



# Nanakuli Community Baseyard

TMK (1) 8-7-09:02 (por.)

Lualualei, O'ahu, Hawai'i

Draft Environmental Impact Statement

November 2009



Prepared for: TROPIC LAND LLC

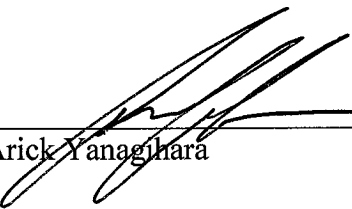
Draft Environmental Impact Statement

Nanakuli Community Baseyard

Lualualei, Waianae District, Oahu, Hawaii

This draft environmental impact statement, and all ancillary documents were prepared under signatory's direction or supervision, and the information submitted, to the best of the signatory's knowledge, fully addresses document content requirements as set forth in HAR §11-200-16 and §11-200-17, as appropriate.

TROPIC LAND LLC

  
\_\_\_\_\_  
Arick Yanagihara

\_\_\_\_\_  
November 3, 2009

Date

Prepared for Tropic Land LLC  
Prepared by Kimura International

November 2009



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**Lualualei, O‘ahu, Hawai‘i**

## **Draft Environmental Impact Statement**

Prepared for:

**Tropic Land LLC**

Prepared by:

**Kimura International, Inc.  
1600 Kapiolani Boulevard, Suite 1610  
Honolulu, HI 96814**

For Submittal to:

**State of Hawaii Land Use Commission  
In support of a District Boundary Amendment**

November 2009

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## Glossary of Acronyms

ALISH	Agricultural Lands of Importance to the State of Hawai‘i
BMP	Best Management Practice
BWS	Board of Water Supply
CBT	Cyclic Biological Treatment
CC&Rs	Covenants, Conditions, and Restrictions
CT	Census Tract
CY	Cubic Yard
dB	Decibel
DEIS	Draft Environmental Impact Statement
DOH	Department of Health, State of Hawaii
DPP	Department of Planning and Permitting, City and County of Honolulu
EA	Environmental Assessment
EISPN	Environmental Impact Statement Preparation Notice
FIRM	Flood Insurance Rate Map
GIS	Geographical Information System
GPD	Gallons per Day
GPM	Gallons per Minute
HAR	Hawai‘i Administrative Rules
HDOT	Hawai‘i Department of Transportation
HECO	Hawaiian Electric Company
HRS	Hawai‘i Revised Statutes
Ldn	(Noise) Level, day-night average
LOS	Level of Service
LSB	Land Study Bureau, University of Hawai‘i
LUC	Land Use Commission
MG	Million Gallons
MGD	Million Gallons per Day
MPH	Miles per Hour
MSL	Mean Sea Level
NPDES	National Pollutant Discharge Elimination System
OEQC	Office of Environmental Quality Control
OMPO	Oahu Metropolitan Planning Organization
ORTP	Oahu Regional Transportation Plan
PSI	Pounds per Square Inch

SCP	Sustainable Communities Plan
SHPD	State Historic Preservation Division
SMA	Special Management Area
TIAR	Traffic Impact Analysis Report
TMK	Tax Map Key
UA	Unilateral Agreement
UBC	Uniform Building Code
USLE	Universal Soil Loss Equation (U.S. Department of Agriculture)
V/C	Volume to Capacity ration
VPH	Vehicles per Hour
WSCP	Wai‘anae Sustainable Communities Plan



## SUMMARY SHEET

### Project Overview

Tropic Land LLC proposes to develop a 96 acre industrial park on a 236.15 acre parcel of land fronting Lualualei Naval Access Road, approximately 2 miles *mauka* of Farrington Highway and south of a U.S. Naval installation. The project area is a portion of Oahu Tax Map Key No. 8-7-9: 02. The parcel is owned in fee by Tropic Land LLC.

The proposed industrial park would consist of approximately 41 lots, averaging two acres each, and developed on a condominium basis. A 25,000 SF incubator center is proposed, to provide affordable, start-up space for small businesses. The project will have a single secured entry on Lualualei Naval Access Road and a secondary access for fire and emergency purposes. The project concept was developed through extensive consultation with, and with the support of a larger number of Leeward Coast residents, the Nānākuli-Mā‘ili Neighborhood Board and other business and community groups.

Tropic Land LLC seeks to amend the State Land Use District boundaries from the Agricultural District to the Urban District and a change in zoning from Preservation (P-2) to Industrial (I-1) for the planned industrial use. The remainder of TMK 8-7-9: 02 will remain in the State Agricultural and Conservation Districts and in the City and County Preservation Zone.

### Alternatives Considered

A number of alternatives were considered for the site, which was formerly proposed for a golf course by the prior landowner. That proposal encompassed 259 acres, and included an 18-hole golf course, clubhouse, driving range, and nursery facility. In 1996, the Honolulu City Council approved a zoning change and Unilateral Agreement that entitles the landowner to build the golf course project. When Tropic Land acquired the property in 2005, it began considering alternative land uses, despite the existing land entitlements. Tropic Land was concerned with community opposition to the former golf course project, as well as economic conditions that reduced the viability of a golf course development.

The possibility of a light industrial park was raised through consultation with community members, who noted the Wai‘anae Coast’s growing residential population and labor force, yet limited employment and economic opportunities. Several alternative configurations for an industrial park were evaluated. The alternatives varied by number of entrances and provided different roadway layouts and lot configurations. The preferred plan with a single entry was selected as the most efficient and secure.

## Project Impacts and Mitigation

**Topography and Physical Conditions.** The project will consist of clearing and grading the 96-acre site of existing vegetation and replacing it with an industrial park facility. All grading operations will be conducted in compliance with County erosion control requirements. To mitigate rockfall hazard from cliffs near the project area, a 100-foot wide buffer will be constructed along the *mauka* boundary. The buffer will prevent falling rocks from rolling into the developed area. The buffer will also be incorporated into the drainage improvements and serve as a fire break.

**Construction Period Noise and Dust.** During construction, there will be short-term, construction related dust and noise. These impacts will be temporary, and will be mitigated by complying with State and County standards. Fugitive dust will be controlled by watering work areas, wind screens, limiting disturbed areas, and covering stockpiled materials and open truckloads. Timely paving and landscaping of project areas early in the construction schedule will also reduce dust emissions.

**Visual Impacts.** The project will modify the visual character at the base of the mountain range by converting an open, undeveloped area to an industrial park. To reduce the footprint of the proposed industrial park, no development will occur above the 200-foot elevation. Palm trees have been planted along the front and sides of the property to soften the view of the project from the street. Accent landscaping will be provided at the front gate and street trees planted along the internal streets.

**Agriculture.** The project will convert approximately 40 acres of arable lands to urban use. The impact on agriculture will be minimal, as these lands are not currently cultivated, and have not been cultivated since the 1980's. The soils in the petition area are clayey and rocky, and only about 13% of the project site is classified as Class B agricultural land with irrigation, with the remainder having marginal productivity. Affordable irrigation water is not available to the site.

**Roadways and Traffic.** Lualualei Naval Access Road will serve as the primary access road for the project. Truck traffic to and from the proposed industrial park is consistent with traffic generated by existing land uses along Lualualei Naval Access Road, including the PVT construction material landfill and a Navy ordnance storage area. The U.S. Navy, which owns Lualualei Naval Access Road, is willing to extend access to Tropic Land and its buyers to use this roadway on the same basis as being afforded to other private business on Lualualei Naval Access Road.

Traffic on Farrington Highway may also be impacted by the increased truck traffic. Tropic Land will discuss traffic mitigation measures with the State and the City, and is willing to participate in a fair-share arrangement to construct improvements to accommodate project build-out. Possible mitigation measures could include a dedicated left-turn lane from Farrington Highway onto Lualualei Naval Access Road, and a second left turn lane from Lualualei Naval Access Road onto Farrington Highway.

**Utilities.** Energy efficient design will be incorporated into development, and the industrial park will utilize recycled effluent for irrigation. The industrial park will be served by a privately owned and maintained independent wastewater treatment system. A solid waste management plan will be developed including efforts to minimize waste generated at the proposed industrial park during construction and operation. Recycling and landfill diversion practices by construction contractors and businesses will be encouraged.

**Other.** The project will not adversely impact flora and fauna, or archeological or cultural resources.

**Unresolved Issues.** As indicated above the U.S. Navy is willing to extend access to Tropic Land and its buyers to use Lualualei Naval Access Road. An unresolved issue is the form of the definitive access agreement, which is under discussion with the Navy.

### **Compatibility with Land Use Plans and Policies**

The development of the light industrial park requires an amendment to the State Land Use District from Agricultural to Urban for the 96-acre project area. The DEIS analysis showed that the project is reasonable, conforms with the objectives of the Hawai‘i State Plan, and with the applicable Urban district standards.

The project is consistent with the Wai‘anae Sustainable Communities Plan (WSCP) objectives and is directly supportive of the WSCP value of economic choices. As a job-producing and economy sustaining land use, the industrial park has the potential to become an employment center, providing greater economic choice to families in the WSCP area. The Honolulu Department of Planning and Permitting’s Draft Wai‘anae Sustainable Communities Plan Revision for 2009 identifies industrial as an alternative land use for this site. The revised Wai‘anae Sustainable Communities Plan must be approved by the Honolulu City Council.

The project area is currently zoned P-2, Preservation with a Unilateral Agreement allowing golf course use. This zoning was obtained in 1999 by the previous landowner, who proposed a golf course on the site and surrounding areas. Tropic Land is seeking a change in zoning from P-2 to Limited Industrial (I-1). The proposed light industrial park is consistent with the purpose of the I-1 district, is compatible with surrounding land uses, and will have minimal environmental impact.

## **Listing of Permits or Approvals**

The following permits are required or potentially required:

### **Federal**

- U.S. Army Corps of Engineers, Jurisdictional Determination (Ulehawa Stream)

### **State of Hawai‘i**

- State Land Use Commission, State Land Use Boundary Amendment
- Department of Health, Section 402, Clean Water Act, National Pollutant Discharge Elimination System (NPDES) Permit

### **City and County of Honolulu**

- Wai‘anae Sustainable Communities Plan Amendment
- Zoning Change (from P-2 Preservation to I-1 Industrial)
- Grading Permit
- Building Permit



## 1. INTRODUCTION

### 1.1 Proposed Action

Tropic Land LLC proposes to develop an industrial park that would occupy approximately 96 acres on TMK 8-7-9: 02, on the east side of Lualualei Naval Access Road (see Site Plan). The industrial park would consist of approximately 41 lots, averaging two acres each, and developed on a condominium basis. Lots in higher visibility areas, such as those along the main entry road and around intersections, may be further divided into smaller parcels. These locations are more likely to attract commercial businesses with greater customer interaction.

An incubator center is proposed for three of the lots. The incubator concept will enable small businesses to obtain affordable, start-up spaces. The concept includes an industrial building with approximately 25,000 SF, providing basic indoor spaces of up to 1,800 SF for a full bay. Open yard space would also be available in units measuring approximately 8,750 SF each.

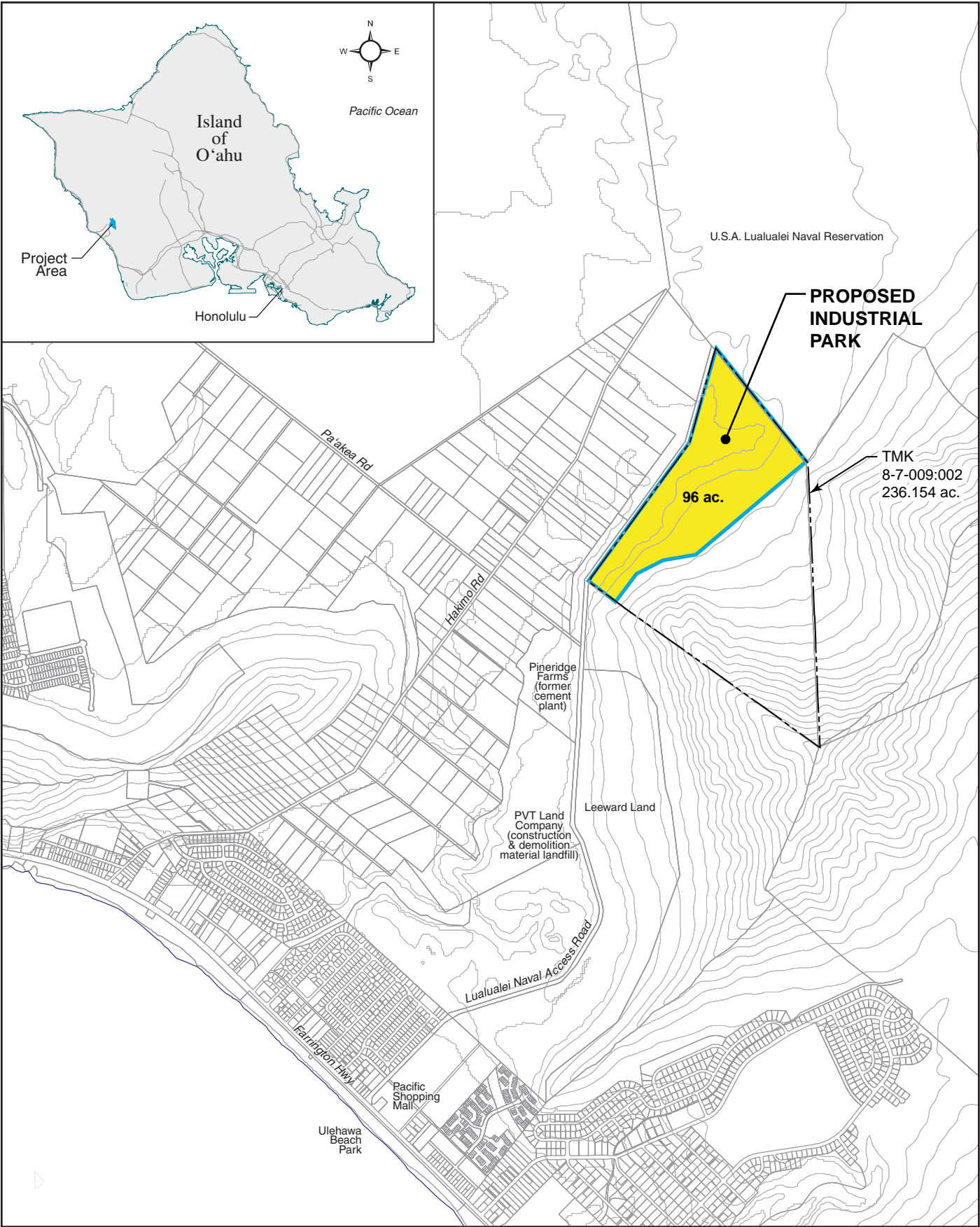
The project will have a single secured entry off of Lualualei Naval Access Road and a secondary access for fire and emergency purposes. The existing tree-lined setback will remain along the Lualualei Road frontage. This setback measures 30 feet wide, except in the northwest corner of the property where a triangular piece of land, approximately 2.4 acres in size, is included in the setback. The north and south property lines have 15-foot setbacks. An additional strip of land, approximately 100 feet wide and *mauka* of the industrial lots, will be used for drainage improvements, rockfall hazard mitigation, and a fire break.

The project will be structured under a condominium form of ownership with individual lots and common ownership of internal roads and infrastructure. Tropic Land LLC is planning to seek an I-1 zone for the area that is planned for industrial use. The remainder of TMK 8-7-9: 02 will remain in the State Agricultural and Conservation Districts and in the City and County Preservation Zone.

### 1.2 Project Location and Description

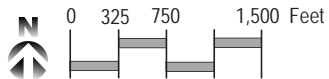
The project area is a portion of the property identified as Tax Map Key 8-7-9: 02. The entire TMK is 236.15 acres, of which the proposed action will occupy 96 acres. It is located in the upper Lualualei Valley approximately 2 miles *mauka* (inland) of Farrington Highway and immediately south of the U.S. Naval installation at Lualualei. The property is owned in fee by Tropic Land LLC. See Figures 1 and 2.

**Access.** At present, legal access to the property is via Hakimo Road. An easement from the Navy allows access from Hakimo Road across Lualualei Naval Access Road to the subject property. Tropic Land has reached an understanding with the Navy for the use of the Lualualei Naval Access Road, which provides a direct route to the property from Farrington Highway. Tropic Land is currently discussing the form of a definitive access agreement with the Navy.



**Figure 1**  
**Location Map**  
November 2009





**Figure 2**  
**Aerial Photograph**  
November 2009





Project site frontage along Lualualei Naval Access Road.



Frontage along Lualualei Access Road





Tropic Land entrance facing Naval Magazine Gate at the end of Lualualei Naval Road



Flat lands facing mountains.

### **1.3 Background of the Project Area—Development History**

The landowner prior to Tropic Land LLC was Kabushiki Kaisha Oban, (referred to as “Oban”) a Japanese corporation. Development of the project area for a proposed golf course was addressed in a Final EIS, accepted in 1991. The proposal included an 18-hole golf course and accessory uses. In 1996, Oban obtained approval of a conditional zoning change for approximately 188 acres from AG-1 Restricted Agricultural District and AG-2 General Agricultural District to P-2 General Preservation District. The zoning change was approved with conditions and recorded as Document 2337653 on September 24, 1996. The property has not been developed as a golf course. It was acquired by Tropic Land LLC from Oban in December 2005.

### **1.4 Purpose of the Draft Environmental Impact Statement**

This Draft Environmental Impact Statement (DEIS) was prepared for the proposed action pursuant to Chapter 343, Hawai‘i Revised Statutes (HRS); and State Department of Health Title 11, Chapter 200, Hawai‘i Administrative Rules (HAR).

The environmental review process allows for three courses of action depending on a project’s anticipated level of environmental impact. The first course would be “exemption” from environmental review according to the HAR Chapter 200 (Environmental Impact Statement Rules). These procedures are applicable to projects that typically do not impact the environment as determined by the relevant accepting authority.

The second course of action applies to projects whose environmental impact would not be “significant.” The term “significant” has a technical definition under HAR Chapter 200. For projects lacking a “significant” environmental impact, an Environmental Assessment (EA) is prepared and is the appropriate environmental review document.

The third course of action applies to projects expected to have a “significant” impact on the environment. For such projects, an Environmental Impact Statement (EIS) is prepared, and is the appropriate environmental review document.

Tropic Land LLC elected to go straight to an EIS for two reasons. First, an EIS had been prepared to examine the impacts of the prior development proposal, the “Oban Golf Course,” and the current property owner desired a similar level of environmental evaluation for the proposed light industrial park. Second, an EIS would allow for comprehensive disclosure and discussion of potential environmental impacts and mitigations.

Before the proposed action can be implemented, the landowner (Petitioner) must obtain an amendment to the State Land Use District (from Agricultural District to Urban District), an amendment to the City and County of Honolulu Wai‘anae Sustainable Communities Plan, and a change in zoning from preservation (P-2) to industrial (I-1). The completed EIS is intended to provide the environmental review needed to support the decision-making process in each case.

## 1.5 Steps in the Environmental Review and Implementation Process

An Environmental Impact Statement Preparation Notice (EISPN) was published by the State of Hawai‘i Office of Environmental Quality Control (OEQC) *Environmental Notice* on May 23, 2009. The 30-day public comment period ended on June 23, 2009. Comments received are included in Chapter 8 of this document.

This DES will be submitted to the OEQC for publication in the *Environmental Notice* announcing a 45-day public review period. Copies of the DEIS will be distributed to government agencies interested parties.

## 1.6 List of Possible Permits, Approvals, and Requirements for Regulatory Compliance

The following permits are required or potentially required. Input on other approvals that may be necessary is requested from government agencies and other participants in the environmental review process.

### Federal

- U.S. Army Corps of Engineers, Jurisdictional Determination (Ulehawa Stream)

### State of Hawai‘i

- State Land Use Commission, State Land Use Boundary Amendment
- Department of Health, Section 402, Clean Water Act, National Pollutant Discharge Elimination System (NPDES) Permit

### City and County of Honolulu

- Wai‘anae Sustainable Communities Plan, Amendment
- Zoning Change (from P-2 Preservation to I-1 Industrial)
- Grading Permit
- Building Permit

## 1.7 Project Summary

Project Name	Nānākuli Community Baseyard
Applicant/Landowner	Tropic Land LLC
Accepting Authority	State Land Use Commission

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Tax Map Keys	8-7-9: 2 (portion)
Location	East side of Lualualei Naval Access Road, approximately 2 miles from Farrington Highway, Wai‘anae District, Island of O‘ahu
Project Area	Approximately 96 acres
Project Description	<p>Tropic Land LLC proposes to develop a light industrial park on approximately 96 acres. The industrial park would consist of approximately 41 lots, averaging two acres each. The project would have a single secured entry off of Lualualei Naval Access Road and a secondary access for fire and emergency purposes. Surrounding the project site are a 30-foot wide, landscaped buffer along the Lualualei Road frontage, approximately 2.4 acres of green space in the northwestern corner, and 15-foot setbacks along the north and south property lines. On the <i>mauka</i> side, an additional strip of land approximately 100 feet wide is planned for drainage improvements and rockfall hazard mitigation.</p> <p>The project will be structured under a condominium form of ownership with individual lots and common ownership of internal roads and infrastructure. Three lots are set aside for a third party to develop an incubator center to provide start-up spaces.</p> <p>Tropic Land LLC is planning to seek an I-1 zone for the proposed industrial are. The remainder of TMK 8-7-9: 02 will remain in the preservation zone.</p>
Existing Uses	<p>The site is vacant and covered mostly with grasses, <i>haole koa</i> bushes, and isolated <i>kiawe</i> trees. Grasses are mowed periodically for fire control purpose and used for silage.</p> <p>The entire site remains subject to an existing Unilateral Agreement (UA) related to the development of a golf course.</p>
State Land Use	Agricultural District
Zoning	P-2 Preservation
Flood Insurance Rate Map	The entire project site is situated within Flood Area Zone D (areas in which flood hazards are undetermined).
Special Management Area	No
EIS Preparer	Kimura International, Inc. 1600 Kapi‘olani Boulevard, Suite 1610 Honolulu, HI 96814 Contact: Glenn Kimura

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## 2. PURPOSE OF AND NEED FOR ACTION

There is a disparity in economic development opportunities on the Wai‘anae Coast. On the one hand, there is a growing residential population and labor force—yet, on the other hand, limited, and even stagnant, employment and available industrial space for business creation and expansion. The proposed light industrial park is needed to develop a new employment center and alleviate the gap between jobs and the available labor force.

The Wai‘anae Coast accounts for almost 5.0 percent of total population on O‘ahu, but less than 1.5 percent of the island’s employment. The imbalance is not expected to improve in the future. The Department of Planning and Permitting prepares socio-economic projections that are reported in the *Annual Report on the Status of Land Use on O‘ahu*. The *Annual Report* for Fiscal Year 2006 indicates that population in the Wai‘anae Development Plan area will grow moderately from 44,656 in 2005 to 52,285 in 2030. However, employment is projected to *decrease* from 7,253 in 2005 to 7,126 in 2030.

One obstacle to job growth, particularly in the traditional industrial sectors (represented by the employment categories of Transportation, Industrial, and Construction) is the lack of available and affordable space. Existing industrial development on O‘ahu is overwhelmingly concentrated within three Development Plan Areas, namely, the Primary Urban Center, ‘Ewa, and Central O‘ahu. The combined inventory of industrial space within the remaining Development Plan Areas of East Honolulu, Ko‘olaupoko, Ko‘olauloa, North Shore, and Wai‘anae totals less than 1.0 million square feet, or only 2.7 percent of the islandwide total. This means that a large proportion of Wai‘anae Coast residents work outside their communities requiring longer commutes, more time spent away from families, and the greater financial and environmental costs of increased fuel use.

The proposed action addresses the ongoing deficiency of developable industrial land on the Wai‘anae Coast. The sustainability of a community, including the ability to support a range of economic activities and workplaces for its residents, requires a broad distribution of land use types. The light industrial park will provide opportunities for blue-collar trade and craft employers to locate within the community.

### Industrial Market Analysis<sup>1</sup>

According to data compiled at the end of 2007 by Colliers Monroe Friedlander (Colliers), the total supply of existing industrial space on O‘ahu was estimated at approximately 36.4 million square feet of floor area within 1,668 buildings. The indicated overall vacancy ate within the island’s industrial marketplace was 3%.

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<sup>1</sup> Based on a Market Analysis and Employment Forecast Study prepared by Hastings, Conboy, Braig & Associates, Ltd. dated March 2008.

The geographic distribution of industrial space on O‘ahu can be allocated among 11 major sub-markets, with the four largest market areas identified as:

Kalihi/Sand Island	8.47 million square feet
Airport/Mapunapuna	8.26 million square feet
Campbell Industrial Park/Kapolei Business Park	5.60 million square feet
Bougainville/Halawa	3.23 million square feet

The seven remaining market areas have smaller inventories of industrial space ranging from as low as 467,000 square feet in Kailua to just over 2.4 million square feet in Iwilei.

Among the more notable aspects or characteristics of O‘ahu’s industrial marketplace is the geographic concentration of the existing supply. Existing industrial development is overwhelmingly concentrated within three of O‘ahu’s planning areas, namely the Primary Urban Center, ‘Ewa, and Central O‘ahu. The Colliers data indicate that the combined inventory of industrial space within the other five planning areas—East Honolulu, Ko‘olaupoko, Ko‘olauloa, North Shore, and Wai‘anae—totals less than 1.0 million square feet, or only 2.7% of the islandwide total.

