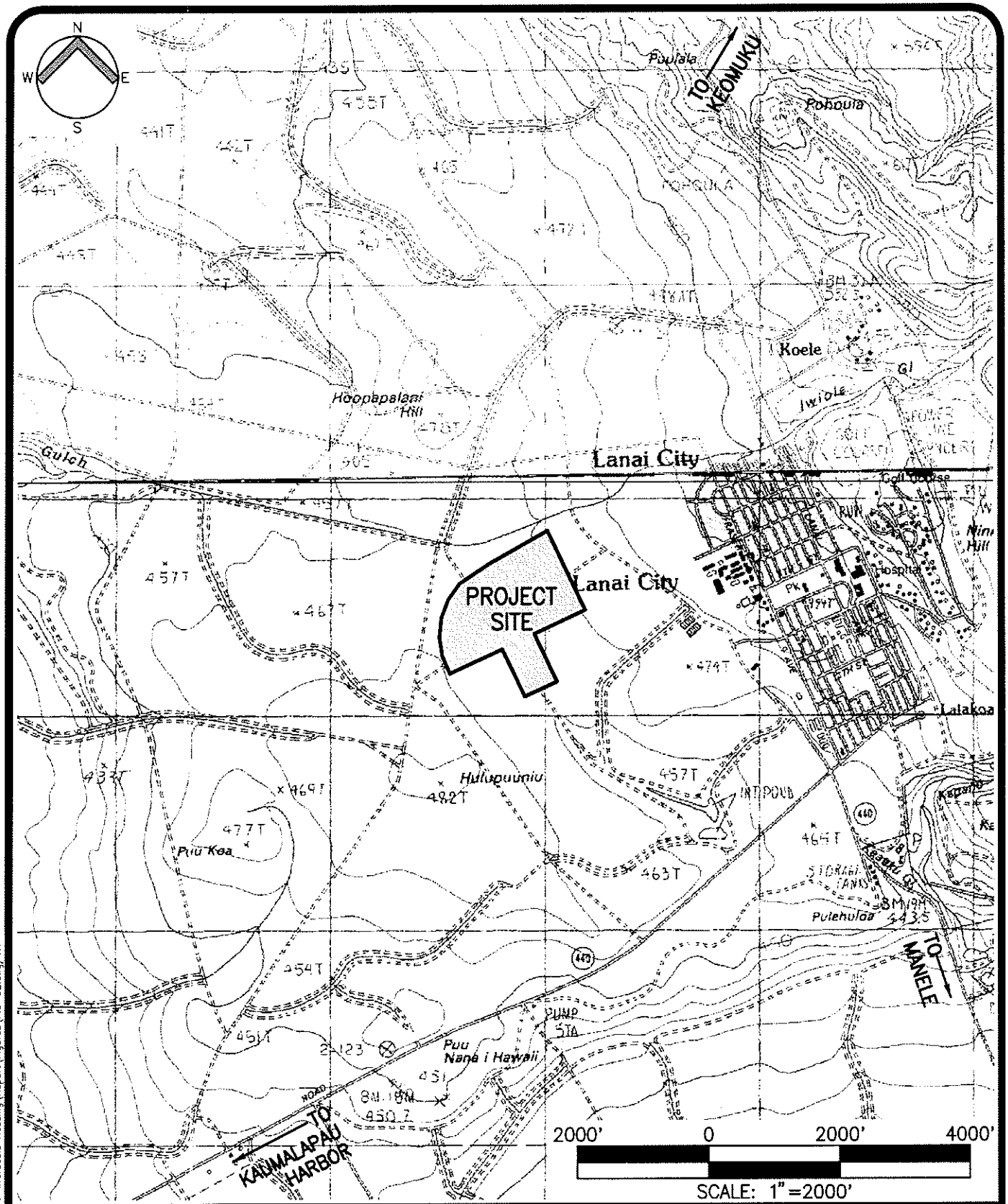
TITLE **ISLAND MAP**
NOT TO SCALE

FIGURE
1

PROJECT ENGINEERING REPORT – LANA'I CITY AFFORDABLE HOUSING PROJECT
LANAI, HAWAII