The Primary Urban Center is characterized as a predominantly built-out market with potential redevelopment as a possible key component of future opportunities for industrial growth. ‘Ewa and Central O‘ahu are characterized as developing areas where the availability of land capable of accommodating continued expansion is the primary driving force regarding future opportunities for growth in the supply of additional industrial land and buildings. Increased industrial development in ‘Ewa and Central O‘ahu is also a response to the continued growth and development of substantial residential communities within these two areas.

Another significant feature of O‘ahu’s industrial marketplace is its relatively low vacancy rate as it relates to pent-up demand. Pent-up demand is defined as the component or quantity of additional market demand that would need to be absorbed or otherwise introduced in the marketplace to restore normal equilibrium between supply and demand during periods of unusually low vacancy. Typically, normal equilibrium between supply and demand is reflected by an overall vacancy rate of, say, 5%. The Colliers data indicate that O‘ahu’s overall vacancy rate is 3%, with the vacancy rate in selected market areas calculated at less than 1%.

O‘ahu’s vacancy rate of 3% equates to approximately 1.1 million square feet of available floor space among a total building inventory of 36.4 million square feet of floor space. Under these conditions, an additional supply of approximately 750,000 square feet of industrial space would be the implied requirement for a normal, equilibrium vacancy rate of 5%. The estimated amount of pent-up industrial demand is equivalent to roughly 50% or one-half of the total inventory floor space currently developed at the Gentry Business Park in Waipio.

### Industrial Market Analysis, Wa‘ianae Planning Area

The subject property’s regional setting and relevant market area is defined as the Wai‘anae planning area. The area extends along the leeward coast of O‘ahu, west of the Wai‘anae Mountain Range, and encompasses the valleys of Nānākuli, Mā‘ili, Wai‘anae, Mākaha, and Mākua, and the residential communities of Nānākuli, Mā‘ili, Waianae, and Mākaha.

The Wai‘anae market area is characterized as an outlying, rural-agricultural district of O‘ahu. Almost one-fourth of the total land area within the Wai‘anae planning area is categorized as agricultural. Only about 5% of the total land area is categorized as urban, with most of the urban designated land used for single-family residential use. Almost two-thirds of the total land area is categorized as either reservation or military. The latter category includes the military installation located directly inland from the subject property.

Similar information is reported by the DBEDT Office of Planning. According to a 2004 report, the total acreage of vacant land zoned for commercial and/or industrial use within the Wai‘anae planning area was statistically equal to zero.

Yet, from an existing demand perspective, the Wai‘anae planning area accounts for roughly 5% of O‘ahu’s total resident population and that continued population growth is projected for the area over the next twenty years. Also, demographic and socioeconomic data from the 2000 Census indicate a significant level of industrial job holders residing within the Wai‘anae planning area. An important implication of these statistics is the presence of an available labor force with industrial job training and experience already residing within the Wai‘anae market area.

### Industrial Land Use Demand Forecasts

The DPP Socioeconomic Projections for the Wai‘anae Development Plan Area forecast a steady and moderate growth in population for the area. In contrast the future outlook for job opportunities in the area is a no growth/ declining scenario. The population forecast for Wai‘anae increases from 44,656 in 2005 to 52,285 in 2030, while the job/employment forecast for Wai‘anae fluctuates at a modest level from 7,253 in 2005 to 7,126 in 2030.

Within the DPP project model, significant job growth to the year 2030 is forecast to occur within three planning areas: Primary Urban Center, ‘Ewa, and Central O‘ahu. All remaining planning areas, including East Honolulu, Ko‘olaupoko, Ko‘olaupoko, North Shore, and Waianae, are projected to have limited prospect for increases in future job opportunities.

Table 1 presents a more detailed breakdown of the DPP job projections to 2030 by various employment categories. Of particular note is a marked decline forecasted construction jobs for the Wai‘anae planning area from 801 in 2005 to 368 in 2030. This represents more than a 50% loss in jobs for the construction industry within the subject market area. The forecasted decline

in construction jobs appears to reflect a perceived lack of anticipated new development within the Wai‘anae planning area.

**Table 1**  
**Forecasted Jobs by Employment Category to the Year 2030**  
**for the City and County of Honolulu and Wai‘anae Planning Area**

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>City and County of Honolulu</b>						
Armed Forces	40,368	40,368	40,370	40,370	40,370	40,370
Public Administration	36,703	37,606	38,601	39,392	40,304	41,282
Hotel	16,795	17,399	17,900	18,500	18,998	19,500
Agriculture	4,627	4,769	4,854	4,945	5,110	5,255
Transportation, Communication, Utilities	39,531	41,599	43,591	45,711	47,816	49,997
Industrial	30,143	31,094	32,052	32,873	33,715	34,636
Construction	25,086	26,187	26,281	26,464	26,975	27,475
Finance, Insurance, Real Estate	33,965	35,611	37,311	38,910	40,603	42,299
Services	201,186	211,296	221,665	231,745	242,163	252,844
Retail	94,447	99,300	104,237	109,120	114,059	119,053
<b>Total Jobs</b>	<b>522,851</b>	<b>545,229</b>	<b>566,862</b>	<b>588,030</b>	<b>610,113</b>	<b>632,711</b>
<b>Wai‘anae Planning Area</b>						
Armed Forces	47	47	47	47	47	47
Public Administration	401	401	401	405	414	421
Hotel	26	109	109	109	109	110
Agriculture	534	553	569	581	607	620
Transportation, Communication, Utilities	193	196	208	221	224	234
Industrial	115	115	115	115	115	115
Construction	801	649	356	373	368	443
Finance, Insurance, Real Estate	245	245	245	245	245	245
Services	3,586	3,586	3,586	3,586	3,586	3,586
Retail	1,305	1,305	1,305	1,305	1,305	1,305
<b>Total Jobs</b>	<b>7,253</b>	<b>7,206</b>	<b>6,941</b>	<b>6,987</b>	<b>7,020</b>	<b>7,126</b>

Source: Department of Planning and Permitting, Socioeconomic Projections, 2000-2030 by Development Plan Area



The data in Table 2 show the disparity in population and job distribution associated with the Wai‘anae planning area. Although Wai‘anae accounts for almost 5% of the total population count of O‘ahu, it has less than 1.5% of the total island-wide job count. This disparity is even greater with respect to jobs within the traditional industrial sectors of employment (represented by employment in the categories of Transportation, Communications, Utilities; Industrial; and Construction). For industrial sector jobs, the Wai‘anae planning area accounts for less than 1% of the island-wide forecast.

**Table 2**  
**Comparison of Population and Employment Forecasts for O‘ahu**  
**and Wai‘anae Planning Area**

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Resident Population Forecast</b>						
O‘ahu	912,913	952,661	995,562	1,037,252	1,078,058	1,117,322
Percent of Island Total	100%	100%	100%	100%	100%	100%
Wai‘anae Planning Area	44,656	45,172	46,991	48,891	50,685	52,285
Percent of Island Total	4.9%	4.7%	4.7%	4.7%	4.7%	4.7%
<b>Employment/Job Forecast (Total Jobs)</b>						
O‘ahu	522,851	545,229	566,862	588,030	610,113	632,711
Percent of Island Total	100%	100%	100%	100%	100%	100%
Wai‘anae Planning Area	7,253	7,206	6,941	6,987	7,020	7,126
Percent of Island Total	1.4%	1.3%	1.2%	1.2%	1.2%	1.1%
<b>Employment/Job Forecast of Industrial Sector*</b>						
O‘ahu	94,760	98,880	101,924	105,048	108,506	112,108
Percent of Island Total	100%	100%	100%	100%	100%	100%
Wai‘anae Planning Area	1,109	960	679	706	707	792
Percent of Island Total	1.2%	1.0%	0.7%	0.7%	0.7%	0.7%

\* Industrial Sector jobs include all jobs within the employment categories: Transportation, Communications Utilities; Industrial; and Construction

Source: Department of Planning and Permitting, Socioeconomic Projections, 2000-2030 by Development Plan Area

The land use demand forecast by the HCBA study are based, in part, on projected modifications to the prevailing disparity between population distribution and job count distribution in the Wai‘anae planning area. The other engine of the land use demand forecast is an employment-

driven model. The methodology used to derive the land use forecasts is explained in the full study which is reproduced in Appendix B. The results of the employment are shown in Table 3.

**Table 3**  
**Industrial Land Use Demand Forecasts, 2005-2030**  
**Proposed Light Industrial Park, Lualualei, O‘ahu**

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Industrial Land Use Demand Forecast—Employment Model</b>						
<b>O‘ahu</b>						
Industrial Sector Job Forecast	94,760	98,880	101,924	105,048	108,506	112,108
Land Use Conversion Factor*	2,500	2,500	2,500	2,500	2,500	2,500
	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job
Industrial Land Use Demand (acres)	5,438	5,675	5,850	6,029	6,227	6,434
Cumulative Demand (acres)	--	236	411	590	789	996
<b>Wai‘anae Planning Area</b>						
Modified Industrial Job Forecast	1,109	1,978	2,038	2,101	2,170	2,242
@ <b>2.0%</b> of O‘ahu	5,000	5,000	5,000	5,000	5,000	5,000
Land Use Conversion Factor*	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job
Industrial Land Use Demand (acres)	127	227	234	241	249	257
<b>Cumulative Demand (acres)</b>	--	100	107	114	122	130
<b>HIGH END</b>						
<b>Wai‘anae Planning Area</b>						
Modified Industrial Job Forecast	1,109	1,681	1,733	1,786	1,845	1,906
@ <b>1.7%</b> of O‘ahu	5,000	5,000	5,000	5,000	5,000	5,000
Land Use Conversion Factor*	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job
Industrial Land Use Demand (acres)	127	193	199	205	212	219
<b>Cumulative Demand (acres)</b>	--	66	72	78	85	92
<b>MID RANGE</b>						
<b>Wai‘anae Planning Area</b>						
Modified Industrial Job Forecast	1,109	1,483	1,529	1,576	1,628	1,682
@ <b>1.5%</b> of O‘ahu	5,000	5,000	5,000	5,000	5,000	5,000
Land Use Conversion Factor*	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job	SF/Job
Industrial Land Use Demand (acres)	127	170	176	181	187	193
<b>Cumulative Demand (acres)</b>	--	43	49	54	60	66
<b>LOW END</b>						

\* Land Use Conversion Factor represented as Land Area per Employee/Job

Source: Hastings, Conboy, Braig & Associates, Ltd., March 2008

At the high end forecast, based on a 2.0% capture rate of O‘ahu’s industrial sector jobs to the Wai‘anae planning area, industrial land use demand within the subject market area is forecast to

be sufficient to absorb approximately 100 to 115 net acres of additional industrial land between 2010 and 2020. By comparison, the proposed subject project is anticipated to introduce 70 net acres of new industrial land onto the market during the same approximate time period.

At the mid-range forecast, based on a 1.7% capture rate of O‘ahu’s industrial sector jobs to the Wai‘anae planning area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 65 to 80 net acres of additional industrial land between 2010 and 2020. Again, the proposed subject project is anticipated to introduce 70 acres of new industrial land onto the market during this same approximate time period.

At the low end forecast, based on a 1.5% capture rate of O‘ahu’s industrial sector jobs to the Wai‘anae planning area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 45 to 55 net acres of additional industrial land between 2010 and 2020. Under this scenario the effective market absorption of the proposed subject project is anticipated to extend beyond a 15- to 20-year time horizon.

The rationale behind the use of modified industrial sector job forecasts for the Wai‘anae planning area was based on an expectation that a significant level of relocation demand (also referred to as transient demand) could potentially be attracted to the subject market area. This potential form of demand might well be the future result of selected industrial businesses acting on a desire to relocate their operations to a lower-cost option with better proximity to available labor resources.

Available market data indicate a geographic disparity between a growing resident population and potential industrial labor force residing within the Wai‘anae market area and the scarcity of any discernable new industrial development and employment opportunities within the same market area. The proposed Nānākuli Community Baseyard has the potential to alleviate or mitigate some of the effects of this ongoing disparity between labor force and job market locations.

The market study concluded that if the proposed light industrial park were successful in obtaining the necessary government approvals, “there is sufficient potential demand in the marketplace to achieve project absorption within, perhaps, a three- to five-year time frame” (Hastings, Braig, Conboy & Associates, 2008: 18).

### **3. PROPOSED ACTION AND ALTERNATIVES**

This chapter discusses the proposed light industrial park, tentatively named Nānākuli Community Baseyard, and alternative development schemes that have been considered.

#### **General History and Background**

In December 2005, Tropic Land LLC purchased the property from Kabushiki Kaisha Oban and the rights to develop a golf course on the property. After purchasing the golf course lands, Tropic received numerous comments from Wai‘anae Coast residents opposing the development of a golf course and requesting that development options be reconsidered. One of the suggestions was to develop a light industrial park. Other suggestions included a Disney-type theme park, golf driving range, affordable housing, and stock car racing facility. However, the predominant request was to develop a light industrial park.

At the September 4, 2007 meeting of the Wai‘anae Coast Neighborhood Board, Tropic announced its willingness to reconsider the golf course development and to discuss alternative development options with members of the community. Tropic met with the Board’s Planning Zoning Committee on October 10 and November 15, 2007 and shared preliminary plans for a light industrial park. The Planning and Zoning Committee voted to forward the proposed project to the entire Board for further discussion and consideration at its meeting on December 4, 2007.

Tropic first met with the newly established Nānākuli-Mā‘ili Neighborhood Board on May 20, 2008 and made a presentation to the full board. A follow-up presentation was made to the Planning and Zoning Committee on June 24, 2008. Both meetings provided opportunities for public input. On July 15, 2008, the Board unanimously adopted a resolution to support the development of the light industrial park.

#### **3.1 Project Description**

##### **Light Industrial Park**

Tropic Land LLC proposes to develop an industrial park that would occupy approximately 96 acres in the upper Lualualei Valley. The project is currently known as the Nānākuli Community Baseyard. It is located on a portion of the property identified as TMK 8-7-9: 02. The project area is bordered by Lualualei Naval Access Road on the west, with agricultural lots on the other side of the roadway. Abutting the property on the north is the Navy Munitions Command, Lualualei Headquarters Branch. Steep cliffs, including the slopes of Pu‘u Heleakala, lie on the south and east. See Figure 3, Site Plan.

The industrial park will be comprised of approximately 41 lots, averaging two acres each. Lots in higher visibility areas, such as those along the main entry road and around intersections, may be divided into smaller parcels for commercial and service-oriented businesses.

An incubator center is proposed for three of the lots. The incubator concept will enable small businesses to obtain affordable, start-up spaces. The concept includes a 25,000-SF industrial building providing indoor spaces of up to 1,800 SF for a full bay. Open yard space would also be available in increments of approximately 8,750 SF each.

The project will be structured under a condominium form of ownership with individual units (lots) and common ownership of internal roads and infrastructure. Tropic Land LLC is planning to seek an I-1 zone for the area that is planned for industrial use. The remainder of TMK 8-7-9: 02 will remain in the preservation zone. Covenants, Conditions, and Restrictions (CC&Rs) will be imposed on the industrial park. The CC&Rs will be used as a mechanism to minimize and mitigate adverse environmental impacts, as described in Chapters 4 and 6 of this DEIS.

## **Infrastructure**

**Access and Circulation.** Formal access to the project site is via Hakimo Road, across land situated between Hakimo Road and Lualualei Naval Access Road (TMK 8-7-10: 06, also owned by Tropic Land), and an easement from the U.S. Navy to cross Lualualei Naval Access Road. Tropic Land LLC has reached an understanding with the Navy for the formal use of the Lualualei Naval Access Road, and is currently discussing the form of a definitive access agreement with the Navy.

The development is planned with a single, secured entry off Lualualei Naval Access Road and a secondary access for fire and emergency purposes. Interior roads will be privately owned and maintained. Street will be designed with a 44-foot right-of-way and two 12-foot lanes. Street corners will be designed with wide turning radii to accommodate large trucks and trailers. Curbs, gutters, and sidewalks will be installed. Street lights and street trees will be installed for safety and aesthetic purposes.

**Buffers and Setbacks.** The existing line of palm trees will remain as a 30-foot landscaped setback along the Lualualei Naval Access Road frontage. In the northwest corner of the property, the setback will encompass Ulehawa Stream. Additional landscaping may be installed within this permanent green space; however, all development will occur outside the setback. The stream itself will remain in its natural state.

The north and south property lines will have 15-foot setbacks. An additional strip of land, approximately 100 feet wide and *mauka* of the industrial lots, will be used for rockfall hazard mitigation and a fire break.

**Drainage.** Retention facilities will be constructed to retain increases in storm drainage runoff that occurs as a result of the proposed development. These facilities will include a combination

of swales, detention ponds, and underground storage tanks. The 100-foot *mauka* strip will also include drainage improvements to accommodate peak runoff from the hillside. Retention facilities within the strip are intended to dampen the peak runoff generated from the hillside.

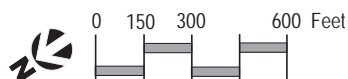
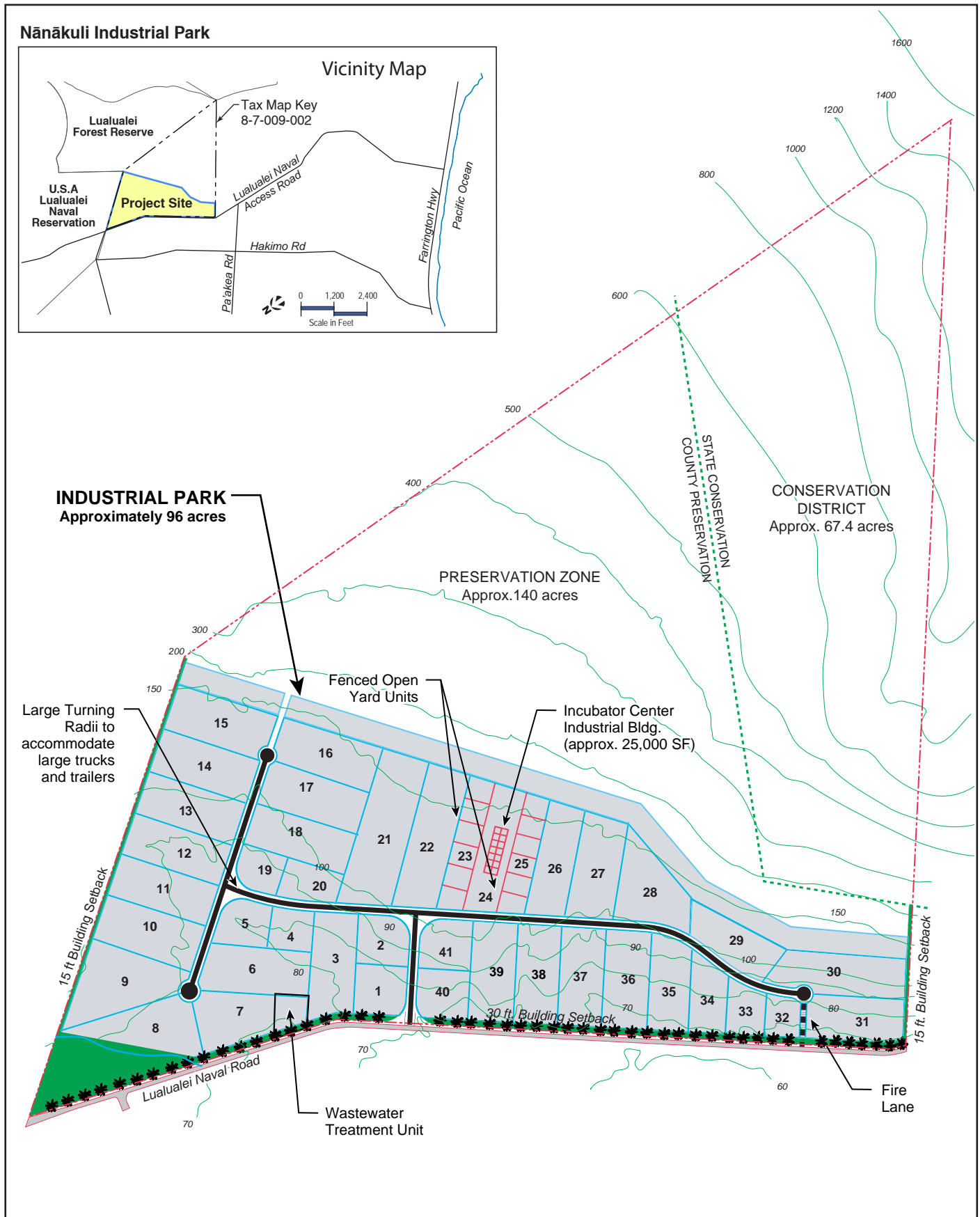
**Potable Water System.** The project's potable water system will be connected to the existing 8-inch Board of Water Supply (BWS) water line along Hakimo Road. A new 16-inch transmission line will be extended along Pa'akea Road and Lualualei Naval Access Road. The potable water distribution system will be designed and constructed in accordance with BWS standards and also to meet fire protection requirements. (Figure 4)

**Non-Potable Water System.** A pump system and non-potable water main will dispense treated effluent for irrigation. (Figure 5)

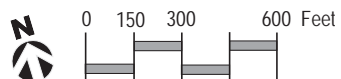
**Wastewater System.** The major components of the proposed wastewater system are the gravity collection system, wastewater treatment unit, and effluent disposal system. The system will be designed and constructed to State and County standards, but the on-site wastewater system will be privately operated and maintained. (Figure 6)

The wastewater treatment unit will be located in a 10,000-SF, fenced area within the industrial park. A single basin reactor will employ cyclic biological treatment with a continuous activated sludge system. Treated wastewater effluent will be chlorinated, disinfected, and pumped to a non-potable water storage tank. Effluent may be supplemented with non-potable water from the existing wells for irrigation purpose.

**Utilities.** The necessary electrical, telephone, cable TV, and high-speed internet services will be provided by Hawaiian Electric Co., Hawaiian Telcom, and Oceanic Time Warner Cable. The existing electrical facility at Mikiloa Substation is expected to supply power to the project site.



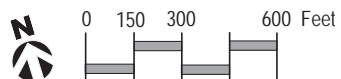
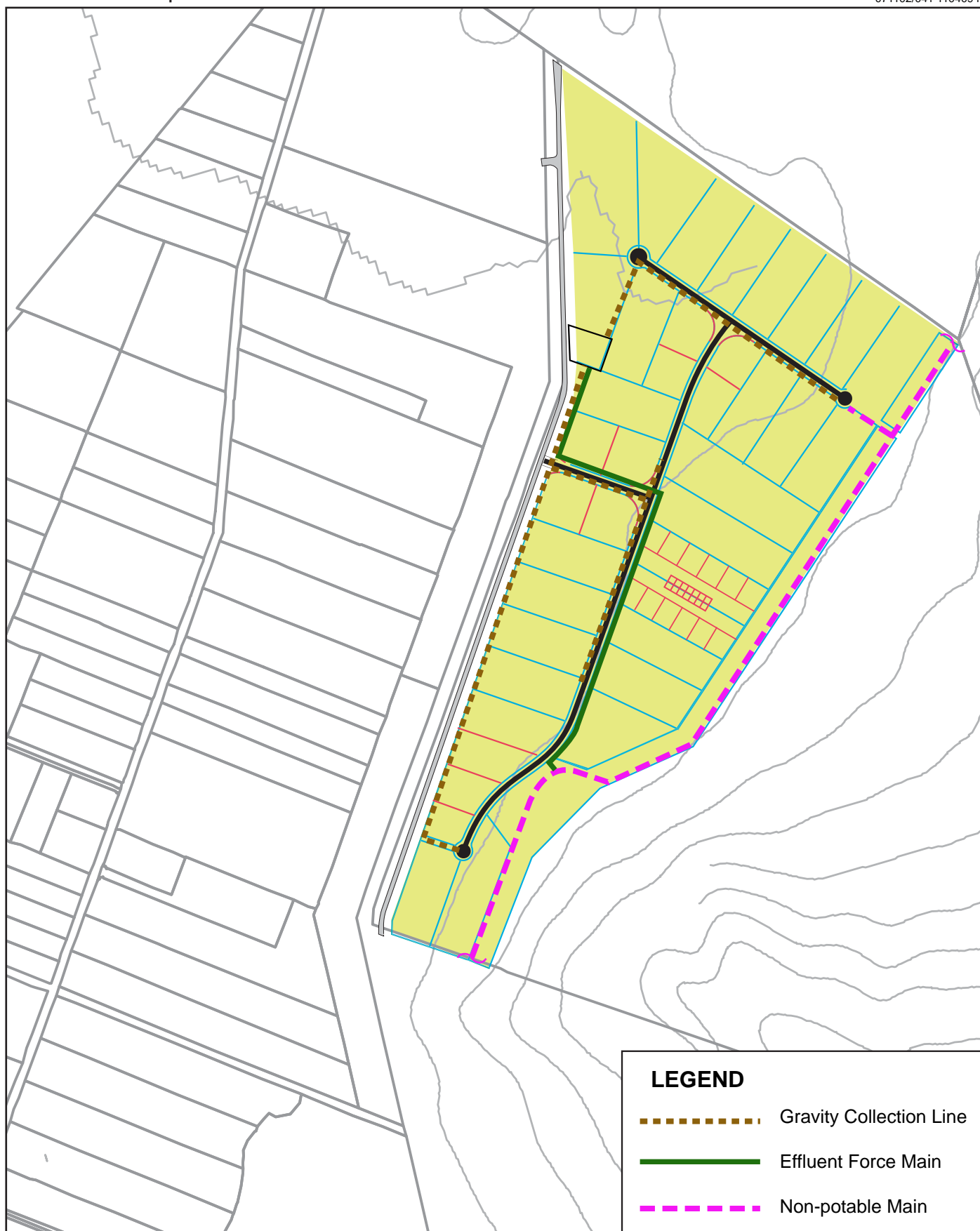
**Figure 3**  
**Site Plan**  
November 2009



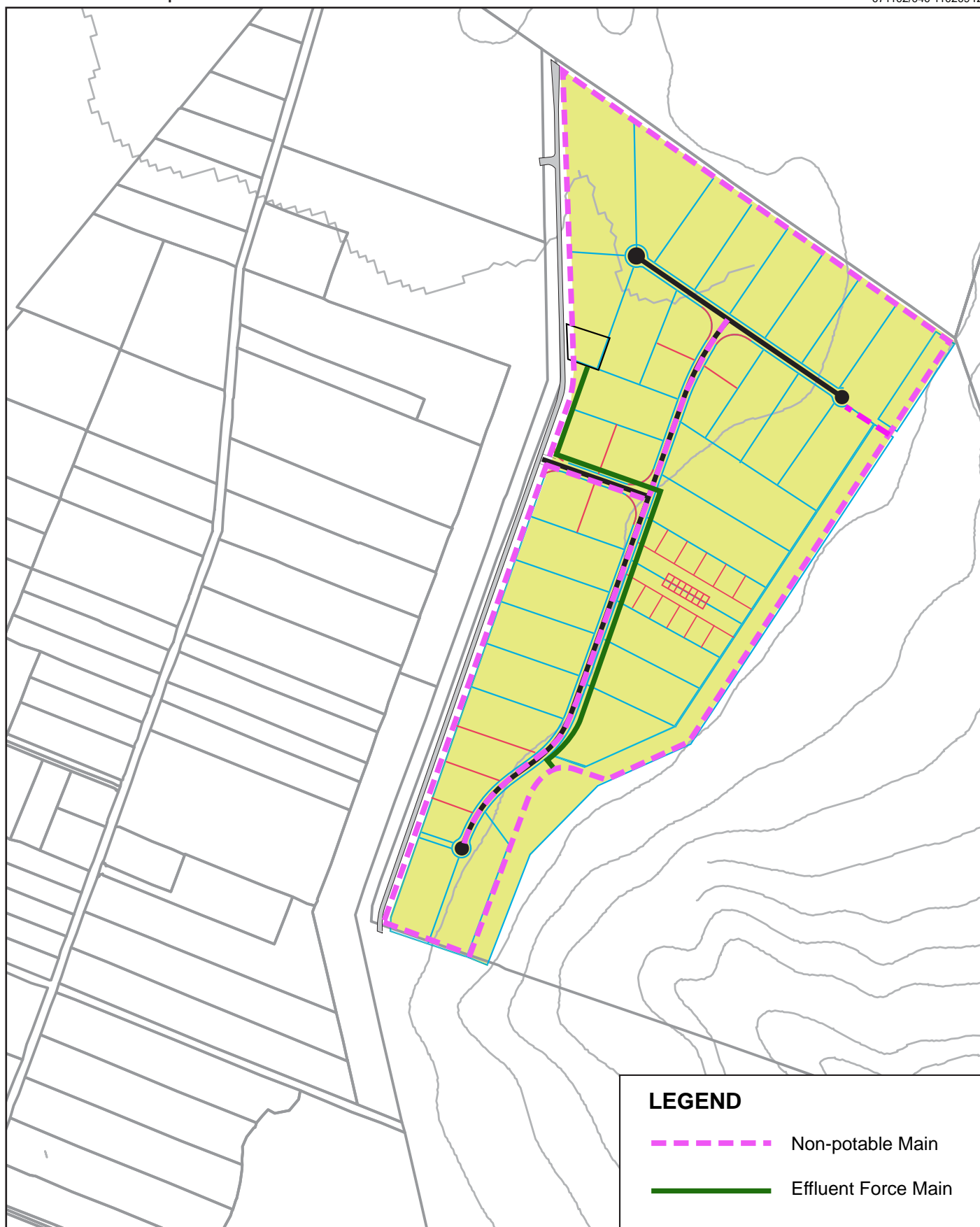
**Figure 4**  
**Potable Water Distribution System**

November 2009





**Figure 5**  
**Wastewater Infrastructures**  
November 2009



**Figure 6**  
**Non-potable Water Infrastructures**  
November 2009

## **3.2 Other Alternatives Considered**

This section reviews alternatives to the proposed development that were considered during the planning process.

### **3.2.1 No Action**

Under the No Action alternative, the industrial facilities and associated infrastructure proposed under the Nānākuli Community Baseyard project would not be realized. This alternative would result in the loss of benefits generated by the proposed development:

- No light industrial uses would occur on the site. Demand for affordable industrial space on the Wai‘anae Coast would not be met.
- The employment forecast of 560 to 840 direct jobs at full build-out of the project would be a foregone benefit.
- Future opportunities for new businesses and relocation opportunities for businesses to relocate closer to their workforce would not be realized.

The No Action alternative does not meet the owner’s objectives, regional economic development benefits, and opportunities for new or expanded businesses, products, and markets. The No Action alternative would result in less environmental impacts than the proposed project since site conditions would remain unchanged. In light of changes made to the Wai‘anae Sustainable Communities Plan (draft currently under public review), this alternative would not address community support for limited industrial expansion.

### **3.2.2 Golf Course**

The golf course alternative is based on an earlier master plan involving approximately 259 acres of Tropic Land’s land holdings, affecting TMKs 8-7-9: 2 (proposed industrial park site) and 8-7-10: 6 and 10 (located across Lualualei Naval Road). In addition to the regulation 18-hole golf course, the master plan includes a clubhouse, driving range, and nursery facility. The City Council approved a zoning change and Unilateral Agreement, effective September 24, 1996, that entitles the landowner to build the golf course project.

Despite existing entitlements, Tropic Land began considering alternative land uses upon acquiring the property in 2005. The search for other land use possibilities was based, in part, on community opposition to the golf course project that was evident in public comments on the EIS and during the City Council’s zoning deliberations. Moreover, the economic feasibility of developing a golf course has diminished over time with the decline of overseas visitors and the opening of other courses in West O‘ahu.

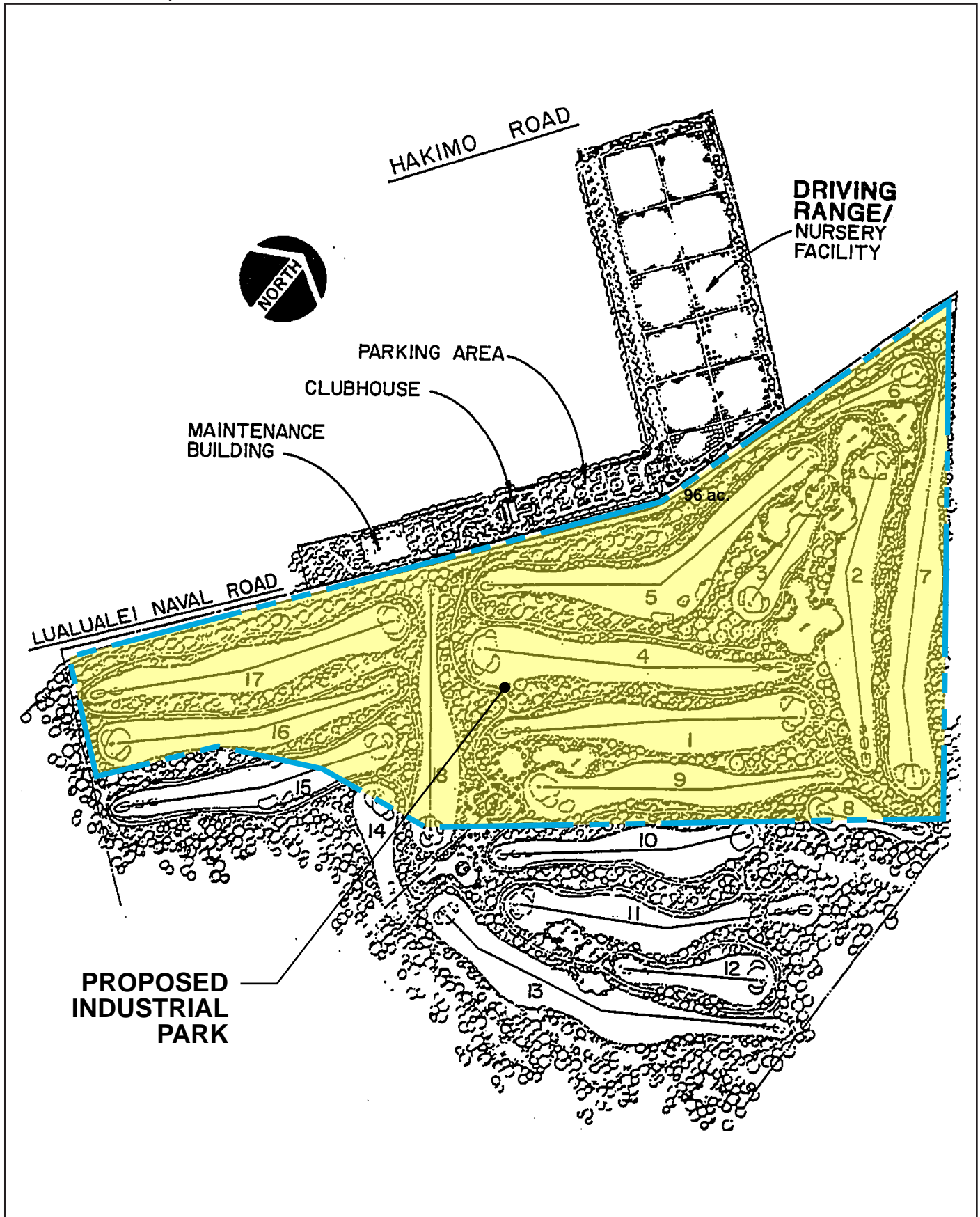
Figure 7 shows the footprint of the proposed light industrial park superimposed over the proposed golf course project.

### **3.2.3 Alternative Industrial Park Configurations**

The planning process included an examination of alternative configurations for the proposed industrial park. The limits of development were established by the steep slopes in the interior of the property. Within the flatter area, the alternatives featured variations in roadway layout and lot division. In addition to the preferred site plan, two alternative considerations were considered (Figure 8).

**Alternative A.** This layout features two entrances to the development with internal roads forming a single “T” intersection. Ultimately, this alternative was dismissed in favor of a site plan with a single entrance with gate control for improved security.

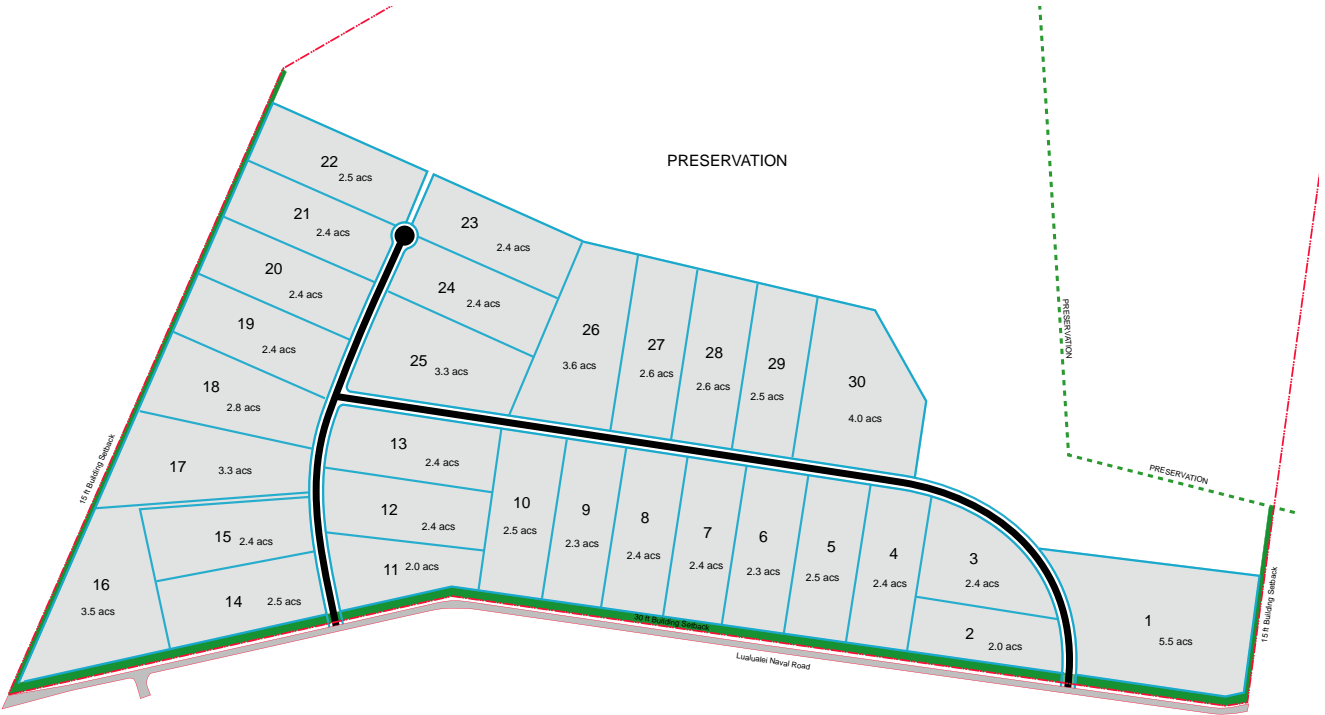
**Alternative B.** This alternative features a single entrance, supplemented by a secondary fire lane for emergency access. However, the layout involves a more extensive network of roads and utility lines, resulting in higher development costs than the preferred site plan.



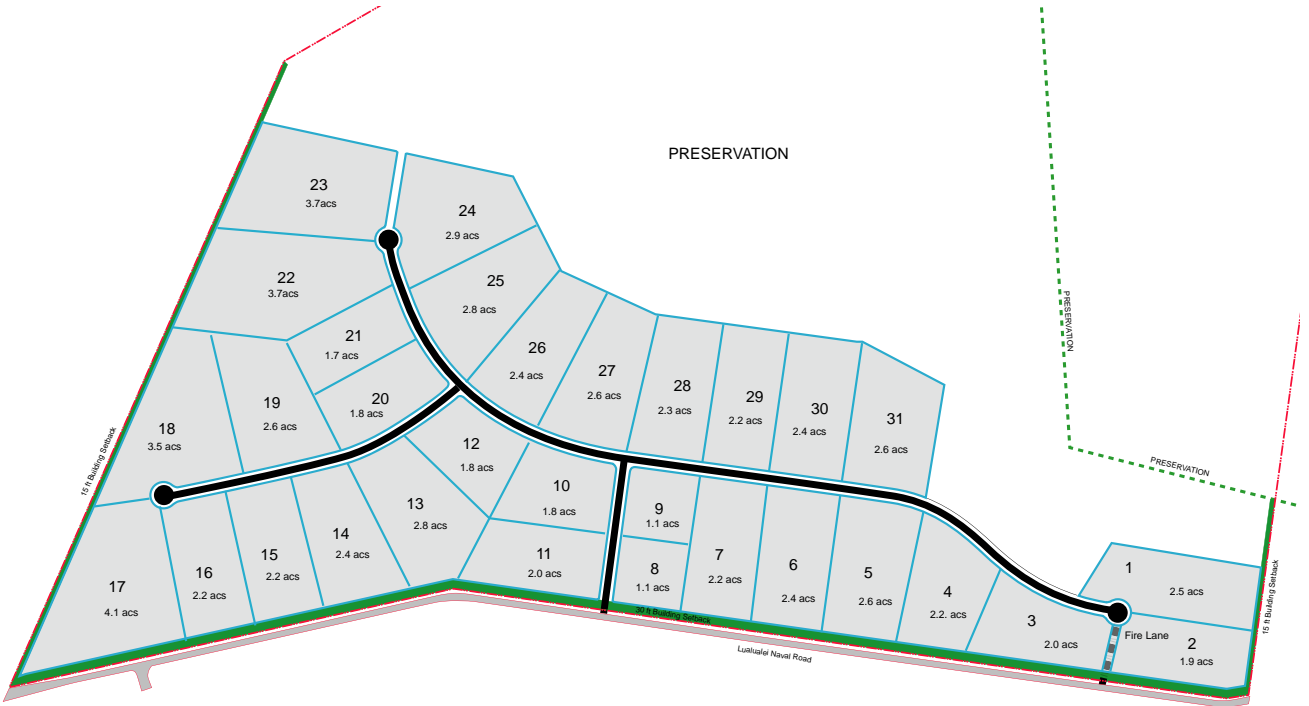
**Figure 7**  
**Comparison of Industrial Park and Golf Course**

November 2009

# Alternative A



# Alternative B



**Figure 8**  
**Alternative Industrial Park Configurations**  
November 2009

### 3.3 Preliminary Cost and Timetable

Based on the conceptual site plan, the preliminary cost for mass grading and infrastructure construction is estimated at \$29 million.

Project occupancy is expected to occur within 18 months from approval of necessary land use amendments, rezoning, and permits. As the master developer for the project, Tropic Land, LLC plans to construct the infrastructure for the light industrial park over a period of ten years. The phased development would proceed as shown in Figure 9. The affected land area and incremental infrastructure components are described in Table 4.

**Table 4**  
**Infrastructure Phasing Plan**

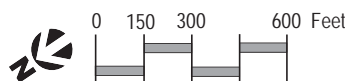
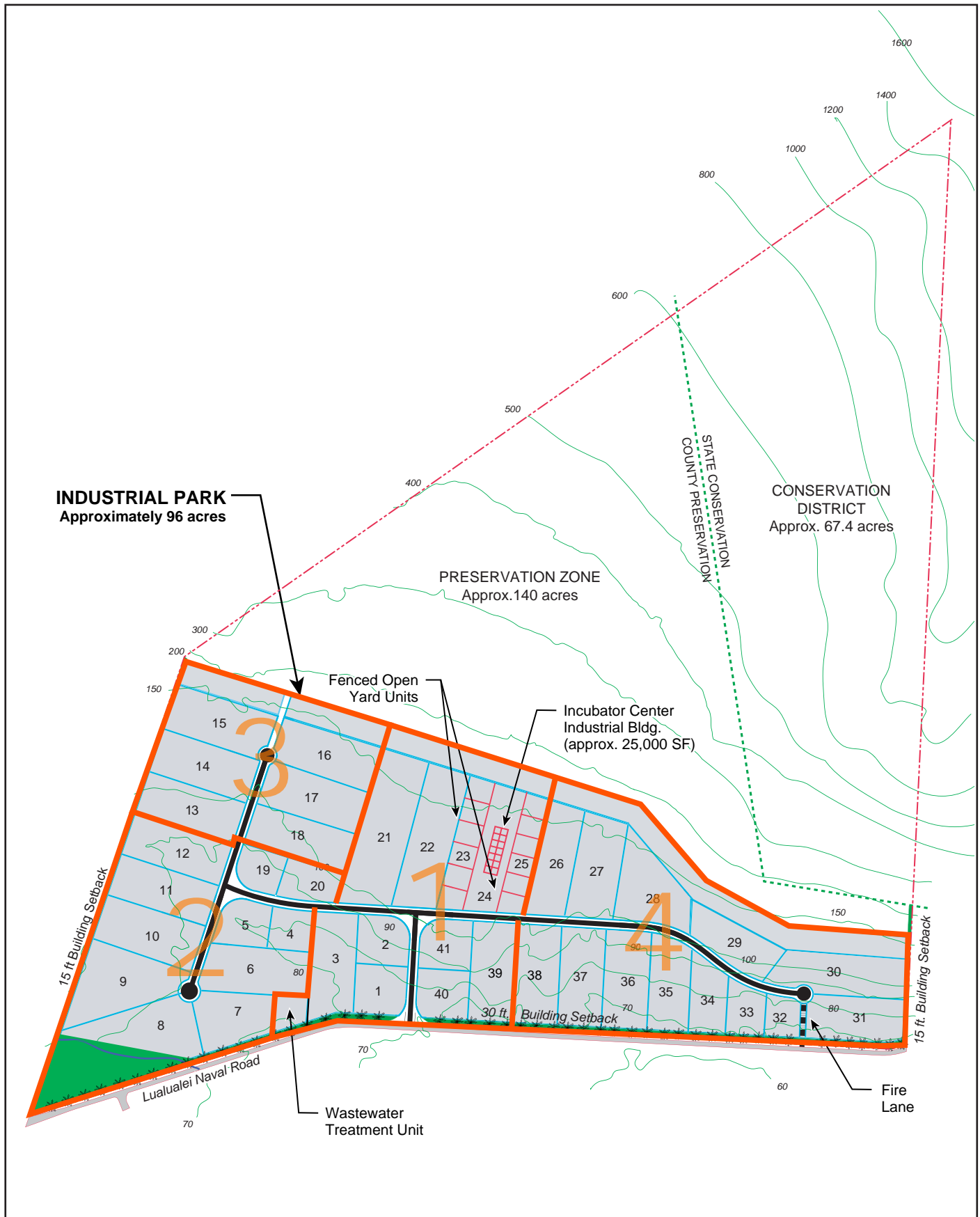
Phase	Area (Acres)	Road* (Feet)	Grading** (Cubic Yards)	Wastewater Treatment System	Rockfall Mitigation	Irrigation	Off-site 16" Water Line	Fire Lane
I	23	1,400	40,000	X	X	X	X	
II	22	1,600	30,000			X		
III	15	400	25,000	X	X	X		
IV	36	1,300	53,000		X	X		X
Total	96	4,700	148,000					

\* Road work to include curb, gutter, sidewalk, drainage, water, sewer, electrical, street lighting systems.

\*\* Grading work is limited to the roadway and rockfall mitigation areas only; quantities approximate.

Industrial lot development will depend upon sales and market absorption. A market study for this project developed three forecasts for industrial land demand in the Wai‘anae planning area. The low-end forecast was based on the assumption that the Wai‘anae area would capture 1.5% of future industrial job growth on O‘ahu; the mid-range forecast was based on capture of 1.7%, and the high-end forecast based on capture of 2.0%. Under the high-end and mid-range forecasts, the 10-year demand for industrial land would exceed the supply of 70 net acres offered by this project. Under the low-end forecast, the 10-year demand for industrial land of 54 acres is 77% of the supply offered by this project. Under either forecast, Tropic Land can reasonably expect the project will be absorbed within 10 years of receipt of all government approvals. A summary of the market study is contained in Chapter 2 of this document and the full study may be found in Appendix B.





**Figure 9**  
**Project Phasing**  
November 2009



## **4. AFFECTED ENVIRONMENT, ANTICIPATED IMPACTS, AND MITIGATION MEASURES**

This chapter presents background information on the existing human and natural environment pertaining to the project site. Utilizing this background, the proposed project is evaluated as to the potential for it to generate significant environmental impacts. Impact discussions are divided into short-term construction-related impacts and long-term operations-related impacts. Mitigation measures are identified and recommended in this chapter.

Technical consultant reports have been prepared to supplement the impact assessment. Findings from these reports are included herein and the reports may be found in the appendices.

### **4.1 Topography and Soils**

#### **Existing Conditions**

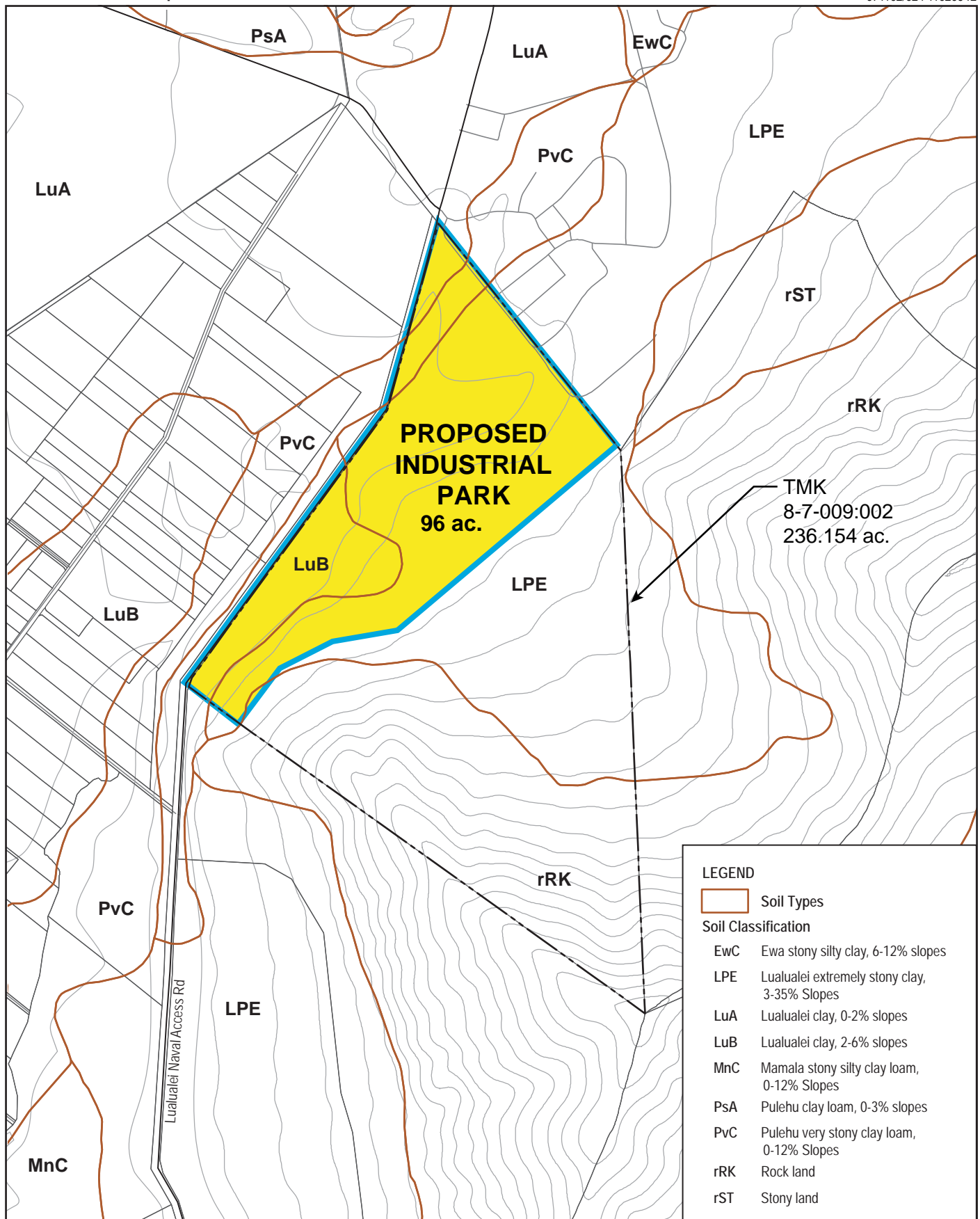
##### Topography

Generally, the project site slopes in a southwesterly direction towards the Lualualei Access Road. Approximately one-third of the parcel is situated below the 200-foot elevation above sea level. This area is relatively flat, sloping at a 12% rate from Lualualei Access Road upward to the foothills of Pu‘u Heleakala ridge.