DATE
7/2009

2008\208-028 Lana'i Affordable Housing\Report\Figures\FIG-01.dwg/1:1



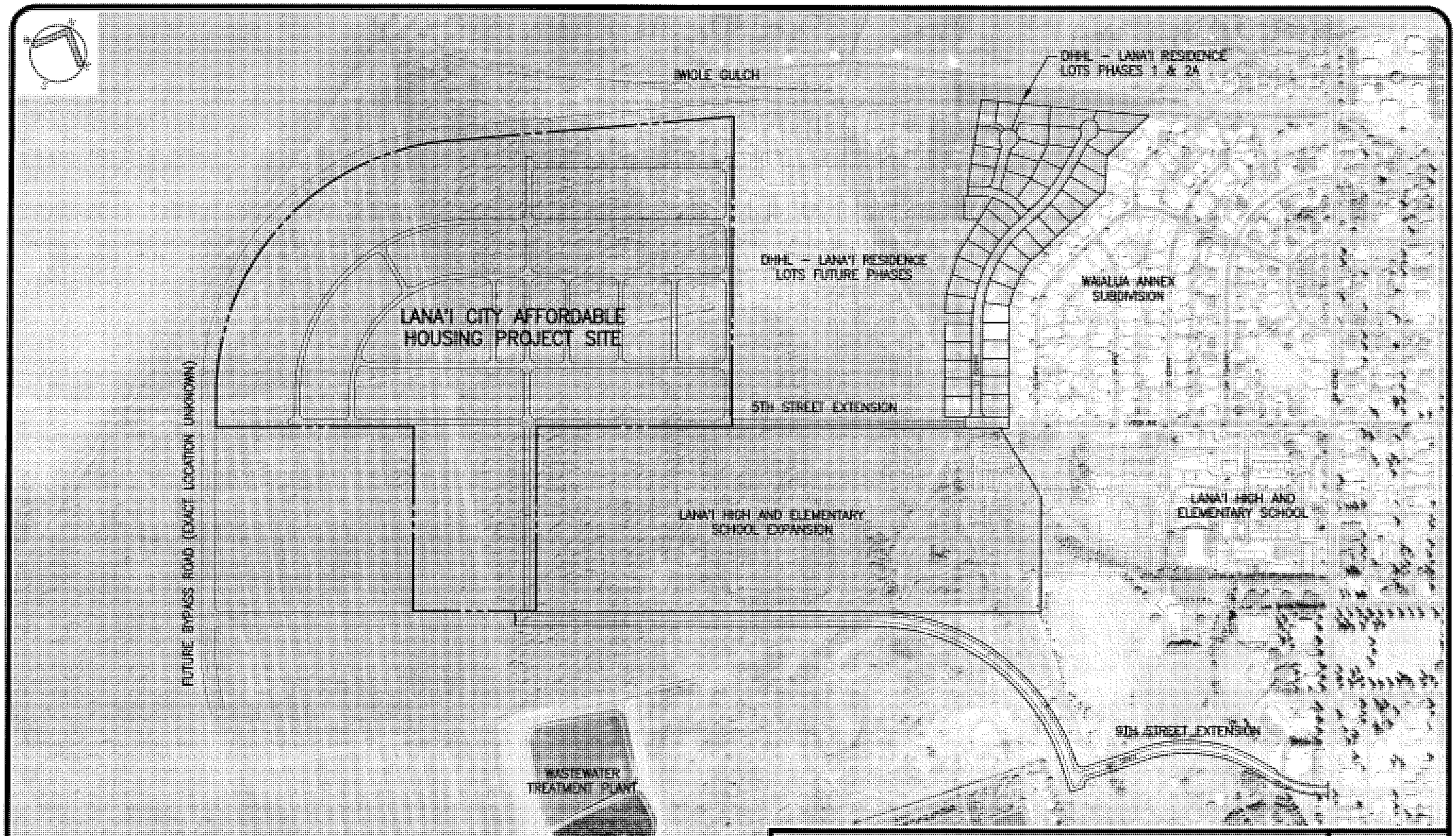
TITLE **U.S.G.S. MAP**
SCALE: 1" = 2000'

FIGURE **2**

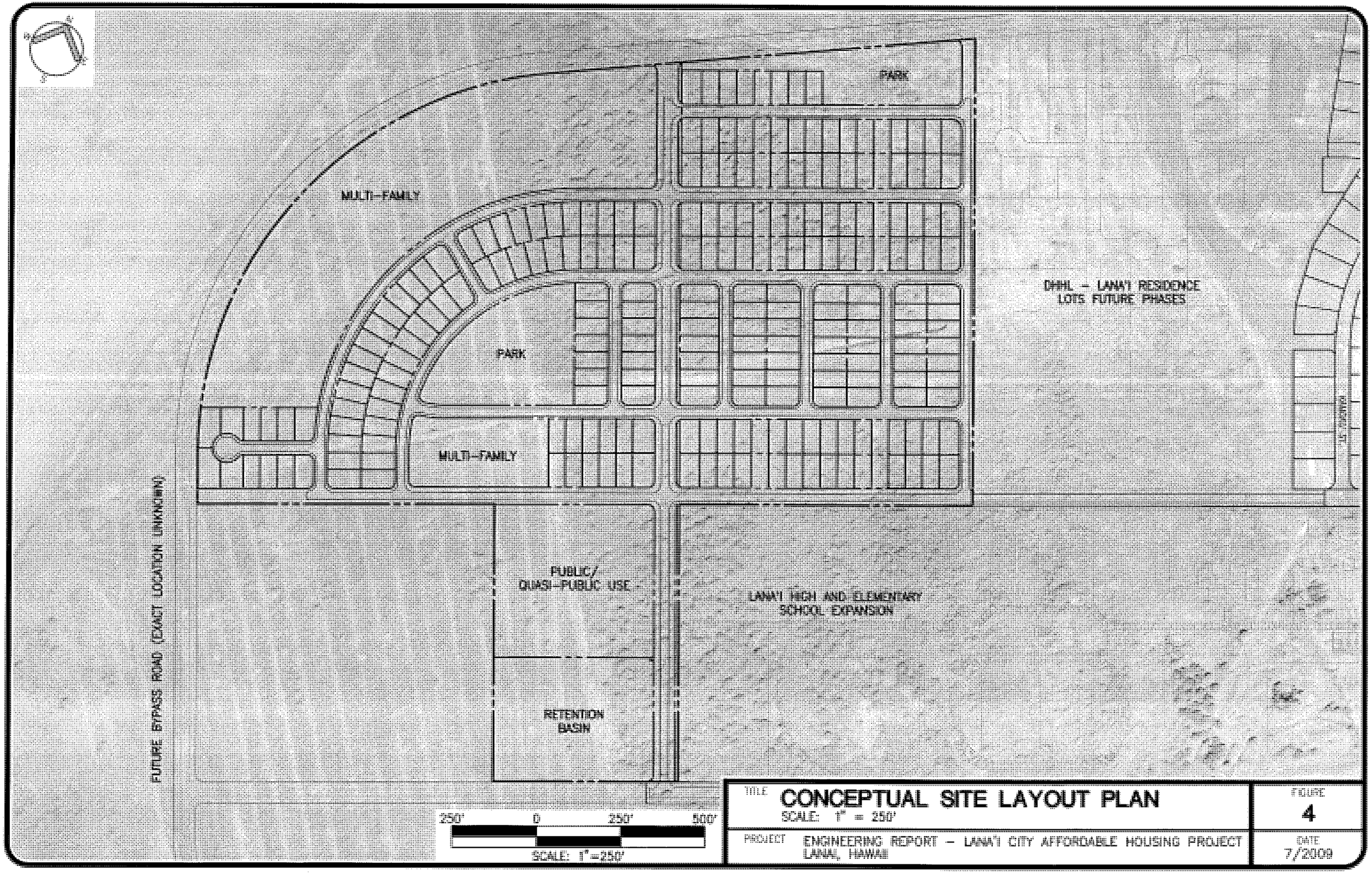
PROJECT ENGINEERING REPORT – LANA'I CITY AFFORDABLE HOUSING PROJECT
LANAI, HAWAII

DATE 7/2009

2008\208-028 Lana'i Affordable Housing\Report\Figures\FIG-02.dwg/1:1



TITLE: **VICINITY MAP** SCALE: 1" = 400'		FIGURE: 3
PROJECT:	ENGINEERING REPORT – LANA'I CITY AFFORDABLE HOUSING PROJECT LANAI, HAWAII	DATE: 7/2009