Above the 200-foot elevation, the site takes on a more abrupt slope. It is estimated that the slope within this “second tier” of the parcel is within the 10-30% range. The rest of the parcel includes the foothills of the Pu‘u Haleakala ridge which slopes radically upward towards the peak of the ridge.

##### Soils

Soil types or classifications for the project site are based on soil surveys by the U.S. Department of Agriculture, Natural Resources Conservation Service (formerly Soil Conservation Service). According to the soil surveys, the project site contains mostly Lualualei extremely stony clay (LPE) with some Lualualei clay (LuB) on portions of the site directly abutting Lualualei Access Road and covering the flatter portions of the site (Figure 10). This section focuses on the erosion potential of on-site soils. Please see Section 4.7 for a discussion of soil suitability for agricultural production.



**Figure 10**  
**Soils Map**  
November 2009

### Erosion Potential

Most of the project site consists of LPE extremely stony clay. LPE soils occur on talus slopes on O‘ahu that range from 3 to 35 percent. The soil is similar to LuB soils except that there are many stones on the surface and in the profile. Runoff is medium to rapid, and the erosion hazard is moderate to severe in steeply sloped areas. LuB soils are also present in the project site and characterized by slow runoff with a slight erosion hazard.

### Grading

The grading concept is to provide relatively level lots. Total earthwork quantities of cut and fill for the development is estimated to be approximately 450,000 cubic yards (CY). An effort to balance earthwork quantities is expected to minimize the cost of purchasing off-site borrow material and/or disposing of excess excavated material at an off-site location. Grading operations will be in conformance with the applicable ordinances of the City and County of Honolulu.

### Soil Erosion

The project site was divided into two subareas for the purpose of calculating soil erosion potential (Figure 11). These subareas represent sites within the project area that vary in soil erosion potential characteristics, such as terrain and/or drainage network.

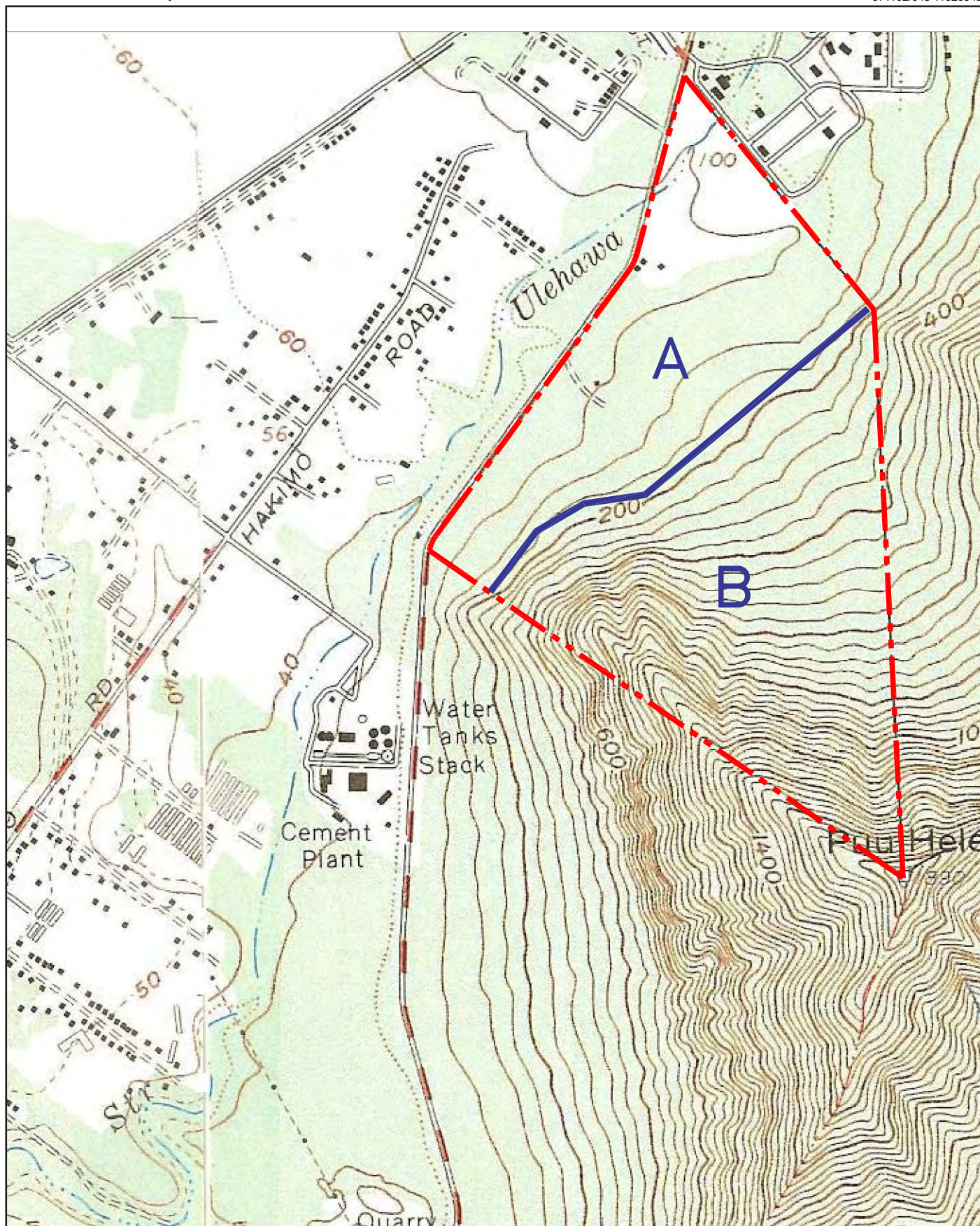
Subarea A, part of the Ulehawa Stream drainage basin, directly abuts Lualualei Access Road and covers the flatter portion of the project site. Subarea A occupies the approximate limits of the project area and is bounded to the north by the Naval installation, south by the ridge line of Pu‘u Heleakala, west by Lualualei Naval Access Road, and east by the approximate 190-foot contour. The entire area of Subarea A will be graded for the proposed industrial park.

Subarea B is located south of subarea A and is bounded on the south and east by the ridge line, and north by the approximate 190-foot contour, occupying an area of approximately 140 acres. Subarea B consists of medium-dense and rocky outcroppings with slopes ranging from 25 to 60 percent. No development is planned for Subarea B and it will remain in its existing state.

### Soil Erosion Potential under Existing Conditions

As calculated in the *Preliminary Engineering Report* by Hida, Okamoto and Associates (October 2009), see Appendix A) and using the U.S. Department of Agriculture, Universal Soil Loss Equation (USLE), the existing soil erosion potential of Subarea A (project site) is estimated at 403 tons/year. The existing soil erosion potential of Subarea B (the remaining 140 acres of the TMK) is estimated at 5,306 tons/year. Therefore, total existing erosion potential of the entire parcel is estimated at 5,706 tons/year.





Source: Hida, Okamoto & Associates, Inc., October 2009

**Figure 11**  
**Subareas for Calculation of Soil Erosion Potential**

November 2009

### Soil Erosion Potential after Development

The long-term change in soil erosion potential based on the proposed land use change also was estimated using the USLE. After development, the soil erosion potential of Subarea A (project site) has been estimated at 264 tons/ year. The erosion potential of Subarea B (remainder of the TMK) would be unchanged at 5,306 tons/year. For the entire parcel, the estimated soil erosion potential after development is 5,570 tons/year.

### **Potential Impacts and Mitigation Measures**

#### Topography

The project site plan consists of a development pattern that is compatible with the topography of the site. The light industrial park is confined to areas with flatter slopes below the 200-foot elevation. As shown in Figure 7 (Chapter 3 of this document), the development footprint is smaller than the golf course previously proposed for the site, and will leave more of the foothills undeveloped.

There is a potential for loose rocks to fall from the slopes behind the proposed development. To mitigate adverse impacts from falling rocks, a 100-foot wide buffer has been set aside along the entire *mauka* boundary of the industrial park. This buffer has not been designed at this point, but is conceived as an unlined channel with possible fencing to catch falling rocks and debris. Engineering plans will be prepared during the project design phase.

#### Soil Erosion

**Short-term Impacts.** Construction of the proposed industrial park will involve land disturbing activities that result in soil erosion. These land disturbing activities include removal of existing vegetation (clearing and grubbing), leveling, removing, and replacing soil. Short-term impacts due to construction are estimated to last 18 months.

Using the USLE, the short-term construction impact was calculated at 36,860 tons of soil erosion for a one-year period. Of this amount, approximate 10% (3,690 tons) could potentially affect Ulehawa Stream.

Mitigation measures will be implemented to reduce short-term soil erosion. These measures include limiting grading to not more than 15 consecutive acres at a time and installing a sedimentation basin at least 12,000 square feet in size at the grading site.

Additional Best Management Practices (BMPs) will be taken to lessen construction impacts further, as listed below.

- Minimize time of construction to the extent possible.
- Retain existing ground cover until the latest date before construction.



- Sod or landscape all cut and fill slopes immediately after grading work has been completed.
- Early construction of drainage control features (i.e., detention/retention basins).
- Use of temporary area sprinklers and spraying in non-active construction areas when ground cover is removed.
- Station water truck on site during construction period to provide for immediate sprinkling, as needed, in active construction zones (weekends and holidays included).
- Use temporary berms and cutoff ditches, where needed, for erosion control.
- Thorough watering of graded areas after construction activity has ceased for the day and on weekends.
- Provide sedimentation basins.
- Use slope stabilization materials where needed.

A Grading and Erosion Control Plan will be prepared in compliance with Chapter 23, Revised Ordinances of Honolulu. Further, the National Pollutant Discharge Elimination System (NPDES) general permit will be obtained from the Department of Health, Clean Water Branch for: construction activities. The NPDES permit will include site-specific BMPs.

**Long-term Impacts.** Based on the USLE, the soil erosion potential of the entire parcel (TMK) should decrease after the proposed industrial park is developed. As shown in Table 5, the erosion potential of Subarea A is estimated to decrease by 0.55 tons/acre/year (139 tons/year) or 66%. Thus sediment transport should decrease after development.

**Table 5**  
**Summary of Soil Erosion Potential**

<b>Subarea</b>	<b>Existing Conditions (tons/year)</b>	<b>Developed Conditions (tons/year)</b>	<b>Percent Change (%)</b>
A	403	264	-66
B	5,306	5,306	0
Total	5,709	5,570	-2

Source: Hida, Okamoto & Associates. October 2009. Preliminary Engineering Report

## 4.2 Groundwater Resources

The information contained in this section is based on a 1988 study of groundwater sources within the site and immediate surrounding area conducted by John F. Mink entitled *Groundwater Resources, Maile [sic], Wai'anae, Pu'u Haleakala to Ulehawa Stream*, October, 1988, appended to the Final Environmental Impact Statement for the Oban golf course project.

## **Existing Conditions**

Mā‘ili is the driest part of the island of O‘ahu, receiving no more than an average of 25 inches of rain per year. Two-thirds of the total annual rainfall occurs between November and April from rainstorms.

Two separate aquifers occur on the property: one consisting of limestone in the valley and the other composed of basalt underlying the valley fill and talus slopes. These aquifers are independent of each other.

The limestone stratum extends throughout Lualualei Valley below the approximately 100-foot elevation contour, while the basalt constitutes the basement of the entire Wai‘anae district and is exposed as slopes and ridges above the level valley floor. The source of groundwater in the limestone is recharged from rainfall and from mountain runoff reaching the valley; the source in the basalt is rainfall on talus slopes and ridges exposed to bedrock.

## **Potential Impacts and Mitigation Measures**

The previous owner, Oban, had drilled two wells with the expectation of tapping groundwater as a source of irrigation water for the proposed golf course and nursery. Groundwater will not be used for the proposed light industrial park and the existing wells will remain capped.

No mitigation is necessary.

## **4.3 Surface Water Resources**

This section discusses surface water conditions at the project site. Information contained in this section is based on the *Preliminary Engineering Report* by Hida, Okamoto & Associates, October 2009 (Appendix A).

### **Existing Conditions**

The Ulehawa Stream drainage basin encompasses approximately 3,178 acres of land and several tributaries which discharge into Ulehawa Stream. A section of Ulehawa Stream, measuring approximately 665 feet, passes through the northwest portion of the project area. In this section, stream flow is intermittent with a normally dry bed. Figure 11 shows the Ulehawa Stream drainage basin. The Ulehawa Stream watershed stretches from sea level to Ulehawa Beach Park to a maximum elevation of 3,098 feet at Palikea, at a distance of over 4.5 miles.

At the project site, the ridges to the west and south of the proposed development area are the most significant features of the watershed. Runoff from off site travels down-slope via the gulches and overland flow. Currently, runoff is conveyed across Lualualei Naval Access Road through four culverts beneath the roadway, eventually draining to Ulehawa Stream.



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### Existing Drainage Conditions

The Ulehawa Stream drainage basin was divided into 3 sub-catchment areas to determine the peak discharge using the County's Storm Drainage Standards (Figure 12). Runoff peak flows were estimated for each sub-catchment area for a 100-year flood event as shown in Table 6.

**Table 6**  
**Pre-Development Peak Flows**

<b>Area Identification</b>	<b>Area (Acres)</b>	<b>100-Year Flow (cubic feet per second or cfs)</b>
A	1,084	2,800
B-1	370	1,350
B-2	236	840
C	1,488	3,600
Total	3,178	8,590

Source: Hida, Okamoto & Associates, October 2009

The Flood Insurance Rate Map (FIRM) indicates that the entire project site is situated within Flood Area Zone D (areas in which flood hazards are undetermined). There are currently no drainage improvements within the project site.

As noted above, the project site contains Lualualei Soils which typically have two horizons, the surface A horizon and the underlying parent material or C horizon. In areas with nearly level topography the A horizon may be about 2 feet deep, but on the talus slopes the surface soil is expected to be thinner.

This soil cracks widely upon drying, but has a high shrink-swell potential so that the cracks close when the soil is thoroughly wetted. This shrink-swell characteristic has a great impact on the infiltration of water and permeability of the soil. When the soil is dry, water infiltration into the surface soil can be rapid; but once the cracks close in the wetted soil, the infiltration of water is greatly reduced. Consequently, runoff is medium to rapid on the steeper slopes.

### Modifications After Development

Development will impact the hydrology of the watershed as sections of undeveloped land will be replaced with impervious surfaces (such as roads, buildings, and parking areas) and the vegetative surface cover will be altered. The corresponding impact will result in higher runoff volumes and peak flows. Since large areas in the upper watershed will remain undeveloped, the impact on peak flows downstream of the site should not be significant.

The construction of new roadways and industrial lots will transect across the hillside. Basic drainage patterns and sub-catchment areas are unlikely to change, but have been divided into more discrete areas for analytical purposes (Figure 13). The estimated 10-year, 50-year, and 100-year peak flows through the development area are summarized in Table 7.

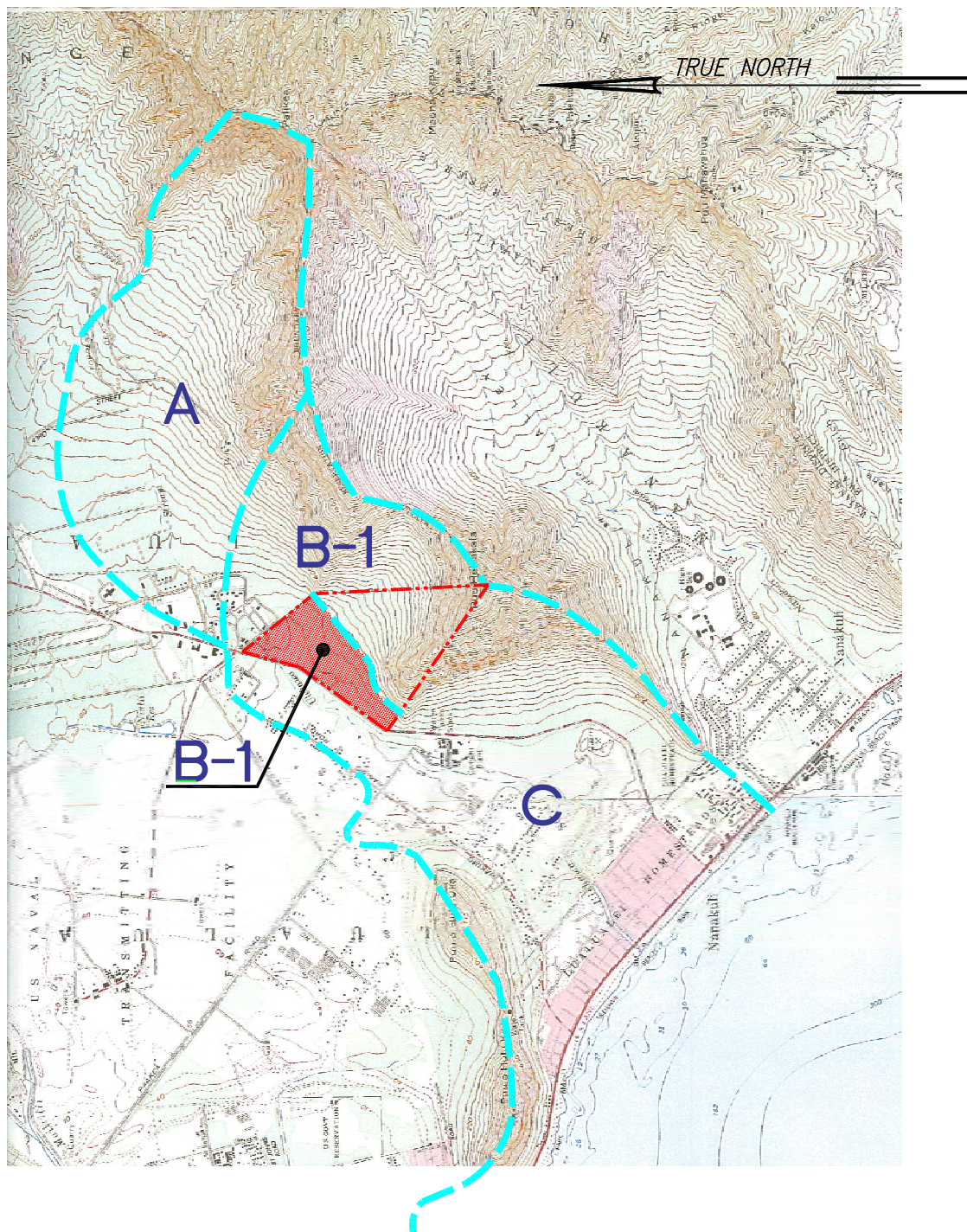
**Table 7**  
**Post-Development Peak Flows**

<b>Area Identification</b>	<b>Tributary Area (acres)</b>	<b>10-Year Flow (cfs)</b>	<b>50-Year Flow (cfs)</b>	<b>100-Year Flow (cfs)</b>
A	1,084			2,800
B-1	370			1,350
B-2-1	52	72	90	
B-2-2	88	121	152	
B-2-3	52	135	169	
B-2-4	44	115	143	
C	1,488			3,600
Total	3,178			

Source: Hida, Okamoto & Associates, October 2009

### Potential Impacts and Mitigation Measures

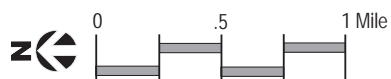
Retention (or detention) facilities are typically constructed to retain increases in storm runoff that occurs as a result of development. These facilities will include open basins, detention ponds, and/or underground storage facilities. Drainage improvements in the approximately 100-foot wide strip of land *mauka* of the industrial lots will be designed to accommodate peak runoff from the hillside. It is intended that the strip of land serve as a detention facility, dampening the peak runoff generated from the hillside. By incorporating these developments into the industrial park's design, there will be no net increase in the discharge of peak storm runoff from the project site relative to existing conditions.



Legend

- TRIBUTARY AREA BOUNDARY
- - - PROJECT BOUNDARY

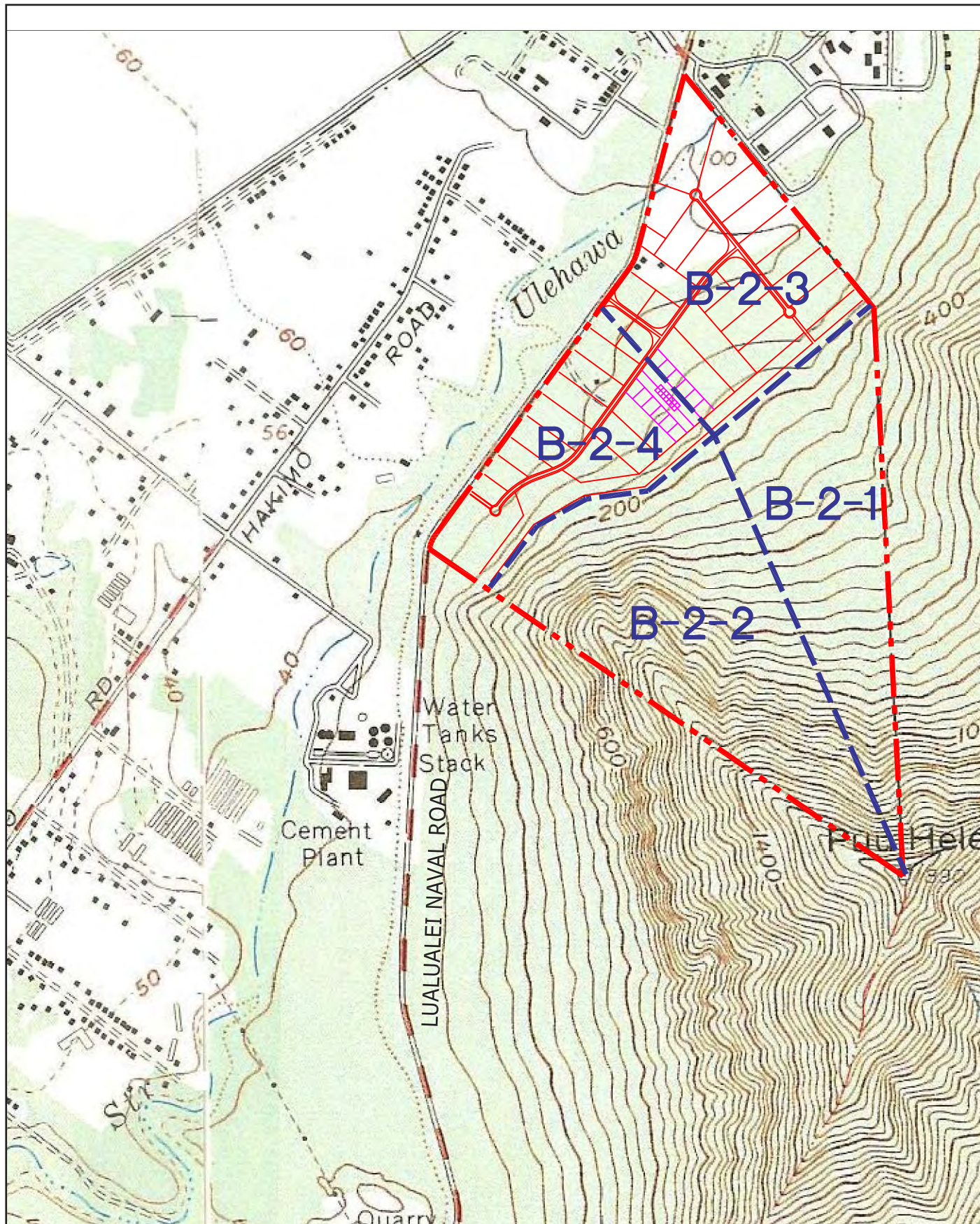
Source: Hida, Okamoto & Associates, Inc., October 2009



**Figure 12**  
**Pre-Development Catchment Areas**

November 2009





Source: Hida, Okamoto & Associates, Inc., October 2009

**Figure 13**  
**Development Catchment Areas**  
November 2009

### Storm Water Quality

The project will meet the City and County of Honolulu's stormwater quality requirements as outlined in the Rules Relating to Storm Drainage Standards, dated January 2000.

During the detailed design of infrastructure, the consulting engineer will work with the City to confirm necessary water quality standards and develop an effective set of Best Management Practices (BMPs) for the project. The objective of the water quality BMPs is to mitigate the impact of pollutants (sediment, grit, oil, heavy metals) that could potentially enter the drainage system from frequent, smaller rainfalls. Plants and landscaping will be incorporated into the design to absorb particles and filter heavy metals. Additional water quality BMPs include the construction of infiltration swales along the roadway. These swales collect runoff, filter particles, and provide infiltration to recharge the groundwater.

### Ulehawa Stream

Ulehawa Stream, an intermittent and normally dry-bed stream, will not be altered in any manner to accommodate the proposed project. Instead, it will be incorporated in its current natural state in the buffer area fronting Lualualei Naval Access Road. In the proposed site plan, the stream is shown outside the proposed development area.

### Off-site Improvements

Runoff from the proposed development will be conveyed across Lualualei Road through the existing culverts. On the north side of the road, runoff flows through Ulehawa Stream. The capacity of the culverts will be re-examined during the preliminary design stage to assess their adequacy and whether improvements are needed.

## **4.4 Natural Hazards**

### **Flooding**

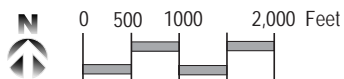
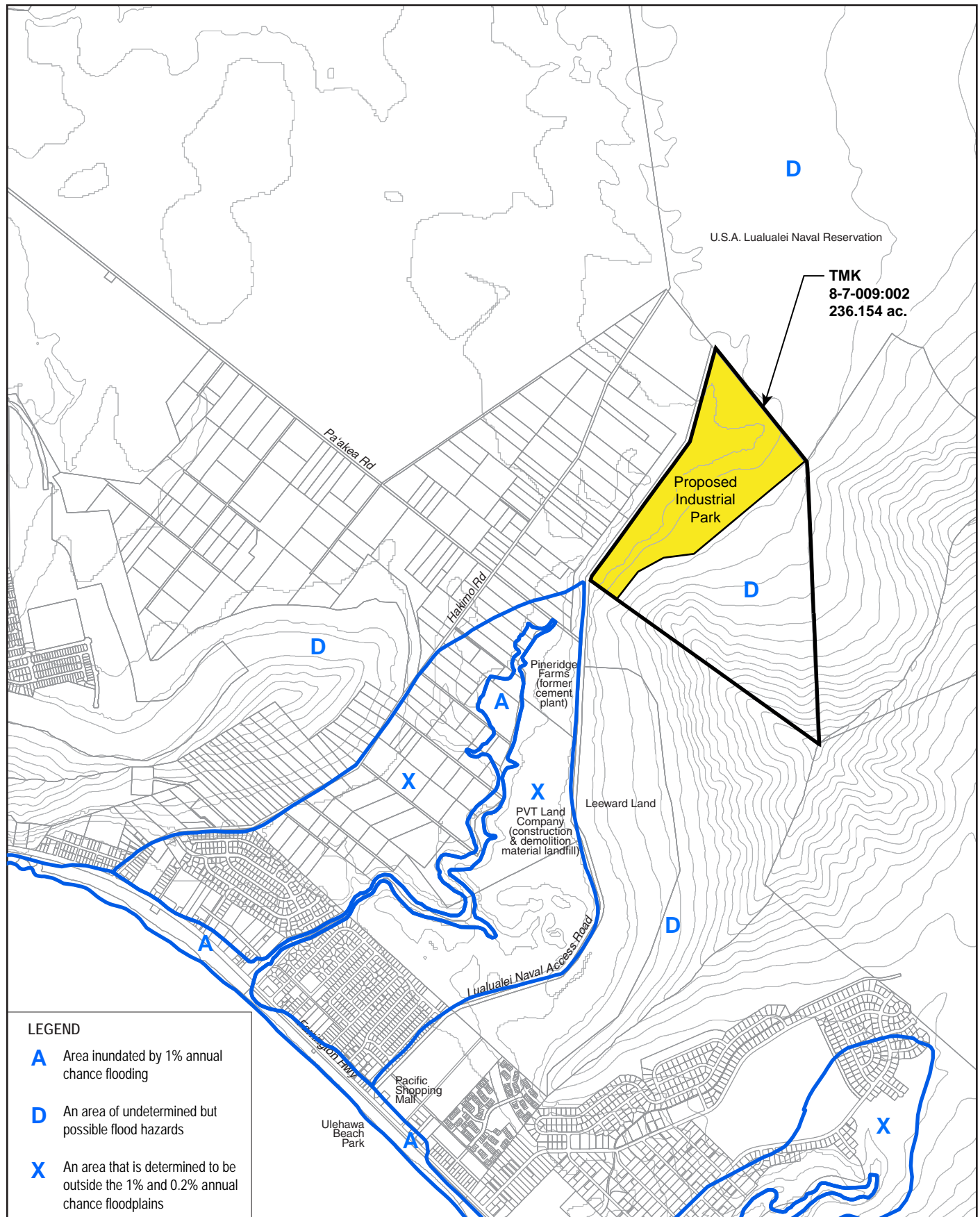
#### Existing Conditions

According to the Federal Emergency Management's Flood Insurance Rate Map (FIRM), lands at the project site are designated as Zone D, an area of "undetermined, but possible flood hazards" (see Figure 14).

#### Potential Impacts and Mitigation Measures

The project area is located in an area of low rainfall activity, but there are occasional storm events. The *mauka* buffer area will serve as a drainage channel that, combined with on-site catch basins, will address potential flood hazards.





**Figure 14**  
**Flood Insurance Rate Map**  
November 2008



Outflow from culvert for Ulehawa Stream which runs under Lualualei Naval Access Road from the project site to the west (Mākaha) side of the road. Normally a dry streambed, this photo was taken immediately after the winter storm of December 11-14, 2008.

## **Rockfall Hazard**

### Existing Conditions

The proposed development is sited below the 200-foot contour line. Above the 200-foot elevation, the parcel takes on a more abrupt slope. It is estimated that the slope within this “second tier” of the parcel is within the 10-30% range. The rest of the parcel includes the foothills of the Pu‘u Haleakala ridge which slopes radically upward towards the peak of the ridge.

### Potential Impacts and Mitigation Measures

There is a potential for loose rocks to fall from the slopes behind the proposed development. To mitigate adverse impacts from falling rocks, a 100-foot wide buffer has been set aside along the



entire *mauka* boundary of the proposed industrial park. The buffer has not been engineered yet, but is conceived as an unlined channel with possible fencing to catch falling rocks and debris. Detailed plans will be prepared during the project design phase.

## **Seismic Activity**

### Existing Conditions

The island of O‘ahu rarely experiences earthquakes because the island is not situated in a highly seismic area. The Uniform Building Code (UBC) provides minimum design criteria to address the potential for damages due to seismic disturbances. The UBC seismic provisions contain six seismic zones, ranging from 0 (no chance of severe ground shaking) to 4 (10% chance of severe shaking in a 50-year interval). O‘ahu is in UBC Seismic Zone 2A.

### Potential Impacts and Mitigation Measures

All structures and facilities will be designed to current seismic standards.

## **4.5 Vegetation Resources**

A detailed botanical survey of the project site was conducted by AECOS Consultants and is included in the study titled *Biological Surveys Conducted on the Tropic-Land LLC, Nānākuli Light Industrial Park Site, Wai‘anae District, O‘ahu, Hawai‘i*, dated June 2008 (see Appendix D). An earlier botanical study was conducted in September 1990 for the proposed golf course by Char & Associates. The information discussed below is taken from the AECOS study, unless otherwise noted.

The AECOS botanical survey was undertaken on June 25, 2008, following a wandering transect that traversed all parts of the project site up to about the 200-foot elevation. The site was conducted early in the dry season and, therefore, a few plants typical of the site, especially annuals, might have completed their lifecycle and been missed or gone dormant.

### **Existing Conditions**

*Kiawe* forests, which vary from open woodland to closed-canopy stands, form the dominant vegetation type within the project site. Buffel grass is the most common ground cover associated with this forest type. At about the 100-foot elevation contour, the composition of the forest changes with the trees more open 30 to 50% cover, and Guinea grass and green panic grass becoming co-dominant with buffel grass at this elevation level. At about the 200 to 250 foot elevation and higher, rocky outcroppings become numerous and *koa haole* shrubs become more commonplace.

Char (1990) developed a longer plant species list with 61 species compared to the 52 species found by AECOS in 2008. However the Char study included a larger area corresponding to the footprint of the proposed golf course. The 24 plant species listed as present in 1990 and not observed in 2008 are mostly common weedy species. At the same time, the AECOS study included 15 species not reported in 1990. A total of 76 species have been identified in the project area, when the results of the 1990 and 2008 survey data are combined. See Table 1 in Appendix D for a list of plants for the project site. No plant species classified as endangered or threatened or proposed as a candidate for listing as threatened or endangered by the Federal or State government was found in the project area.

No part of the project site is included in a federally designated plant critical habitat. However, Unit 15 encompasses the adjacent Pu'u Heleakala and the ridgeline above the project area extending to the northeast (Federal Register 2003). Unit 15 extends all along the Wai'anae ridge to the upper end of Lualualei Valley. In the project area, the boundary of this unit descends to around the 500-foot elevation on the ridges to the northeast and southwest, rising to the 1,000-foot contour in the valley behind the proposed industrial park. Within the property boundaries, the area of critical habitat is entirely within the State Conservation District, which is excluded from any development.

The site below the Conservation District lacks habitat for valuable native plants. This area has seen various uses and activities over the years and a portion is presently used for property maintenance. The project area has been subjected to more than one wildfire; Char (1990) reported the site as partly burned during her survey.

### **Potential Impacts and Mitigation Measures**

Modifications to the site from clearing and development are not expected to result in any deleterious impacts to native botanical species. Since the plant species within the project site are common throughout the Hawaiian Islands and elsewhere, no special mitigation measures are proposed by the Petitioner with respect to existing vegetation.

The biological surveys (Rana Productions and AECOS 2008) noted that human activity could increase the potential for fires that could spread upslope. On the other hand, human presence and a secure facility increases vigilance and reduces opportunities for arson and malicious activities. A fire contingency plan will be formulated prior to project construction with the *mauka* buffer area also serving as a fire break. Firefighting resources in the project area will be improved because the facility will be outfitted with a water system that complies fully with the Honolulu Fire Department's requirements. Engineering plans will be submitted to the department for review and approval as prescribed.

## 4.6 Wildlife Resources

A faunal survey was conducted by Rana Productions and is included in a report titled *Biological Surveys Conducted on the Tropic Land LLC, Nānākuli Light Industrial Park Site, Wai‘anae District, O‘ahu, Hawai‘i*, dated June 2008 (Appendix D). The 2008 survey updates a report by Andrew Berger entitled *Terrestrial Vertebrae Animals of the Proposed Lualualei Golf Course*, August, 1990, that was prepared for the golf course project. The information below is taken from the more recent Rana study, unless otherwise noted.

An avian and mammalian survey was conducted by Rana Productions on June 25, 2008. Eight avian count stations were evenly spaced across the approximately 100-acre proposed development area. Each station was counted once. Field observations were made with the aid of binoculars and by listening for vocalizations. Counts were concentrated in the early morning hours. Time not spent counting was used to search the site and the surrounding area for species and habitats not detected during count sessions. Areas upslope of the project site was covered as well to look for additional habitats or species beyond the proposed disturbance area.

### Existing Conditions

A total of 227 individual birds of 17 species, representing 12 separate families, were recorded during station counts. All of the 17 species detected are considered to be alien to the Hawaiian Islands. No avian species currently listed as threatened or endangered, or proposed as a candidate for listing as threatened or endangered, and no critical habitat for any such species under either the Federal or State endangered species programs was detected during the course of this survey (DLNR 1998, Federal Register 2005, USFWS 2005, 2008).

Avian diversity and densities were in keeping with the location and xeric habitat present on the site. Four species: House Sparrow (*Passer domesticus*), Spotted Dove (*Streptopelia chinensis*), Common Waxbill (*Estrilda astrild*), and Zebra Dove (*Geopelia striata*), accounted for slightly more than 54% of the total number of all birds recorded during station counts. The most common recorded species was House Sparrow, which accounted for approximately 17% of the total number of individual birds recorded. An average of 28 birds were detected per station count. The list of avian species detected on the project site may be found in Table 2 in Appendix D.

The Rana survey in 2008 detected three mammalian species within the project site: domestic dog (*Canis f. familiaris*), small Indian mongoose (*Herpestes a. auro-punctatus*), and cat (*Felis catus*). Although undetected during the 2008 survey, it is likely that four rodent species use various resources in the project area: Roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), European house mouse (*Mus musculus domesticus*), and possibly Polynesian rat (*Rattus exulans*).

## Potential Impacts and Mitigation Measures

The findings made by Rana Productions in 2008 are consistent with the findings of a previous study conducted on the subject property (Berger 1990), and with at least three other avian surveys conducted in 2004, 2005, and 2007 on lands immediately adjacent to the site (David 2007). Given the highly disturbed nature of the site and the almost completely alien-dominated vegetation present, all avian species detected were common lowland alien species. Berger reached similar conclusions in 1990—that there is no suitable native forest habitat for any of the Hawaiian forest birds anywhere near the project site and there is no suitable wetland habitat for any of the endangered Hawaiian waterbirds on or anywhere near the project site.

Although not detected during the course of the 2008 survey, the 1990 survey or recent surveys of the adjacent property, it is possible that the Hawaiian endemic sub-species of the Short-eared Owl (*Asio flammeus sandwichensis*) or *pueo* forages within the project site upon occasion (Berger 1990, David 2007). The O‘ahu population of this species is listed as endangered under State of Hawai‘i endangered species statutes, but it is not listed under the Federal Endangered Species Act. Because the habitat on site changes on changes on a regular basis due to man-made alterations and fire, the site likely does not contain suitable nesting habitat for this species very often, if ever. From the *pueo*’s perspective, there is nothing unique about the habitat present on the project site. There are larger areas of better foraging and nesting habitat within the military installation located in close proximity to the project site. Clearing of the project site may temporarily disturb foraging *pueo*, although such activity is unlikely to result in adverse impact to this species.

Since the project will not have any adverse effect on any endemic ecosystem or on any endangered or threatened animal species in the area, no mitigation measure is proposed by the Petitioner with respect to the project’s impacts on wildlife within or near the project site.

## 4.7 Farmland Resources

The information in this section is based on an Agricultural Feasibility Report prepared by John J. McHugh, Jr. Ph.D. of Crop Care Hawai‘i, LLC dated May 2008 (Appendix C).

### Existing Conditions

The property is undeveloped and not being used currently for agriculture. It is overgrown with non-native trees, shrubs, and grasses. Much of the property is heavily sloped with a gradient rise of over 70% in some sections. The lowest sections of the property contain slopes of greater than 10%. Rainfall in the area is less than 20 inches annually which makes it difficult to graze animals without the use of expensive irrigation water.

### Soil Analysis

Half of the property is Lualualei extremely stony clay soil (LPE) which is characterized by slopes of 3 to 35%. The LPE soil has a Capability Classification of VIIc which has very severe limitations rendering it unsuitable for cultivation because of unfavorable texture as well as being extremely stony and rocky.

The remainder of the soil is composed of Lualualei clay (LuB) which has a slope of 2 to 6%, Lualualei clay of 0% slope (LuA), and Pulehu very stony clay loam (PvC) with slopes of 0 to 12%.

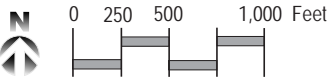
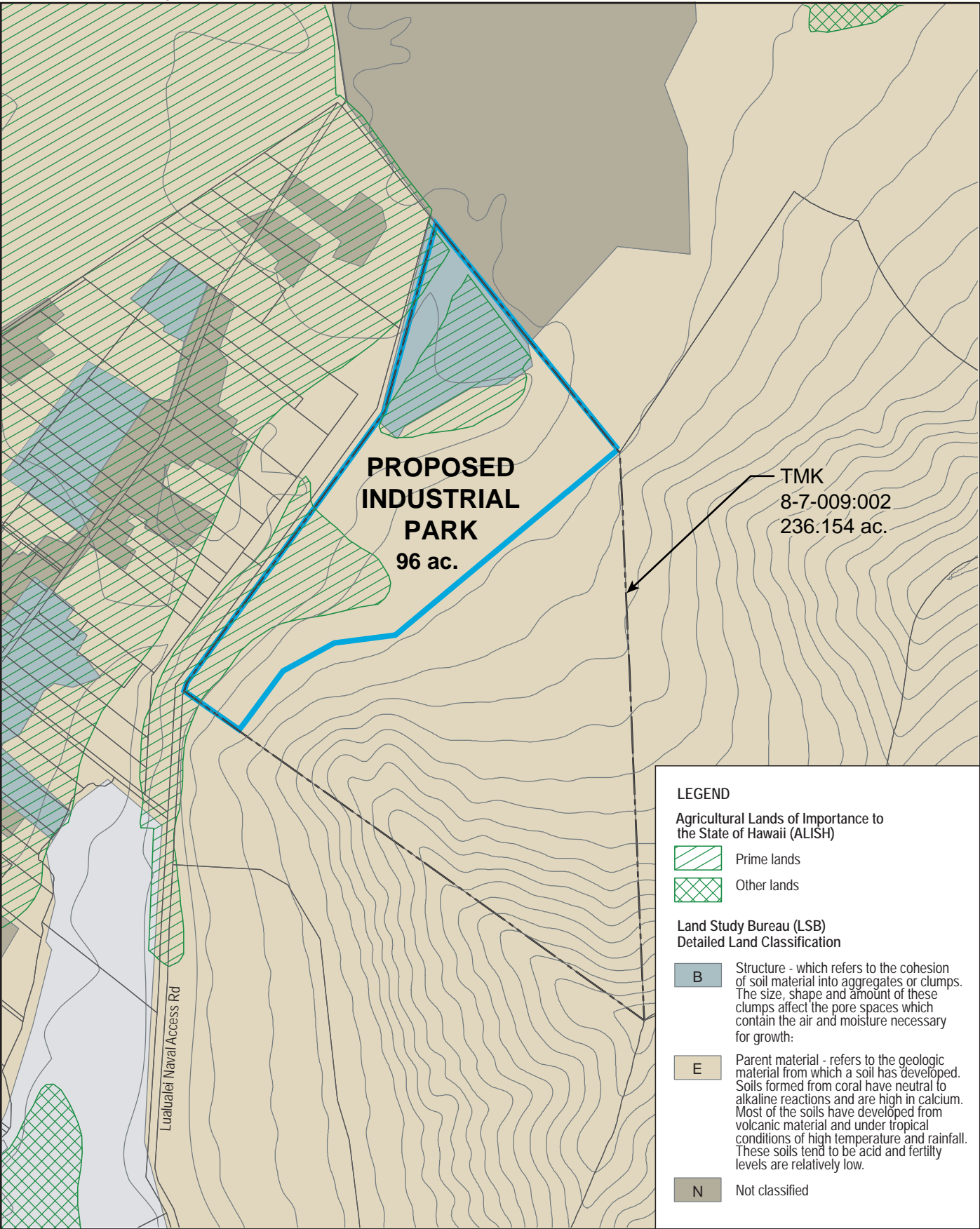
LuA and LuB soils, if not irrigated have a Capability Classification of VIc which has extreme limitations that make them generally unsuited to cultivation and have a stony or rocky texture. If irrigated, the Capability Classification improves to IIIc for the LuA soil and IIIe for the LuB. Class III soils can have severe limitations that reduce the choice of crop plants. IIIc soils are challenged because of stoniness and/or unfavorable texture, resulting in poor water holding capacity, while IIIe soils are subject to severe erosion if cultivated and not protected. PvC soils have a Capability Classification of IVc which has very severe limitations that also can reduce the choice of crop plants, require careful management, and are stony, shallow with unfavorable texture, and have low water holding capacity coupled with severe shrink/swell characteristics. Irrigation does not improve the Capability Classification of PvC soil.

### Land Classification and Crop Productivity Ratings by the Land Study Bureau, University of Hawai‘i

Approximately 80% of the project site has an overall agricultural productivity rating of E—as determined by the University of Hawai‘i Land Study Bureau. Lands rated in this low category are characterized by soils in their native state having serious limitations relative to agricultural productivity. Because much of the parcel is stony, agricultural options for the project site, without amendment or modification, are considered to be minimal. A small portion of the site with an overall agricultural productivity rating of B is accorded that rating if it is irrigated (Figure 15).

### Ratings under the ALISH System

Maps detailing Agricultural Lands of Importance to the State of Hawai‘i (ALISH) were first created in 1977 as a joint effort between the U.S. Department of Agriculture, Soil Conservation Service (now known as the Natural Resource Conservation Service) and the University of Hawai‘i, College of Tropical Agriculture and Human Resources. Lands were broken down into four categories: 0 = Unclassified, 1 = Prime Agricultural Lands, 2 = Unique Lands, 3 = Other Lands. The LuA, LuB, and PvC soils combine to form that portion of the property considered to be Prime Agricultural Lands under the ALISH system (Figure 15).



**Figure 15**  
**ALISH-LSB Map**  
November 2009

## Potential Impacts and Mitigation Measures

To bring the more agricultural suitable areas of the property into agricultural use would require water sources that are not readily available to new agricultural operations on the Wai‘anae Coast of O‘ahu. For the approximately 40 acres of farmable land, the water requirement in the hot and dry climate of Nānākuli, would be 5,400 gallons per acre per day using drip irrigation technology. This amounts to a water demand for crops grown on those acres of 216,000 gallons per day. This type of water consumption would be difficult to provide which further renders the property unsuitable for agricultural production. The combination of poor soil conditions and high water requirement makes it unlikely that any prospective farming operator would consider this property for active agriculture.

With the availability of more favorable options, including several thousand acres of Campbell land in Kunia, Dole land in Wahiawā and Waialua, and Galbraith Estate land in Wahiawā, there are more affordable options with better access to irrigation water resources than are present on the Wai‘anae Coast.

## 4.8 Archaeological, Historic, and Cultural Resources

An archaeological survey of the project site was conducted in November, 1990 by Cultural Surveys Hawai‘i and the findings and conclusions of that survey are contained in *An Archaeological Inventory Survey for the Proposed Lualualei Golf Course, Lualualei, Wai‘anae, O‘ahu*, January, 1991 (Appendix F). Information in this section is based on that report.

### Archaeological and Historic Resources

#### Existing Conditions

An archaeological survey of the project site was conducted in November, 1990 by Cultural Surveys Hawai‘i. The findings and conclusions of that survey are contained in *An Archaeological Inventory Survey for the Proposed Lualualei Golf Course, Lualualei, Wai‘anae, O‘ahu*, January, 1991. Information in this section is based on that report.

Figure 16 shows cultural resources in the larger region and Figure 17 shows cultural resources that have been identified within TMK 8-7-09: 02. A total of seven archaeological sites have been identified in and around what is now the site of the proposed industrial park. Only two of the sites (50-80-08-4366 and -4367) are interpreted as being attributable to traditional Hawaiian activity, with one site (50-80-08-4366) probably representing prehistoric, recurrent habitation on the foothills of Pu‘u Heleakala. This is primarily evidenced by the presence of a probable hearth feature within the site complex.



Site 50-8-08-4367, a remnant wall section running adjacent to an intermittent stream bed, suggests an agricultural usage possibly constructed to retain or divert water. Given the weathered condition of the structure, this site may be prehistoric.

The five remaining sites identified within the project area are attributable to historic land usage. Four sites (50-80-08-4364, -4370, -4372, and -4373) are associated with cattle ranching and include cattle walls, an historic house lot, and various other ranching infrastructure. One site (50-80-08-4365) represents a military shelter evidenced by bullets and C-ration cans.

Six of the seven sites in the project area were evaluated as “no longer significant” (NLS) because of lack of cultural or scientific interest beyond their plotted distribution. Site 50-80-08-4366 was determined likely to yield information important to prehistory or history. This site lies outside what was then the proposed golf course, and is similarly outside the proposed industrial park and, therefore, will not be disturbed. Table 8 summarizes the archaeological and historical sites and their significance.