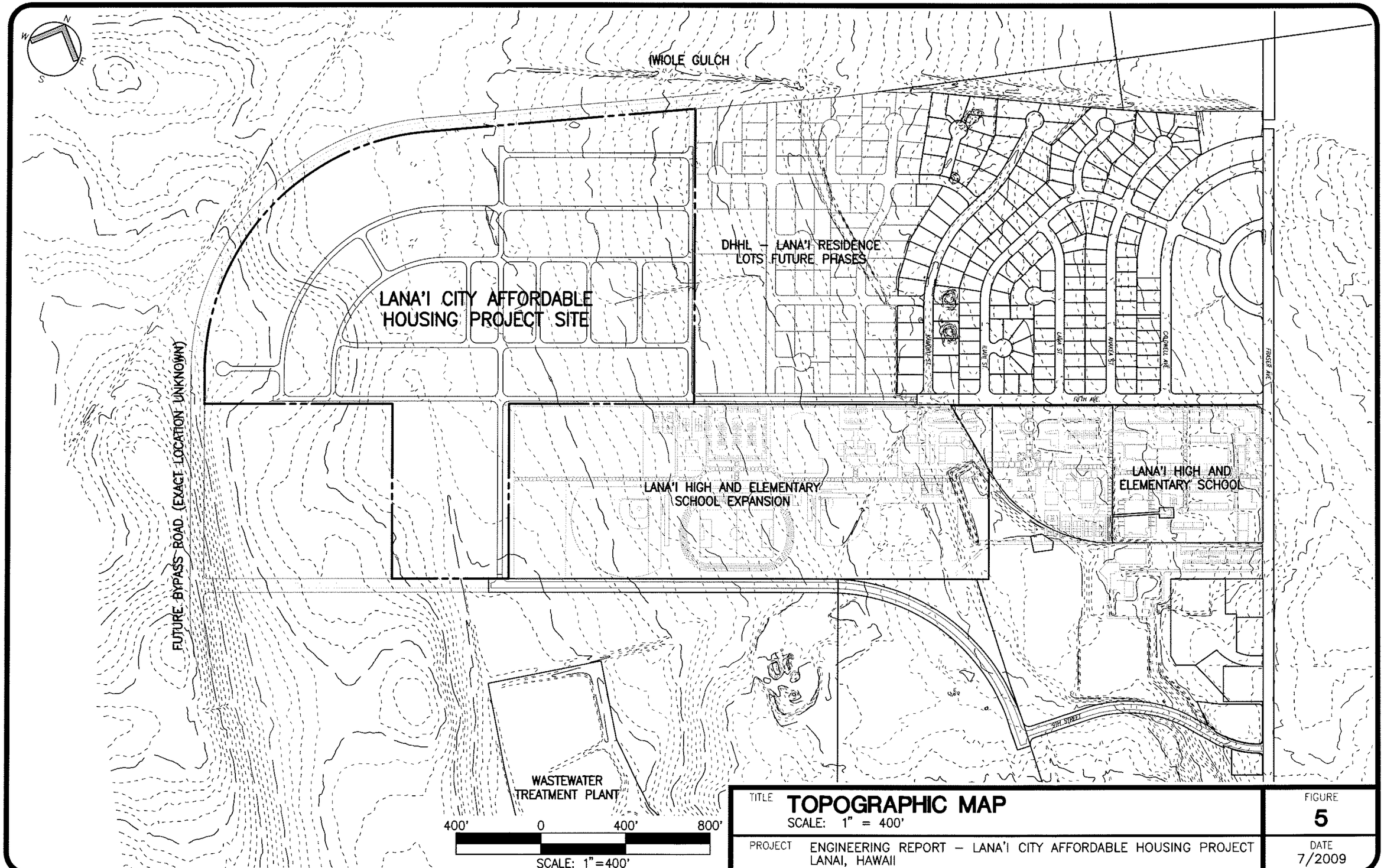


TITLE: **CONCEPTUAL SITE LAYOUT PLAN**
SCALE: 1" = 250'