**Table 8**  
**Archaeological Sites Summary and Significance, TMK 8-7-09: 02**

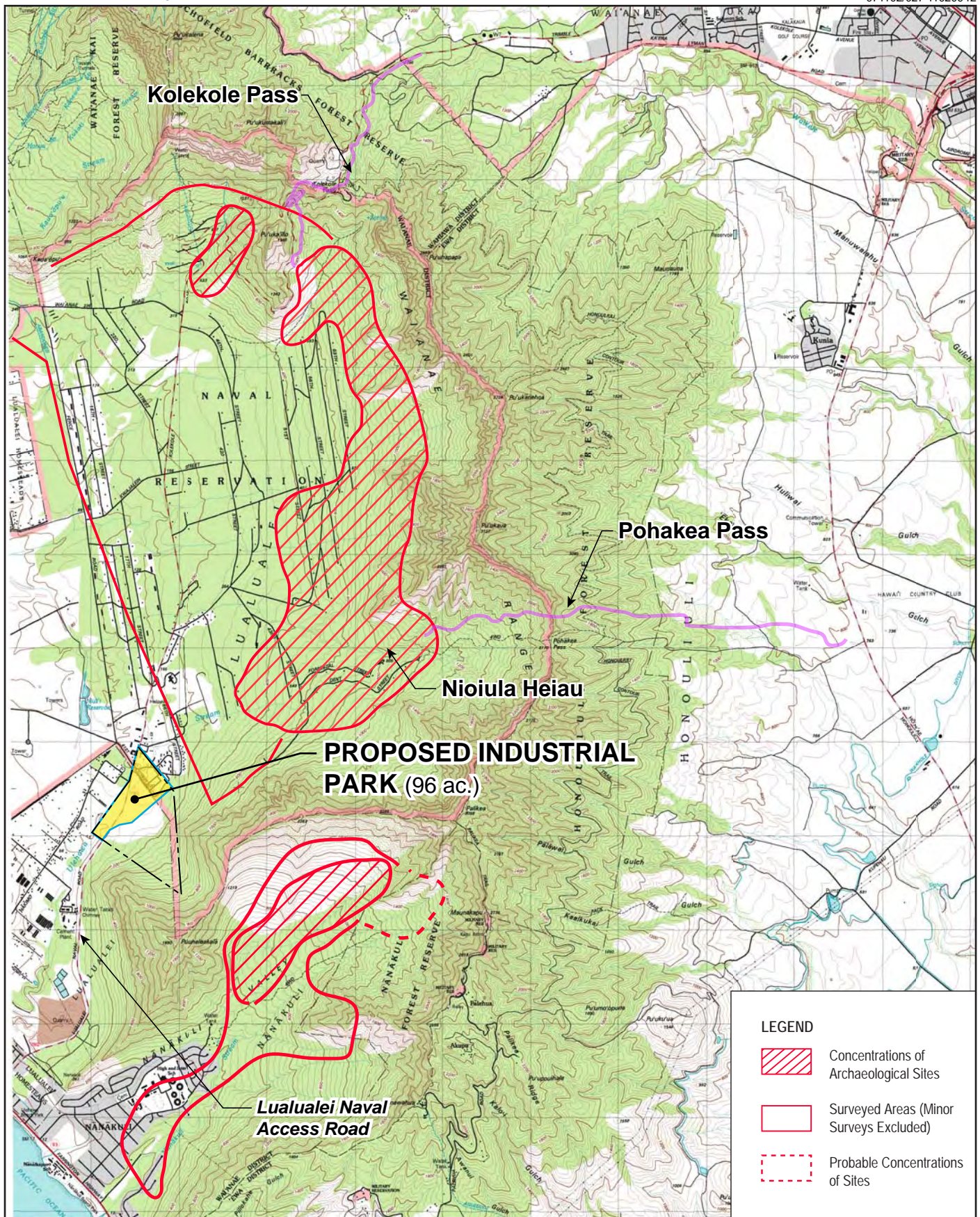
<b>State Site #</b>	<b>Site Type</b>	<b>Function</b>	<b>Significance</b>	<b>Recommendation</b>
50-80-08-4364	Wall	Ranching	NLS	None
50-80-08-4365	Shelter	Military	NLS	None
50-80-08-4366	Structural complex	Habitation	D	Preserve
50-80-08-4367	Wall remnant	Agriculture	NLS	None
50-80-08-4370	House lot	Ranching	NLS	None
50-80-08-4372	Foundation	Ranching	NLS	None
50-80-08-4373	Incinerator	Ranching-Military	NLS	None

NSL: No longer significant

D: Significance criteria “D” per National Historic Preservation Act, wherein the site may be likely to yield information important to prehistory or history

Source: Cultural Surveys Hawai‘i. January 1991. *An Archaeological Inventory Survey for the Proposed Lualualei Golf Course, Lualualei, Wai‘anae, O‘ahu.*

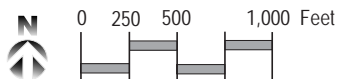
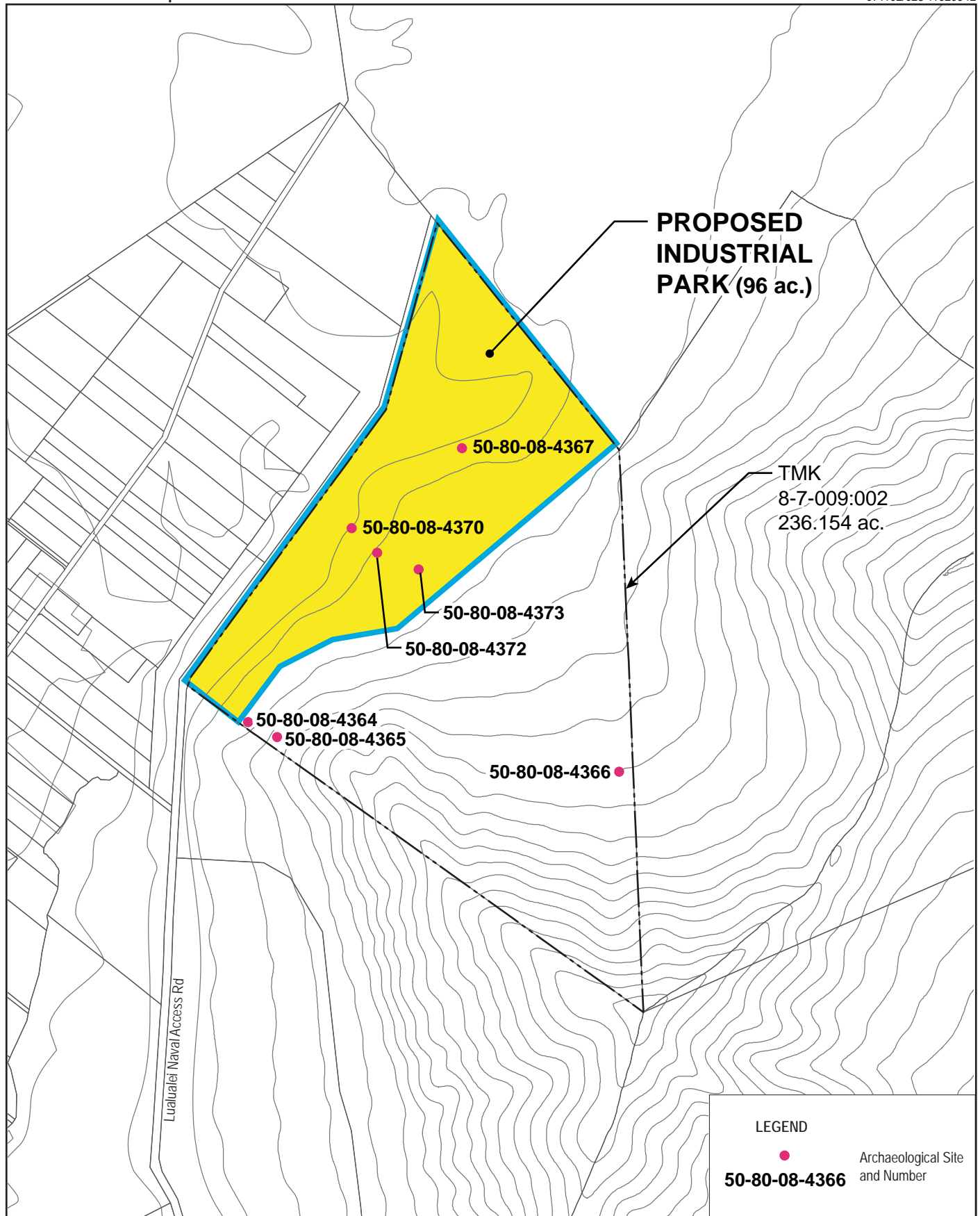




Source: Waianae Sustainable Communities Plan, City and County of Honolulu, 2000.

**Figure 16**  
**Cultural Resources Map (Regional)**  
November 2009





**Figure 17**  
**Cultural Resources Map (Site)**  
November 2009

### Potential Impacts and Mitigation Measures

The Department of Land and Natural Resources, State Historic Preservation Division (SHPD) was consulted during the environmental review process for the earlier golf course proposal. At that time, the SHPD determined that the golf course project would have no adverse impact on significant historical resources (see correspondence from SHPD in Appendix H). The project limits of the proposed industrial park are contained within the boundaries of the proposed golf course, and is not expected adversely affect historic resources. However, should any archaeological resource be encountered during construction, all work in the immediate vicinity will cease and the appropriate authorities will be contacted promptly. The contractor(s) for this project will be required to follow all procedures specified in Section 6E-46.6, Hawai'i Revised Statutes and Chapter 13-300, Hawai'i Administrative Rules in the event that inadvertent discoveries are made.

## **Cultural Resources**

### Existing Conditions

The information in this section is based on the *Cultural Impact Assessment-Final Report*, July 2009, prepared by Jannel L. Kaohu (JLK Management, LLC) and Angelita S. Aipoalani and Hanalei Y. Aipoalani (Mother Earth Foundation).

Areas within the Lualualei *ahupua'a* are believed to have been used for cultivation of the warrior art of *Lua*, a Native Hawaiian form of martial arts. However, there is no evidence that the project area was or is currently being used for traditional practices, such as gathering of native materials or for any cultural or religious purpose. No burials are believed to exist within the project area. There were no commoner land claims within the project area. Although some Native Hawaiian activity may have occurred on the project area, the patterns of land use are relatively clear that the Native Hawaiians did not use this land nearly as intensively as the coastal areas, well-watered areas, and forest zones.

Recorded Hawaiian legends, *mo'olelo*, describe a location within the Lualualei *ahupua'a* as the birth place of Maui, son of Mauiakalana and Hina'akealoha. According to literature, Maui's birthing place is located on the south side of Wai'anae at Ulehawa and Kaolae (west-southwest of the project site).

**Maui Rock.** In the 1930's, McAllister recorded Site 148 in his work. McAllister described a large rock referred to as "Maui" located about 1.1 miles from Nānākuli station toward Pu'u O Hulu (McAllister 1933: 110). This rock represents the place where Maui first landed in the Hawaiian Islands from the south. The stone was surrounded by water and is where he reposed and sunned himself. The rock is memorialized at Garden Groves, a private condominium development off of Farrington Highway in Lualualei. (p. 7)

Hawaiian mythology also accounts for Maui venturing the Wai‘anae Coast of O‘ahu. Kaneana, cave of Kane, commonly known as Mākua cave, is said to have been frequented by demigod Maui and the home of Nanue, the shark man. The cave is located at the base of a 200-foot outcropping of rock along Farrington Highway in Mākua (near Ka‘ena Point), approximately 9 miles west-northwest of the project site.

There are no registered historic sites within the project site. However, according to the National and State Register of historic Places, Nioiula Heiau, a registered historic site is located near the Tropic Land parcel.

**Nioiula.** Roy Kakulu Alameida, author of *Na Mo‘olelo Hawai‘i o ka Wa Kahiko*, refers to Nioiula Heiau in his story about Kawelo. Alameida writes, “Kawelo then picked up the man. He took him to the *ali‘i nui* of O‘ahu to offer as a sacrifice to the gods at Nioiula Heiau at Lualualei.

Thos G. Thrum’s compilation of data, recorded in the Hawaiian Almanac and Annual from 1907 states that Nioiula Heiau (Halona, Lualualei), a paved and walled *heiau* of *pookanaka* class, about 50 feet square in two sections; [was] recently destroyed.

According to Kahu Kamaki Kanahale, a long-time resident of Nānākuli and respected cultural practitioner, “Nioiula is located on Halona ridge in Lualualei next to the forest reserve. Part of the *heiau* has been complete destroyed with the stones being used by the McCandless ohana (1930’s-1940’s) of the Silva family. It was *kapu* when we were little because *kupuna*(s) told us that people were sacrificed there to the ancient gods. It belonged to the O‘ahu god—King Kākuihewa.” (p. 8)

Research into the *heiau*’s location using the Geographic Information System (GIS) supported by the City and County of Honolulu and State Department of Land and Natural Resources indicate that Nioiula Heiau is situated on property owned by the federal government (TMK: 8-8-01: 01). The Tropic Land property extends to the ridgeline, but the proposed industrial park is located at the base of the cliffs at or below the 200-foot elevation.

#### Potential Impacts and Mitigation Measures

The Cultural Impact Assessment concluded that the project site does not have a direct or indirect adverse impact on culturally significant sites. Nor does it obstruct access to culturally significant sites. Effects stemming from the development of the project on Hawaiian culture would be minimal due to its geographic location and lack of surface water, burial sites, and commoner land claims. If Hawaiian activity occurred within the project area, it would not have been nearly as intensively utilized as coastal areas, well-watered areas, and forest zones.

## 4.9 Roadways and Traffic

The information in this section is based on a *Traffic Impact Analysis Report* prepared by the Traffic Management Consultant dated September 2008 (Appendix E).

### Existing Conditions

Farrington Highway is the primary arterial highway on the Leeward coast of O‘ahu, carrying over 48,000 vehicles per day in both directions. Farrington Highway is a four-lane highway, which is generally oriented in a north-south direction. Farrington Highway is signalized at Lualualei Naval Access Road. A left-turn lane is not provided on southbound Farrington Highway at this intersection. The posted speed limit is 35 miles per hour (mph).

Lualualei Naval Access Road is a two-lane, two-way roadway which provides access to the U.S. Naval installation in Lualualei. The posted speed limit on this road varies between 25 mph and 45 mph.

Tropic Land LLC has reached an understanding with the U.S. Navy for the use of the Lualualei Naval Access Road, and is currently discussing the form of a definitive access agreement with the Navy.

### Field Investigation and Data Collection

Manual traffic count surveys were conducted at the intersection Farrington Highway and Lualualei Naval Access Road on May 1-2, 2008 during the peak periods of traffic from 5:30 AM to 8:00 AM and from 2:30 PM to 5:00 PM. Additional surveys were conducted on Lualualei Naval Access Road at an existing baseyard on the project site on July 21-22, 2008.

### Existing AM Peak Hour Traffic

The AM peak hour of traffic on Farrington Highway varies between 5:00 AM and 7:00 AM. The AM peak hour selected for the analysis—5:45 AM to 6:45 AM—was based on the observed AM peak hour of traffic on Lualualei Naval Access Road. During this period, Farrington Highway carries about 2,800 vehicles per hour (vph) total for both directions. Lualualei Naval Access Road carried a total of 430 vph at Farrington Highway during the AM peak hour of traffic. At the project site, the traffic volume on Lualualei Naval Access Road was about 120 vph.

The intersection of Farrington Highway and Lualualei Naval Access Road operated at an overall Level of Service “D” with a v/c ratio of 1.12 during the AM peak hour. Southbound Farrington Highway operated at LOS “E.” The left-turn movement from Lualualei Naval Access Road on Farrington Highway operated at LOS “F.”

### Existing PM Peak Hour Traffic

The PM peak hour of traffic was defined as 3:15 PM to 4:15 PM when Farrington Highway carries about 3,500 vph total for both directions. Lualualei Naval Access Road carried a total of over 500 vph during the PM peak hour. At the project site, traffic volume on Lualualei Naval Access Road was about 100 vph.

During the PM peak hour, the shared through/left-turn lane on southbound Farrington Highway at Lualualei Naval Access Road operated as a de facto left-turn lane. The intersection of Farrington Highway and Lualualei Naval Access Road operated on at an overall LOS “C” with a v/c ratio of 0.94. The left-turn movement from Lualualei Naval Access Road onto Farrington Highway operated at LOS “D.”

### **Capacity Analysis Methodology**

The highway capacity analysis used in the analysis is based on procedures described in the Highway Capacity Manual (HCM) published by the Transportation Research Board, 2000. HCM defines Level of Service (LOS) as “a quality measure describing operational conditions within a traffic stream.” Several factors may be included in determining LOS, such as speed, travel time, freedom to maneuver, traffic interruptions, driver comfort and convenience. LOS “A,” “B,” and “C” are considered satisfactory levels of service. LOS “D” is generally considered a “desired minimum” operating level of service. LOS “E” is an undesirable condition, and LOS “F” is an unacceptable condition. Intersection LOS is based primarily on average delay, which is measured in seconds per vehicle (sec/veh).

**Table 9**  
**Level of Service Criteria (Highway Capacity Manual)**

LOS	Signalized Intersections	Unsignalized Intersections
	Control Delay (sec/veh)	Control Delay (sec/veh)
A	≤10	≤10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

Source: *Highway Capacity Manual*, 2000

Note: sec/veh = seconds per vehicle



Volume-to-capacity (v/c) ratio is a measure comparing the relative traffic demand to the roadway's capacity. HCM defines capacity as "the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic flow, and traffic control conditions." A v/c ratio of 0.50 indicates that the traffic demand is utilizing 50% of the roadway's capacity. A v/c ratio in excess of 1.0 indicates that the traffic demand exceeds the carrying capacity of the highway facility.

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### Future Traffic Conditions

**Background Growth in Traffic.** The O'ahu Transportation Regional Plan 2030 (ORTP) was prepared for the O'ahu Metropolitan Planning Organization (OMPO) in April 2006 and amended in May 2007. The Year 2030 socio-economic forecasts indicated about a 0.5% annual increase in population and employment on the Wai'anae Coast. Based on the ORTP socio-economic forecast, an annual growth of 0.55% was applied uniformly to the existing peak hour traffic to estimate the Year 2020 peak hour traffic demands without the proposed project.

**Year 2020 AM Peak Hour Traffic Without Project.** During the AM peak hour without the project, traffic demands at the intersection of Farrington Highway and Lualualei Naval Access Road are expected to exceed the carrying capacity of the existing intersection, operating at an overall LOS "F" with a v/c ratio of 1.23. The southbound approach of Farrington Highway and the left-turn movement from Lualualei Naval Access Road are expected to operate at LOS "F."

**Year 2020 PM Peak Hour Traffic Analysis Without Project.** The PM peak hour demand without the project is expected to exceed the existing carrying capacity of the intersection of Farrington Highway and Lualualei Naval Access Road, operating at LOS "D" with a v/c ratio of 1.01. Southbound Farrington Highway and the left-turn movement from Lualualei Naval Access Road are expected to operate at LOS "D."

### **Potential Impacts**

#### Project-related Trip Generation Characteristics and Trip Distribution

During the AM peak hour, the project is expected to generate a total of 522 vph—433 vph entering the site and 98 vph exiting the site. The proposed project is expected to generate a total of 518 vph—109 vph entering the site and 409 vph exiting the site during the PM peak hour.

The trip distribution is based on the projected growth in the 'Ewa and Wai'anae regions. By 2020, the population of the 'Ewa region is expected to exceed the Wai'anae region by a ratio of 3 to 1. Similarly, employment in the 'Ewa region is expected to be 6.7 times that of the Wai'anae Coast. Table 10 summarizes the traffic assignment splits during the peak hours of traffic.

**Table10**  
**Traffic Assignment**

Peak Hour	Direction	Northbound	Southbound
AM	Enter	75%	25%
	Exit	15%	85%
PM	Enter	85%	15%
	Exit	75%	25%

Source: Traffic Management Consultant. *Traffic Impact Analysis Report*, September 2008.

#### AM Peak Hour Traffic Impact With Project

With project implementation, the intersection of Farrington Highway and Lualualei Naval Access Road is expected to operate at an overall LOS “F” and a v/c ratio of 1.86 during the AM peak hour. Southbound Farrington Highway and Lualualei Naval Access Road approaches are expected to operate at LOS “F.”

#### PM Peak Hour Traffic Impact With Project

With project implementation, the intersection of Farrington Highway and Lualualei Naval Access Road is expected to operate at LOS “F” with a v/c ratio of 1.39. Both Farrington Highway approaches and Lualualei Naval Access Road are expected to operate at LOS “F.”

### **Mitigation Measures**

To mitigate the impacts of project-generated traffic, Tropic Land will discuss traffic mitigation measures with the State and City, and is willing to participate in a fair share arrangement to improve the intersection of Farrington Highway and Lualualei Naval Access Road.

Improvements recommended by the Traffic Impact Analysis Report (TIAR) include:

- Widening of southbound Farrington Highway to provide an exclusive left-turn lane (350 feet in length)
- Widening Lualualei Naval Access Road to provide double left-turn lanes (350 feet in length) and an exclusive right-turn lane

Table 11 summarizes projected traffic impacts under scenarios with and without the proposed development, and with mitigation measures.

AM peak hour traffic in 2020 is projected to be virtually the same “with” or “without” the project. In either case, the intersection of Farrington Highway and Lualualei Naval Access Road performs at LOS “F” in the southbound and westbound directions. Minimal delays are

experienced in the northbound direction (toward Mākaha) during the AM peak hour with LOS “A” conditions. With construction of the industrial park and intersection improvements (as described above), the TIAR calculates that intersection performance will improve from LOS “F” to LOS “E” in the southbound through and westbound left-turn directions. The addition of an exclusive left-turn lane from Farrington Highway onto Lualualei Naval Access Road will improve LOS in this direction from “F” to “A.” However, northbound traffic on Farrington will experience a decrease in LOS from “A” to “C” with changes in the traffic signal phase shortening “green time” to accommodate left-turning vehicles in the southbound direction. Nevertheless, the recommended improvements would raise LOS to “C” from LOS “F” for 2020 AM peak hour traffic under “without project” or “with project” scenarios.

Without the project, the intersection of Farrington Highway and Lualualei Naval Access Road is expected to perform at LOS “C” and “D” levels during the PM peak hour in 2020. If the proposed industrial park is constructed without intersection improvements, level of service is expected to decrease to unacceptable levels. However, with improvements LOS “D” and “E” conditions are expected, with the intersection as a whole performing at LOS “D.”

**Table 11**  
**Capacity Analysis: Farrington Highway and Lualualei Naval Access Road**

Scenario			SB Thru	SB Left	NB Thru	NB Right	WB Left	WB Right	Int.
Existing AM Peak Hour Traffic	LOS		E		A		F	B	D
	v/c		1.12		0.37		0.79	0.23	1.12
	Delay*		76.0		3.4		94.6	18.7	52.8
Existing PM Peak Hour Traffic	LOS		C	C	C		D	C	C
	v/c		0.67	0.95	0.92		0.73	0.59	0.95
	Delay		29.7	27.3	23.9		50.4	24.5	26.7
2020 AM Peak Hour Traffic Without Project	LOS		F		A		F	B	F
	v/c		1.23		0.40		0.82	0.24	1.23
	Delay		125.6		3.6		98.3	18.3	84.0
2020 PM Peak Hour Traffic Without Project	LOS		D	D	C		D	C	C
	v/c		0.81	1.01	0.95		0.76	0.66	1.01
	Delay		48.2	41.1	28.1		53.5	31.3	34.7
2020 AM Peak Hour Traffic With Project	Without Improvements	LOS	F		A		F	C	F
		v/c	1.86		0.63		1.06	0.27	1.86
		Delay	408.1		6.3		136.8	21.9	237.3
	With Improvements	LOS	E	A	C		E	A	C
		v/c	0.88	0.71	0.84		0.61	0.10	0.88
		Delay	73.0	7.2	26.1		59.6	6.4	22.0
2020 PM Peak Hour Traffic With Project	Without Improvements	LOS	F	F	F		F	D	F
		v/c	1.39	1.14	1.09		1.16	0.64	1.39
		Delay	245.7	100.4	82.4		136.6	43.1	97.2
	With Improvements	LOS	E	A	D		E	D	D
		v/c	0.82	0.52	1.00		0.95	0.70	1.00
		Delay	60.4	7.9	43.4		75.9	46.6	38.0

Source: Traffic Management Consultant. *Traffic Impact Analysis Report*, September 2008.

SB = Southbound Farrington Highway (to Honolulu)  
NB = Northbound Farrington Highway (to Mākaha)  
WB = Westbound Lualualei Naval Access Road (*makai*)

Int. = Intersection  
\* Delay measured in seconds

## **4.10 Air Quality**

### **Existing Conditions**

#### Climate

Lualualei Valley is relatively arid. Mean annual rainfall is approximately 20 to 30 inches and varies from about 3.5 inches in December and January to about 0.4 inches in June and July. Mean pan evaporation is approximately 70 to 80 inches annually and varies from over 8 inches in July and August to about 4 inches in December and January. There is an evaporation deficit of approximately 50 inches annually and there are no months when rainfall equals pan evaporation.

Average temperatures within the area surrounding the project site varies from 70.3 degrees (January) to 76.7 degrees (October). Prevailing tradewinds come from a northeast direction at an average 10 mph (January) to 13.6 mph (July). Cloud cover varies from 51% in the summer to 63% in spring. Sunshine percentages range from 59% in the winter to 75% in the summer.

On an annual basis, wind conditions in the area are dominated by brisk trade winds; however, there is a marked seasonal difference in the velocity and persistence of such trade winds. Trade winds tend to decline in the fall and winter months (light and variable) which can contribute to higher pollutant concentrations. Near coastal areas also experience land-sea breeze regimes with onshore winds during the day and offshore winds at night.

#### Air Quality

In August 2009, HECO made available a website for the West O'ahu Air Quality Monitoring Program, part of its overall plan to develop the Campbell Industrial Park Generating Plant. Posted on the website are readings from four air quality monitoring stations, including the Lualualei Monitoring Station, located at the Nānākuli Civil Defense Site. This station collects data on 12 parameters of air quality: sulfur dioxide (24-hour average), ozone (8-hour average), carbon monoxide (8-hour average), nitrogen dioxide (1-hour average), nitric oxide (1-hour average), oxides of nitrogen (1-hour average), sulfur dioxide (1-hour average), sulfur dioxide (3-hour average), ozone (1-hour average), carbon monoxide (1-hour average), and particulates (PM10, 1-hour average). Data is available in real time via the Internet. In addition to the specific parameter, the Air Quality Index reports daily air quality.

Given the recentness of the air quality station, long-term data are not available. However, available data indicate that local air quality is in compliance with State and Federal standards. The project area is rural and lightly developed. The nearest major stationary sources, the PVT Landfill and Pineridge Farms operations, are located downwind of the site under normal trade winds and, thus, would impact the project site air quality only during southerly (kona) wind conditions.

Similarly, the large power plant located some five miles away at Kahe Point is also downwind during trade wind conditions. Mobile source activity along Lualualei Access Road is so low that such activity has minimal air quality impact.

## **Impacts and Mitigation Measures**

### Short-term Air Quality Impacts

Construction activities will result in temporary and localized impacts on air quality in areas adjacent to the construction site. Equipment used during the construction phase will emit exhaust and airborne particulates, and construction work will produce dust. Due to the low background levels of pollutants in the area and favorable climatic conditions, increased vehicular emissions are not expected to be significant. The contractor will be required to use vehicles that are properly maintained.

To control dust during the construction phase, BMPs will be specified in construction plans, including the following:

- Water active work areas and temporary unpaved work roads
- Use wind screens and/or limit the area that is disturbed at any given time
- Mulch or use chemical soil stabilizers on inactive areas of the project site
- Cover transported or stored soils
- Implement a tire washing program to reduce dust emissions from trucks tracking dirt onto paved roadways in the project area
- Establish landscaping early in the construction schedule

Construction activities will employ fugitive dust emission control measures in compliance with provisions of the State Department of Health Rules and Regulations (Chapter 43, Section 10), and Hawai'i Administrative Rules (HAR), Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33 on Fugitive Dust.

### Long-term Air Quality Impacts

Long-term air quality impacts from project operation are not expected to be significant.

No specific mitigation measures are proposed to reduce vehicle-generated carbon monoxide levels at the Farrington Highway/Lualualei Access Road intersection or any other portion of the route to the site due to the insignificant increase in expected air emissions in these areas. Worse-case projected levels of emissions at these areas will be well within the State of Hawai'i and Federal Ambient Air Quality Standards because of the low current traffic volumes along the route and insignificant increases to such volumes which would be attributable to the project.

## **4.11 Noise**

### **Existing Conditions**

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, or when it has adverse effects on health. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels (dB). Another common measure is the Day-Night Average Level (Ldn), which is a weighted average of the intensity of a sound with corrections for time of day, and is averaged over 24 hours. Of particular significance are sensitive receptors—activities or land uses that may be subject to the stress of interference from noise. Land uses associated with sensitive receptors often include residential dwellings, hotels, hospitals, nursing homes, education facilities, churches, and libraries.

Existing background ambient noise levels in the project environs are controlled by traffic on Lualualei Naval Access Road, birds, dogs, wind, and foliage.

For residences in the vicinity of the project site, which are removed from Lualualei Access Road, existing average background ambient noise levels range from 45 to 55 Ldn, which is in the “minimal exposure, unconditionally acceptable” noise exposure category. Existing noise levels in the further removed residential areas west of the proposed development are low. During quiet periods between local traffic, background ambient noise levels along the roadway are dominated by the sounds of dogs, birds, wind, and distant traffic.

Existing traffic noise levels along Lualualei Naval Access Road are moderate (approximately 61 to 62 Ldn) at 50 feet setback distance from the roadway center line. Maximum noise levels (Lmax) associated with heavy truck and bus traffic on the two roadways are in the order of 78 to 85 dB at this setback distance. Minimum background ambient noise levels of approximately 35 to 50 dB occur between periods of traffic flow.

### **Potential Impacts and Mitigation Measures**

#### Short-term, Construction Noise

Audible construction noise will be unavoidable during project construction. Short-term noise impacts associated with project construction will occur. Actual noise levels produced during construction will be a function of the methods employed during each stage of construction. Equipment likely to be used include excavator, backhoe, front-end loader, grader, forklift, semi-trucks, dump trucks, concrete trucks, compactors, paving equipment, and compressors. Typical ranges of construction equipment noise vary between 70 and 95 dBA, which exceeds permissible levels. Earthmoving equipment, e.g., backhoes, front loaders, bulldozers, and diesel-powered trucks, will probably be the loudest equipment used during construction. The contractor will be required to maintain and properly muffle construction equipment and on-site vehicles that exhaust gas or air.



In cases where construction noise exceeds, or is expected to exceed the State's "maximum permissible" property line noise levels, a permit will be obtained from the State Department of Health under Hawai'i Administrative Rules Chapter 11-46, Rules on Community Noise. In order for the DOH to issue a construction noise permit, the contractor must submit a noise permit application to the DOH which describes the construction activities for the project. Before issuing the permit, the DOH may require the contractor to incorporate noise mitigation into the construction plan. The DOH may also require the contractor to conduct a noise monitoring or community meeting inviting the neighboring residences and businesses to discuss construction noise.

The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on machines with diesel and gasoline engines, using property tuned and balanced machines, and so forth. The DOH may require additional noise mitigation treatments, such as a temporary barrier around a generator.

Specific permit restrictions required for construction projects by the DOH are:

- No permit shall allow construction activities creating excessive noise before 7:00 am and after 6:00 pm of the same day
- No permit shall allow construction activities which emit noise in excess of 95 dBA except between 9:00 am and 5:30 pm of the same day
- No permit shall allow construction activities which exceed the allowable noise levels on Sundays and on certain holidays. Pile driving and other activities exceeding 95 dBA will be prohibited on Saturdays.

The DOH noise permit does not limit the noise level generated at the construction site, but rather the times at which noisy construction can take place. Therefore, noise mitigation for construction activities will be addressed using project management to ensure compliance with time constraints.

Properly muffled and maintained construction equipment will be required on the job site. The incorporation of State Health Department construction noise limits and curfews will also be applied to project construction.

#### Future Traffic Noise Environment

Moderate noises increases generated by project-related traffic and non-project-related traffic are predicted to occur along Lualualei Naval Access Road. Intermittent vehicular noise along this roadway from project-generated traffic would represent a minimal increase in noise. For most sources, a doubling of distance results in a dBA fall in noise level. The closest noise sensitive receptor in the project area is a single residence set back from Lualualei Naval Access Road. Therefore, traffic noise impacts associated with the project are not considered to be significant. Along Farrington Highway where traffic volumes, speeds, and noise levels are significantly high, the added noise contributions from project-generated traffic should not be significant when

compared to non-project traffic noise contributions. Project traffic noise impacts along the highway are not anticipated because of the dominating influence of non-project traffic noise over project-generated traffic noise.

## **4.12 Visual Resources**

### **Existing Conditions**

The Wai‘anae Sustainable Communities Plan (2000) shows Farrington Highway as a beautification area. This main thoroughfare along the Wai‘anae Coast provides scenic views of both the coastline and the Wai‘anae Mountain Range. The project site, located approximately 1.5 mile inland, is not visible from Farrington Highway.

### Cultural Significance of Visual Resources

During scoping meetings with the community and in response to the EISPN, concerns were raised about the significance of the mountains framing Lualualei Valley; in particular, the mountainous silhouette of the demigod Maui. The area in question lies to the north and east of the project site, lying within the Lualualei Naval Reservation. The Wai‘anae Sustainable Communities Plan (reference Open Space Map) also shows this area with a concentration of archaeological sites. The project site is outside the view plane.

### **Potential Impacts and Mitigation Measures**

The proposed industrial park is located off the main highway, where it will not detract from either the scenic views of the coast or the ambiance of small commercial villages in nearby Nānākuli and Mā‘ili.

Development of the light industrial park will alter the physical appearance of the site. The existing landscape of various grasses and isolated *kiawe* trees will be replaced by buildings and roads. Figure 18 provides simulations that indicate how the light industrial park might appear when fully developed. With an I-1 zoning designation, the maximum building height would be 40 feet.

The view at street level will be buffered by trees and fencing along the entire Lualualei Naval Road frontage. Aesthetic treatment at the front gate, including signage and accent landscaping will provide an attractive entry to the project. Within the industrial park, sidewalks, street trees, and street lights will provide a uniform appearance to the overall project. Covenants, Conditions, and Restrictions (CC&Rs) will be developed and implemented for the purpose of regulating standards of appearance and orderliness on individual lots for the benefit of all owners and the community in general.

## Visual Simulation - Industrial Park



## Visual Simulation - Front Gate



**Figure 18**  
**Visual Simulations**  
November 2009

## 4.13 Social and Economic Characteristics

### Existing Conditions

#### Demographics

The decennial censuses provide the most accurate and comprehensive set of socio-economic data. For the latest census, conducted in 2000, the U.S. Census Bureau divided the Wai‘anae Coast into seven census tracts (see Figure 19). The project site is located in Census Tract (CT) 96.01, which also includes Nānākuli Valley. Lualualei Naval Access Road is the dividing line between CT 96.01 and CT 96.04—the latter containing the residential areas of Lualualei. For purposes of the EIS analysis, the Wai‘anae Coast is separated into two subareas:

#### Nānākuli-Lualualei-Ma‘ili

- CT 96.01 Nānākuli-Lualualei
- CT 96.03 Ma‘ili
- CT 96.04 Niuli‘i Reservoir
- CT 97.02 Lualualei Homesteads

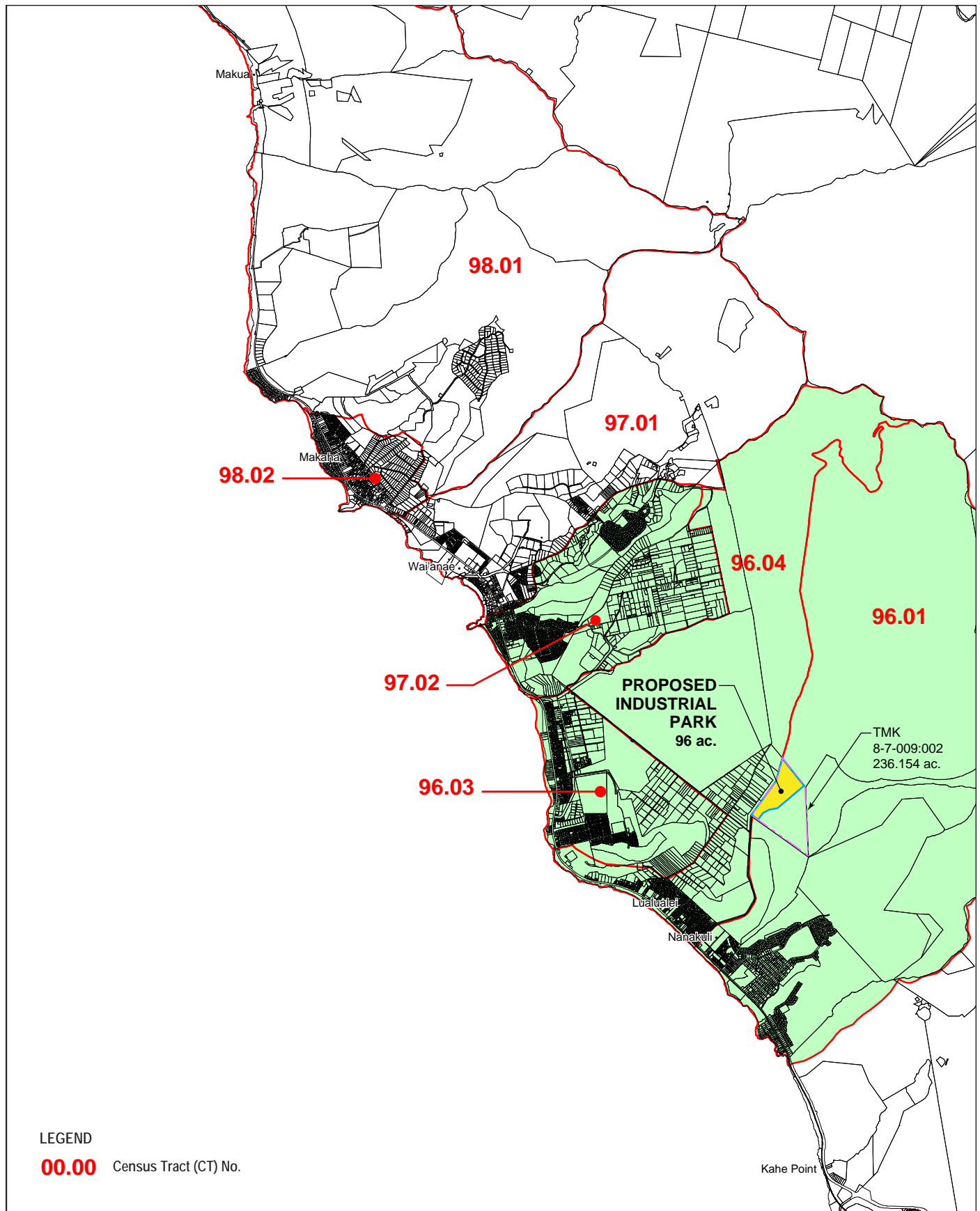
#### Wai‘anae-Mākaha

- CT 96.01 Wai‘anae Kai
- CT 98.01 Mākaha
- CT 98.02 Mākaha Valley-Mākua

**Table 12**  
**Resident Population by Census Tract, Subareas, Region, County, and State**  
**1990 and 2000**

<b>Geographic Area</b>	<b>1990</b>	<b>2000</b>	<b>Net Change</b>	<b>Percent Change</b>
<i><b>Census Tracts</b></i>				
CT 96.01 Nānākuli-Lualualei	5,974	6,854	880	14.7%
CT 96.03 Ma‘ili	6,820	7,946	1,126	16.5%
CT 96.04 Niuli‘i Reservoir	4,733	5,624	891	18.8%
CT 97.02 Lualualei Homesteads	6,153	8,125	1,972	32.0%
CT 97.01 Wai‘anae Kai	5,523	5,480	-43	-0.8%
CT 98.01/02 Mākaha	8,208	8,229	21	0.3%
<i><b>Subareas</b></i>				
Nānākuli-Lualualei-Ma‘ili	23,680	28,549	4,869	20.6%
Wai‘anae-Mākaha	13,731	13,709	-22	-0.2%
Wai‘anae Coast	37,411	42,258	4,847	13.0%
% of O‘ahu	4%	5%	12%	
O‘ahu (City & County of Honolulu)	836,231	876,156	39,925	4.8%
State of Hawai‘i	1,108,229	1,211,537	103,308	9.3%

Sources: U.S. Census, 1990, 2000



**Figure 19**  
**2000 Census Tracts**  
November 2009

In 2000, there were 6,854 residents in CT 96.01 (Nānākuli-Lualualei). The larger community of Nānākuli-Lualualei-Mā‘ili had a residential population of 28,549. Together with the Wai‘anae-Mākaha community, the Wai‘anae Coast had a population of 42,258. Relative to the island as a whole, approximately 5% of O‘ahu’s population lived on the Wai‘anae Coast.

Although the Wai‘anae Coast has a relatively small share of the islandwide population, population *growth* was relatively high through the 1990s. The Wai‘anae Coast experienced a net increase of 4,847 people or a growth rate of 13.0%. In comparison, the island of O‘ahu had a growth rate of only 4.8%. All of the net increase in population occurred in the Nānākuli-Lualualei- Mā‘ili area. The upper portion of the Wai‘anae Coast, Wai‘anae-Mākaha, experienced a small net decrease in population between 1990 and 2000.

### Employment and Income

The Wai‘anae Coast accounts for almost 5.0 percent of total population on O‘ahu, but less than 1.5 percent of the island’s employment. The imbalance is not expected to improve into the future. The Department of Planning and Permitting prepares socio-economic projections that are reported in the *Annual Report on the Status of Land Use on O‘ahu*. The *Annual Report for Fiscal Year 2006* indicates that population in the Wai‘anae Development Plan area will grow moderately from 44,656 in 2005 to 52,285 in 2030. Over the same period, however, employment is projected to decrease from 7,253 in 2005 to 7,126 in 2030.

Table 13 shows the occupational profile of the Wai‘anae Coast labor market. Compared to the island as a whole, Wai‘anae residents are less likely to hold jobs in management positions. On the other hand, they are concentrated in blue-collar occupations, including construction, extraction, and maintenance, as well as production, transportation, and material moving.

**Table 13**  
**Occupational Profile for Wai‘anae Coast and O‘ahu, 2000**

Occupational Category	Wai‘anae Coast		O‘ahu	
	No. of Persons	Percent	No. of Persons	Percent
Management	3,173	22%	129,513	34%
Services	3,205	22%	75,149	20%
Sales	3,878	27%	111,376	29%
Farming	221	2%	2,534	1%
Construction	1,878	13%	30,180	8%
Production	2,180	15%	33,716	9%
All Occupations	14,535	100%	382,468	100%

Source: U.S. Census, 2000



## Potential Impacts and Mitigation Measures

**Demographics.** The proposed development is not expected to affect the number of residents or the demographic characteristics of people who live in the area.

**Employment and Income.** The proposed development is expected to have a beneficial impact on the region as a job-producing and economy sustaining land use. Historically, the Wai‘anae Coast has experienced disproportionately high rates of unemployment and underemployment. The industrial park has the potential to become an employment center offering well-paid jobs that are within convenient commuting distance of Wai‘anae Coast communities. The employment forecast is based on an analysis by Hastings, Conboy, Braig & Associates, Ltd dated March 2008 (see Appendix B).

**Short-term Employment.** During the 15-month construction period, the on-site job requirement is estimated to range from 80 to 100 workers. The daily on-site job count will probably vary depending on factors such as phasing and scheduling of construction work and availability of work crews. In addition to on-site jobs, there is a reasonable expectation of related off-site job creation. Off-site jobs potentially include construction material suppliers and transportation services. The potential off-site job requirement is estimated at 20 percent of the on-site job requirement or between 15 to 20 workers.

**Long-term Employment.** The long-term employment impact ranges from 840 to 1,260 jobs. This number includes direct, indirect, and induced job creation effects. Direct job creation includes employment generated by businesses operating or based at the proposed light industrial park. Indirect job creation refers to a secondary level of employment generation because of goods and services purchased by businesses operating at the light industrial park. Induced job creation is a tertiary level of employment generation because of goods and services purchased from the incomes of people with jobs directly or indirectly related to industrial park businesses. In this way, employment impacts have a ripple effect throughout the larger economy. The number of direct jobs created by the proposed development is forecast at 560 to 840 full-time jobs. The direct job forecast is based on the estimated amount of developed industrial land multiplied by a factor of 8 to 12 employees per acre.

The creation of indirect and induced jobs was forecast using employment multipliers in the 2002 *State Input-Output Study* published by the State Department of Business and Economic Development and Tourism, June 2006. Using a comparatively low employment multiplier factor of 1.5, the total long-term employment forecast—combining direct, indirect, and induced employment—is estimated at 840 to 1,260 jobs.

No mitigation is necessary.



#### 4.14 Land Use

##### Existing Conditions

The project site is vacant and covered mostly with grasses, *koa haole* bushes, and isolated *kiawe* trees. Level portions of the site were used for sugar cane production, but production ceased in the early 1900s. Since then, the property has remained largely vacant and unused. A truck farm operated on 15 acres for a brief period in the 1980s, closing voluntarily in 1988.

There is limited use of the property at the present time. Grasses are mowed periodically for fire control purpose and used for silage. The entire site is subject to an existing Unilateral Agreement (UA) related to the development of a golf course. In compliance with a UA condition to provide a 30-foot wide landscaped buffer on the east side of Lualualei Naval Access Road, trees were planted in a linear strip fronting the roadway in the summer of 2007.

##### Surrounding Land Uses

Land uses in the Lualualei Valley are generally divided into four zones. The lower valley or *makai* zone is characterized by a mix of residential and commercial uses that developed along Farrington Highway. The upper valley is occupied by the U.S. military, including the Naval Magazine which connects over the ridge to Schofield Barracks on the central O‘ahu plateau.

The western zone is dominated by numerous lots that are arrayed along the *mauka-makai* oriented Hakimo Road. Lualualei Naval Access Road is the *mauka-makai* transportation spine for the eastern zone of the valley. Unlike Hakimo Road, the parcels on Lualualei Naval Access Road are larger and much fewer in number. This corridor has a distinctly industrial character, conveyed by the presence of the PVT landfill for construction and demolition debris and the former cement plant, now operated as a waste processing facility by Pineridge Farms. The project site lies *mauka* of Pineridge Farms, and abuts the Naval installation. The foothills of Pu‘u Heleakala Ridge form the site’s eastern and southern boundaries.

##### Regional Industrial Land Use

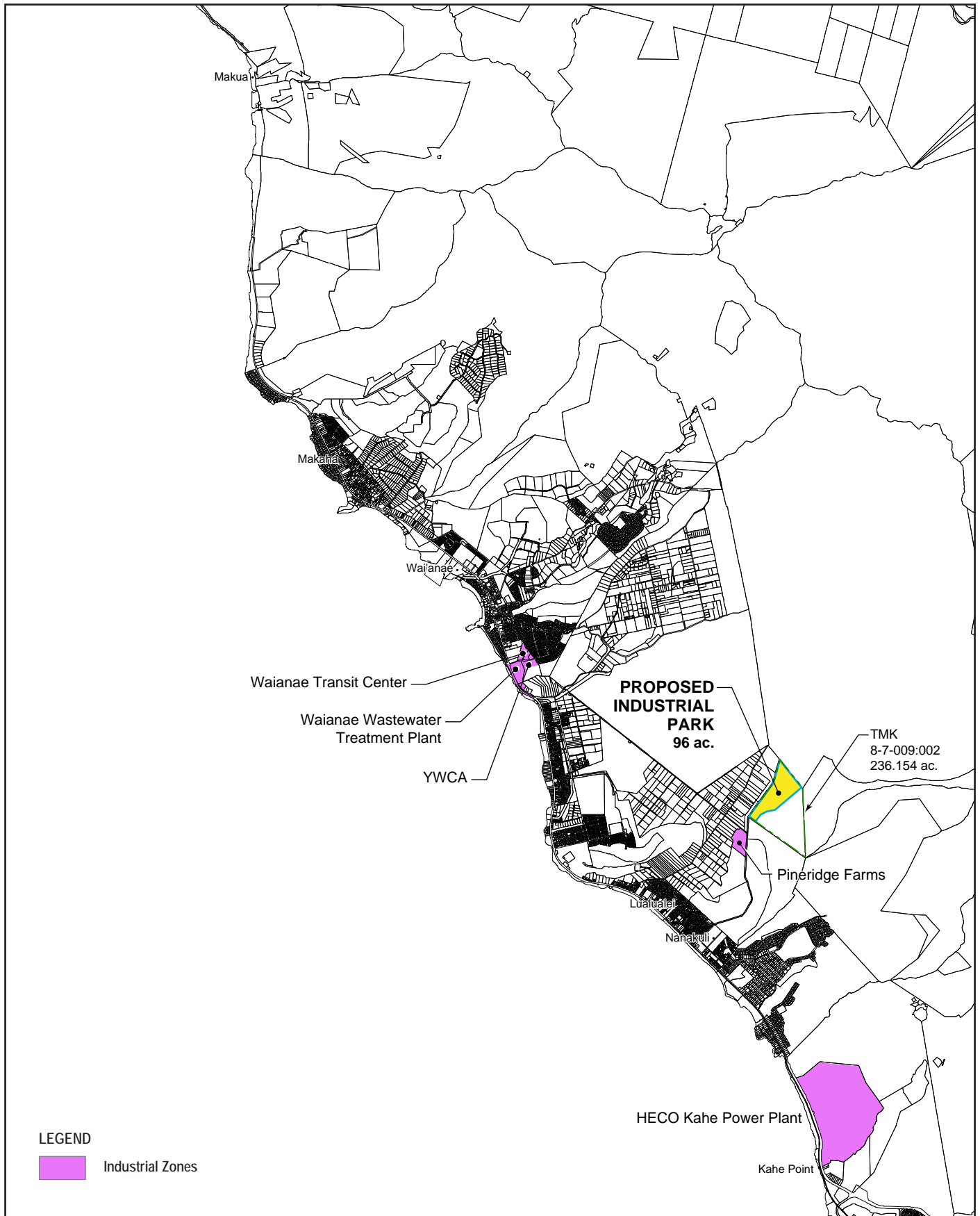
According to 2007 data compiled by real estate specialists, Colliers Monroe Friedlander, the total supply of existing industrial space on the island of O‘ahu was estimated at approximately 36.4 million square feet of floor area. The overall vacancy rate within O‘ahu’s industrial marketplace was estimated at 3%. Existing industrial development on O‘ahu is overwhelmingly concentrated within three designated Development Plan Areas, namely, the Primary Urban Center, ‘Ewa, and Central O‘ahu. Based on the Colliers data, the combined inventory of industrial space within the remaining Development Plan Areas of East Honolulu, Ko‘olaupoko, Ko‘olaupoko, North Shore, and Wai‘anae totaled less than 1.0 million square feet, or 2.7% of the islandwide total.

Figure 20 shows the existing distribution of industrially zoned land on the Wai‘anae Coast. The industrial acreages are mainly occupied by public and quasi-public entities, such as the HECO

power generation plant at Kahe, Wai‘anae Wastewater Treatment Plant, and Wai‘anae Transit Center. The only privately-owned sites are 25 acres in the Lualualei Valley occupied by West O‘ahu Aggregates and Pineridge Farms, and 4.76 acres in Wai‘anae. Small businesses in the Wai‘anae Coast looking for industrial space to lease or own have virtually no options but to locate outside their community.