FIGURE: **4**

PROJECT: ENGINEERING REPORT – LANA'I CITY AFFORDABLE HOUSING PROJECT
LANAI, HAWAII

DATE: 7/2009



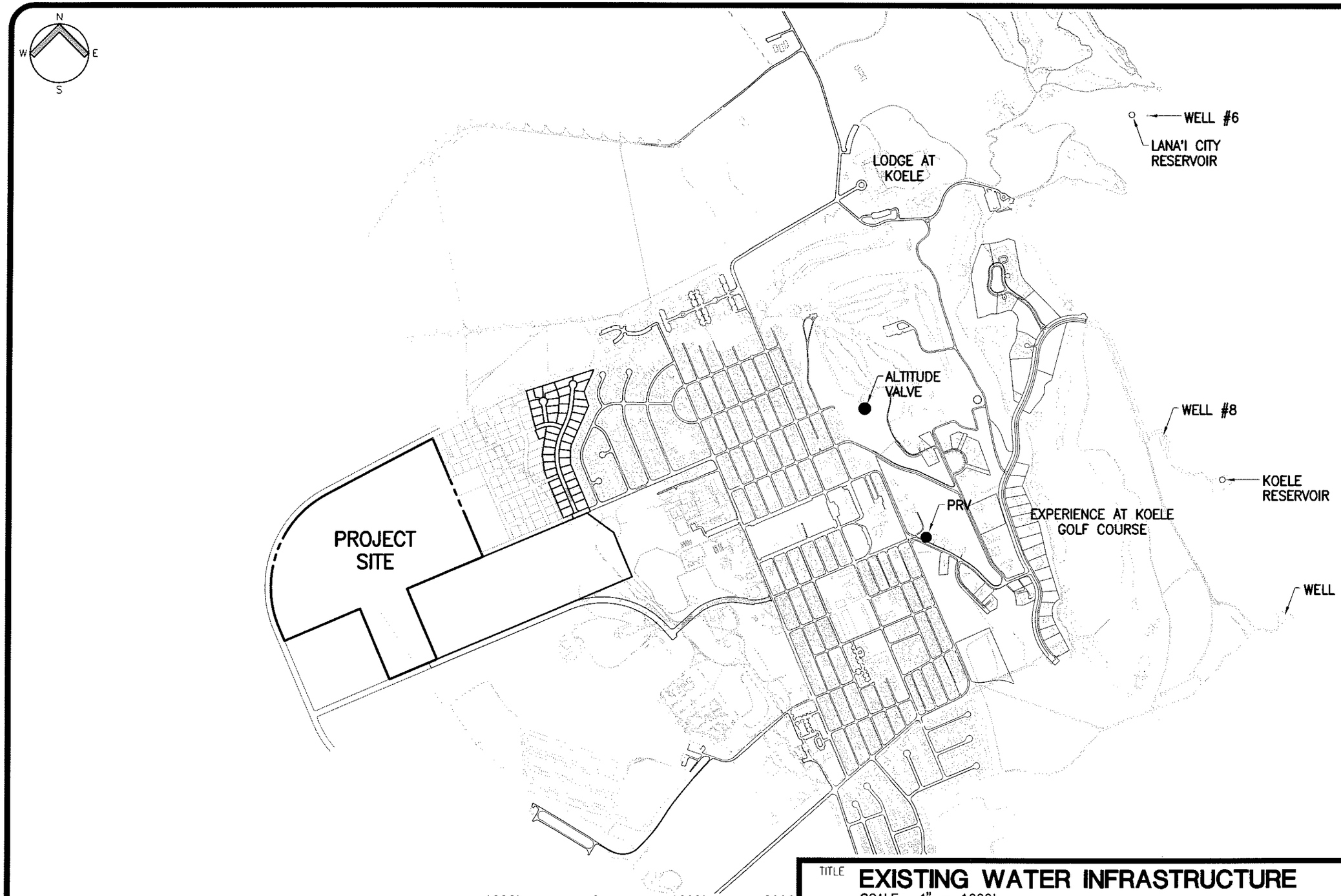
TITLE **TOPOGRAPHIC MAP** SCALE: 1" = 400'		FIGURE **5**
PROJECT	ENGINEERING REPORT – LANA'I CITY AFFORDABLE HOUSING PROJECT LANAI, HAWAII	DATE 7/2009

TITLE: **EXISTING SEWER LAYOUT**
SCALE: 1" = 400'

FIGURE: **6**

PROJECT: ENGINEERING REPORT – LANA'I CITY AFFORDABLE HOUSING PROJECT
LANAI, HAWAII

DATE: 7/2009



TITLE **EXISTING WATER INFRASTRUCTURE**
SCALE: 1" = 1000'

FIGURE **7**

PROJECT ENGINEERING REPORT – LANA'I CITY AFFORDABLE HOUSING PROJECT
LANAI, HAWAII

DATE 7/2009

TABLE 1
SUMMARY OF CLIMATOLOGICAL DATA AT LANA'I CITY (1961-1990)

Month	Temperature (F)			Rainfall (in)		
	Average	Average Maximum	Average Minimum	Average	Maximum	Average Minimum
January	66.2	72.7	59.7	6.11	16.90	0.43
February	66.4	73.2	59.4	4.09	13.66	0.56
March	67.0	73.6	60.3	3.73	12.77	0.16
April	67.8	74.3	61.4	3.49	14.31	0.27
May	68.9	75.3	62.4	2.94	10.07	0.30
June	70.4	76.7	64.1	1.35	6.44	0.05
July	71.4	77.3	65.4	1.98	7.45	0.22
August	72.1	78.3	66.0	1.50	4.15	0.17
September	72.2	78.8	65.4	2.16	8.85	0.24
October	71.4	78.1	64.5	2.81	11.44	0.07
November	69.7	76.4	63.0	3.84	16.53	0.16
December	67.3	73.8	60.7	4.65	10.40	0.19
ANNUAL	**69.2**	**75.7**	**62.7**	**38.65**	**66.87**	**17.06**