### **Potential Impacts and Mitigation Measures**

Tropic Land intends to seek a zone change to the I-1 district for approximately 96 acres of the parcel on the east side of Lualualei Naval Access Road. As defined by the Honolulu Land Use Ordinance, I-1 is a limited industrial district and would be compatible with the rural milieu and lifestyle of the Wai‘anae District. The proposed industrial development is expected to have few environmental impacts and uses are intended to complement the development scale of the communities they would serve. Land uses permitted within the industrial park will be further specified in the project’s covenants, conditions, and restrictions.



**Figure 20**  
**Existing Industrial Zones, Waianae Coast**

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## 4.15 Infrastructure

### 4.15.1 Water

#### Existing Conditions

The Board of Water Supply (BWS) Pu‘u -o-Hulu system services properties along Hakimo Road (Figure 21). The water storage facility located closest to the project site is Pu‘u -o-Hulu Reservoir, with a 1.5 million gallon (MG) capacity and spillway elevation at 241.75 feet. The reservoir provides water services through a 20-inch transmission line and an 8-inch distribution main along Hakimo Road. Currently the Lualalei Booster Station has limited capacity of 25,000 gallons per day (GPD). The existing water system provides a flow of approximately 2,200 gallons per minute (GPM) to a fire hydrant at the intersection of Pa‘akea Road and Hakimo Road.

#### Project Water Demand

Based on development information shown in Table 14, the Average Daily Demand for the development is estimated to be 22,550 GPD. The Maximum Daily Demand is estimated to be 45,100 GPD with a Peak Hour Demand of 67,650 GPD.

Since the proposed light industrial park will be developed as a condominium, the Covenants, Conditions, and Restrictions (CC&Rs) will define the types of business permitted and impose any restrictions on quantity of water used. The Association of Owners will implement and enforce the CC&Rs.

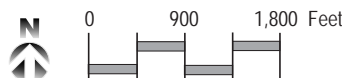
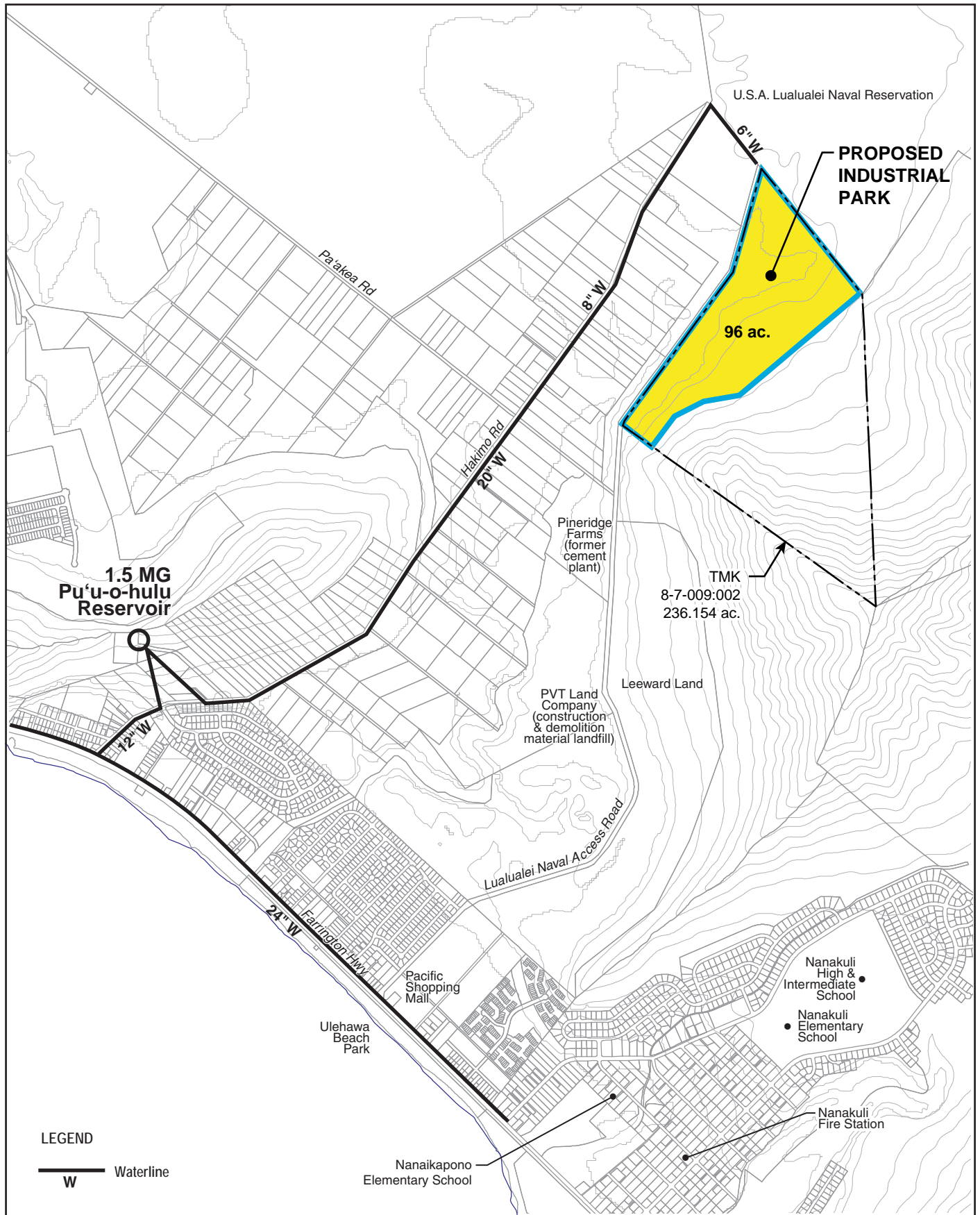
The projected water demand for fire protection is 4,000 GPM over a three-hour duration for the industrial park with a fire hydrant to be located within 125 linear feet of each lot. This demand is based on the BWS Standards, Table 100-19, Fire Flow Requirement.

**Table 14**  
**Estimated Potable Water Use Demand**

<b>Land Use</b>	<b>No. of Lots</b>	<b>Average De Facto Population*</b>	<b>GPD/Capita</b>	<b>Other Usage (GPD/Lot)</b>	<b>Average Daily Demand (GPD)</b>
Industrial	41	10	25	300	22,550

\* De facto population is based on a percentage of employment to estimate employees on site throughout the work day.

Source: Hida, Okamoto & Associates, Inc. *Preliminary Engineering Report*, October 2009



**Figure 21**  
**Existing Public Infrastructure**

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### Proposed Water Supply System

The proposed potable water system will be connected to the existing 20-inch BWS water main at the intersection of Pa‘akea Road and Hakimo Road. A new 16-inch transmission line will be located along Pa‘akea Road and Lualualei Naval Access Road, entering into the project site. An easement from the Navy will be needed for a portion of the water line to be constructed under Pa‘akea Road and Lualualei Naval Access Road.

By letter dated July 2, 2009, BWS indicated that installation of a new 16-inch water main will provide adequate fire flow to the proposed industrial development. Design and construction of the potable water distribution system will be in accordance with BWS Standards. The easement and water systems will be dedicated to the BWS.

### **Impacts and Mitigation Measures**

The proposed Nānākuli Community Baseyard will impact the Wai‘anae regional water system by increasing the demand for potable water. The industrial park’s water system will upgrade fire protection resources in the vicinity.

To reduce the demand for potable water, non-potable water—treated wastewater effluent—will be used for irrigation. Another water-saving measure is the requirement that industrial park businesses that wash fleet vehicles on-site install systems that recycle wash water. This requirement would also be administered through the CC&Rs.

## **4.15.2 Wastewater Facilities**

### **Existing Conditions**

Presently, the property is not served by the City and County’s wastewater collection and disposal system. Residential areas between the project site and the junction of Waiolu Street and Hakimo Road are mainly serviced by cesspools. Wastewater disposal by cesspools is a major issue within the Wai‘anae planning area. The City has no plans to serve the Agricultural District surrounding the project area with public sewers.

The municipal sewer main nearest to the project site is an 8-inch gravity sewer at Mohihi Street, approximately 2 miles south of the project site along Lualualei Naval Access Road.

### Project Wastewater Facilities Demand

Wastewater will be generated from the various facilities within the proposed Nānākuli Community Baseyard at an estimated average rate of 22,550 GPD or 0.23 MGD and will be typical of domestic wastewater in composition. Projected wastewater flows are based on a de facto population of 410 with 25 GPD/capita and 300 GPD/lot. Since the project will be

developed as a condominium, CC&Rs will establish permitted types of businesses, as well as the composition and quantity of wastewater discharges from each lot. The Association of Owners will implement and enforce the CC&Rs.

### Proposed Wastewater System

The major components of the proposed wastewater system are: (1) the gravity wastewater collection system, (2) the wastewater treatment unit, and (3) the wastewater effluent disposal system. The proposed wastewater infrastructure will serve only the Nānākuli Community Baseyard project.

Collection System. The proposed on-site wastewater collection system is illustrated in Figure 5 (Chapter 3). Gravity sewers will be located within sewer easements. Preliminary pipe line sizes range from 8 to 10 inches in diameter. Design and construction of the system will be in accordance with standards established by the City and County and State Department of Health. The on-site wastewater system will be privately operated and maintained.

Wastewater Treatment Unit. The proposed wastewater treatment unit will be sited in a relatively central location and at a lower elevation fronting Lualualei Naval Access Road, as shown in Figure 5 (Chapter 3). The unit will use a cyclic biological treatment (CBT) technology consisting of a single basin reactor with continuous activated sludge system. The self-contained treatment unit processes all steps of flow equalization, biological oxidation, nitrification, denitrification, and solids-liquids separation in the same basin. A microprocessor automatically coordinates all the equipment and phases of each cycle.

In addition to the CBT unit, filtration and chlorination units, pumps, piping, and appurtenances will be required—all housed within a building. A total fenced area of approximately 10,000 square feet is expected to be sufficient for the entire wastewater treatment facility.

Effluent Disposal. The treated wastewater effluent will be chlorinated, disinfected, and pumped to a non-potable water irrigation system. In the early stages of development, when wastewater levels are relatively low, effluent may be diluted with potable water for irrigation purpose. Ultimately, 100% of the estimated irrigation water requirement can be supplied by the treated effluent. Sludge will be removed and disposed of in accordance with applicable State laws.

### **Impacts and Mitigation Measures**

With proper operation, the wastewater system will provide for safe and reliable treatment and disposal of project-generated wastewater. Objectionable odors will not be generated by the wastewater treatment facility. Pumps and blowers normally associated with wastewater processing will be enclosed within a control building to reduce the impact of operating noises.

Placement of the treatment unit below ground level and landscaping around the perimeter fence will reduce the visual impact on motorists passing on Lualualei Naval Access Road.



### 4.15.3 Non-Potable Water

#### Existing Conditions

The project area is located entirely within the No Pass zone, which means that untreated effluent cannot be injected underground. The project proposes to use treated effluent for surface discharge which is a permitted method of disposal. The State of Hawai‘i, Department of Health, Wastewater Branch is the agency with jurisdiction for the application of recycled water under Hawai‘i Administration Rules 11-62-27. According to the Guidelines for Treatment and Use of Recycled Water, allowable R-1 irrigation uses include golf courses, parks, playgrounds, schoolyards, athletic fields, residential property managed by an irrigation supervisor, and roadsides and medians. The project site currently has no R-1 distribution system.

#### Proposed Non-Potable Water System

In the long-term, treated effluent from the wastewater treatment unit is expected to supply the entire estimated demand for irrigation water. The non-potable water system will consist of a pump system and non-potable water distribution main to dispense non-potable water for irrigation. Pipes and pumps will be sized to accommodate the maximum daily irrigation flow with a residual pressure of 20 pounds per square inch (PSI) at the critical location.

#### Project Demand

The potential non-potable water uses for this project include irrigation of the buffer area, commercial landscaping, and roadway medians. The non-potable water demand is estimated to be 0.023 MGD (Table 15). To accommodate the irrigation flow requirement for one day, the minimum irrigation water storage tank will be 0.03 MG.

**Table 15**  
**Estimated Non-Potable Water Use Demand**

<b>Land Use</b>	<b>Acre</b>	<b>GPD/Acre</b>	<b>Daily Demand (GPD)</b>
Landscaped Setback Area (Front, Sides)	3.5	1,440	5,040
Roadway Median, Commercial Landscaped Area	5.0	1,440	7,200
Rockfall Hazard Mitigation Area	7.3	1,440	10,512
Total			22,750
Rounded			0.023 MGD

Source: Hida, Okamoto & Associates, Inc. *Preliminary Engineering Report*, October 2009

## **Impacts and Mitigation Measures**

The proposed non-potable water system will have beneficial impacts by reducing the demand for potable water and providing a safe and efficient means of disposing project-generated effluent.

A water reuse plan will be developed for effluent water from the wastewater treatment plant. The plan will include additional information about irrigation practices, management, public education, and other required information per the DOH Recycled Water Guidelines.

### **4.15.4 Solid Waste Disposal Facilities**

#### **Existing Conditions**

The primary solid waste disposal site on O‘ahu is the Waimanalo Gulch Sanitary Landfill, which is owned by the City and County of Honolulu and contracted to Waste Management of Hawai‘i for management and operation. Opened in 1989, the landfill is located in the Kahe Valley. This facility is permitted to operate until July 31, 2012. It accepts approximately 300,000 tons of municipal solid waste and 100,000 tons of ash and residue from H-POWER annually.

The PVT Land Company waste disposal site is approximately 5,500 feet from the project site. The privately owned PVT facility is the only authorized location on O‘ahu that accepts construction and demolition debris material.

Because the project site is vacant and unused land, it is not serviced by the City refuse collection program or any comparable private refuse collection service.

#### **Projected Solid Waste Generation and Characteristics**

The proposed light industrial park will generate solid waste during construction and after development. Construction wastes primarily will consist of vegetation and debris when clearing the site prior to grading. Most of these wastes will be combustible.

When the project is fully built out, solid waste generation is expected to be approximately 1 ton per day based on average generation of 5.0 pounds per capita per day and a de facto population of 410. The composition of solid waste is expected to be typical for a municipal source.

Certain industrial uses may have the potential to generate hazardous or regulated waste. Quantities have not been estimated because the precise nature of future occupants is unknown. However, the intent of the light industrial park is to limit occupants to those who would generate, use, and handle only incidental volumes of hazardous and regulated materials.

### **Impacts and Mitigation Measures**

Refuse generated by the industrial park will be collected by a private refuse collection company for disposal at the H-POWER Plant or Waimanalo Gulch landfill. To reduce the waste stream, Tropic Land will develop a recycling plan for the construction and operational phases of the project. As appropriate, the plan will include a collection system for plastics, glass, paper and cardboard, cans, recyclable construction material, and green waste. Source separated material will be diverted to recovery facilities.

Where possible and appropriate, the project will specify or use products with recycled content, such as pavement material, concrete aggregate fill, and steel. In other cases, products produced locally will be used where possible and appropriate, including soil amendment and hydro-mulch. Individual lot owners will also be encouraged to develop and implement their own recycling plans.

All lot owners will be required to comply with State and federal regulations for the handling, storage, treatment, transport, and disposal of hazardous wastes. The State Department of Health oversees the reporting of inadvertent releases or spills.

#### **4.15.5 Electricity and Telecommunications Services**

##### **Existing Conditions**

There is an existing wood joint pole line along the Honolulu side of the Lualualei Naval Access Road right-of-way that abuts the project site. All of the poles contain Hawaiian Electric Co. (HECO) 3-phase, 11.5 kV, Hawaiian Telcom, and Oceanic Time Warner Cable lines. Power to this primary line is supplied by the Mikiloa Substation Feeder No. 3 on Pa‘akea Road which has available capacity to serve the proposed development.

##### **Modifications After Development**

It is anticipated that HECO, Hawaiian Telcom and Oceanic will provide the necessary electrical, telephone, cable TV, and high-speed Internet services to the project site. The total diversified electrical demand for the entire development is estimated to be 1.05 MVA. Power is planned to be supplied to the site via the existing Mikiloa Substation. The project site will not require its own substation.

##### **Impacts and Mitigation Measures**

The proposed Nānākuli Community Baseyard will place additional demands on the electrical and telecommunication utilities. Tropic Land will work with each of the companies for timely design and construction of utility infrastructure and delivery of required services. Utility lines within the project area will be placed underground to mitigate visual impacts.

Energy efficiency design guidelines will be incorporated into the project's Covenants, Conditions, and Restrictions (CC&Rs) to promote energy conservation. Among the guidelines that will be considered for inclusion in the CC&Rs are:

- Use of heat pumps, solar heating systems, and photovoltaic systems.
- Use of high-efficiency appliances and air conditioners.
- Use of timer or motion-sensing light and air condition controls.
- Promotion of energy saving opportunities through green building design, including building orientation and insulation.
- Use of landscaping to minimize heat islands, with preference for native, drought-tolerant plant species.

## **4.16 Public Facilities and Services**

### **4.16.1 Police and Fire Protection**

#### **Existing Conditions**

**Police:** The amendment area falls within the service area of District 8 which stretches from 'Ewa Beach to Ka'ena Point. The District 8 headquarters are located in Kapolei. There is a substation in Wai'anae which serves as a base for personnel patrolling the Wai'anae Coast.

**Fire:** The closest fire station, located in Nānākuli valley, is approximately 3.4 miles from the project site. The Nānākuli Station houses an engine unit and a tanker unit, as well as emergency medical services (EMS) unit. Back-up fire and EMS services are provided from the Wai'anae Fire Station, approximately 8 miles away.

#### **Impacts and Mitigation Measures**

By letter dated June 2, 20009, the Honolulu Police Department indicated that the project will have no significant impact on its facilities or operations. As security measures, the light industrial park will be fenced along the Lualualei Naval Road frontage and side boundaries. The main entry is via a front gate manned by a security guard or electronic security system after normal business hours.

New water lines, fire hydrants, and emergency access will be constructed by Tropic Land as prescribed by the Honolulu Fire Department and Board of Water Supply. The 100-foot buffer along the *mauka* boundary of the proposed development is intended to serve as a fire break. These improvements will accommodate the fire protection needs of the proposed industrial park. No short- or long-term adverse impacts to fire protection capability are anticipated.

#### **4.16.2 Health Care Facilities**

##### **Existing Conditions**

The primary health care facility on the Wai‘anae Coast is the Wai‘anae Comprehensive Health Center in Mā‘ili. This facility provides 24-hour emergency services. Additional round the clock emergency health services are provided by Hawai‘i Medical Center West, located in ‘Ewa Beach, with 102 beds for acute and critical care. Ambulance services to the site would come from the Wai‘anae Fire Station where ambulance services are available round the clock.

##### **Impacts and Mitigation Measures**

Existing health care facilities should be adequate to accommodate the needs of the proposed development. These facilities, including the Wai‘anae Coast Comprehensive Health Center and St. Francis-West Medical Center, have the general and emergency medical capabilities to treat injuries that might arise from light industrial uses. No short- or long-term adverse impacts are expected.

#### **4.16.3 Schools**

##### **Existing Conditions**

The campuses of Nānākuli Elementary School and Nānākuli Intermediate and High School are located in the valley to the east of the project site. The Lualualei and Nānākuli valleys are separated by a ridge of the Wai‘anae mountain range and connected by Farrington Highway

##### **Impacts and Mitigation Measures**

The proposed development is not expected to add additional students to the current public school enrollment.

#### **4.16.4 Park and Recreational Facilities**

##### **Existing Conditions**

There are no existing parks and recreational facilities in the immediate environs of the project site. According to the *Wai‘anae Sustainable Communities Plan* (2000), City parks in the vicinity are located on the coast, including Nānākuli Beach Park, Ulehawa Beach Park, and Lualualei Beach Park, encompassing an area of almost 137 acres.

##### **Impacts and Mitigation Measures**

There would be no short- or long-term impact on park or recreational resources.

## **5. RELATIONSHIP TO EXISTING LAND USE PLANS, POLICIES, AND CONTROLS**

This chapter discusses the relationship of the project to the objectives and policies of the Hawai‘i State Plan and Functional Plans, the State Land Use Commission Rules, the Coastal Zone Management Program, the City and County of Honolulu General Plan, and the Wai‘anae Sustainable Communities Plan.

### **5.1. Hawai‘i State Plan**

The Hawai‘i State Plan, Chapter 226 Hawai‘i Revised Statutes (HRS), established a set of goals, objectives and policies that serve as long-range guidelines for the growth and development of the State. The purpose of the Hawai‘i State Plan is to “...serve as a guide for the future long-range development of the State; provide a basis for determining priorities and human resources, land, energy, water and other resources; improve coordination of federal, state and county plans, policies, programs, projects and regulatory activities; and to establish a system for plan formulation and program coordination to provide for an integration of all major state and county activities” (Chapter 226-1: Findings and Purpose, HRS).

The project’s compatibility with applicable elements of the State Plan are described below.

#### ***Section 226-6, Objective and policies for the economy—in general.***

- Objectives:
- (a) Planning for the State’s economy shall be directed toward achievement of the following objectives:
    - (1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai‘i’s people.
    - (2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.
- Policies:
- (5) Assure that the basic economic needs of Hawai‘i’s people are maintained in the event of disruptions in overseas transportation.
  - (7) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawai‘i’s small scale producers, manufacturers and distributors.
  - (1) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.



**Discussion:** The intent of the proposed light industrial park is to increase opportunities for new and small businesses along the Leeward Coast and West O‘ahu. The Leeward coast is an area with historically high unemployment rates, and is especially vulnerable to disruptions in overseas transportation because of its distance and geographic isolation from urban Honolulu. The project is intended to support small local businesses and enhance the economic self-sufficiency of these communities.

## 5.2 State Functional Plans

Part of the overall State planning system is the development of State Functional Plans. While the Hawai‘i State Plan establishes long-term objectives, the purposes of the Functional Plans are to define strategies for the function area and to provide strategies for departmental policies, programs, and policies.

There are twelve State Functional Plans that serve as the primary implementing vehicle for the goals, objectives and policies of the State Plan. The following discusses the State Functional Plans that are applicable to the project.

### *Employment Functional Plan*

The State Employment Functional Plan, completed in 1989, identified five major objectives:

- Improve the qualification of entry-level workers and their transition to employment
- Develop and deliver education, training, and related services to ensure and maintain a quality and competitive workforce
- Improve labor exchange
- Improve the quality of life for workers and families
- Improve planning of economic development, employment, and training activities.

The following objectives and policies apply to the project:

Objective: (I.B) Develop and deliver education, training and related service to ensure and maintain a quality and competitive workforce.

Problem 1: There are insufficient opportunities for occupational skill training, upgrading skills, retraining, entrepreneurial and customized training.

**Discussion:** This section of the Employment Functional Plan identifies the need for entry-level training services, upgrading the skills of the existing work force, and supporting small businesses. Specifically the plan states, “Nurturing existing small businesses and new entrepreneurs will provide opportunities for new ownership which may help retain, expand and diversify managerial and technological expertise in Hawai‘i.” (State Employment Functional Plan, p. 19).

A major purpose of the proposed light industrial park is to encourage local entrepreneurship, and establish a setting where small, local businesses can develop, thrive, and reach their full potential. The facility can also develop into an employment and training center for the Leeward Coast, which historically has experienced disproportionate rates of unemployment.

### ***State Agriculture Functional Plan***

Objective: (H) Achievement of productive agricultural use of lands most suitable and needed for agriculture.

Policy: (H.2) Conserve and protect important agricultural lands in accordance with the Hawai‘i State Constitution.

**Discussion:** The proposed industrial park site is located within the State Agricultural District. The Applicant’s petition to the State Land Use Commission is requesting that 96 acres be reclassified from the Agriculture to the Urban District. Portions of the site are classified as “prime lands” under the Agricultural Lands of Importance to the State of Hawai‘i (ALISH) and an isolated section is rated “B” Under the Land Study Bureau (LSB) Detailed Land Classification System.

Notwithstanding their classification, these lands are not desirable agricultural lands. The project area’s clayey and rocky soils are poorly suited for diversified agriculture. The project site is situated between industrial uses and the military installation in a location that has not experienced economically viable agricultural activity for decades.

### ***State Transportation Functional Plan***

The 1991 State Transportation Functional Plan identified the four most critical issues of transportation: congestion, economic development, funding and education. Objectives, policies and implementing actions were identified for each issue. The following objectives and policies apply to the project:

Objective: (I.B) Reduction of travel demand through zoning and decentralization initiatives.

Policies: (I.B.1) Close the gap between where people live and work through decentralization, mixed zoning, and related initiatives.

**Discussion:** The proposed light industrial park will provide business and employment opportunities to residents of the Wai‘anae Coast area, closer to the where people live. This will reduce the need for local residents to commute to jobs outside the community, reducing traffic along the narrow and chronically congested Farrington Highway corridor.

### ***Energy Functional Plan***

The priority of the 1991 State Energy Functional Plan was to lessen the State's reliance on petroleum and other fossil fuels. The plan noted that the State depends on fossil fuels for about 90 percent of our total energy needs, and emphasized the need to develop alternate and renewable energy sources, energy conservation, and an integrated approach for more effective energy development and management.

Issue Area: Overdependence upon oil and other fossil fuels for energy needs.

Objective: (A) Moderate the growth in energy demand through conservation and energy efficiency.

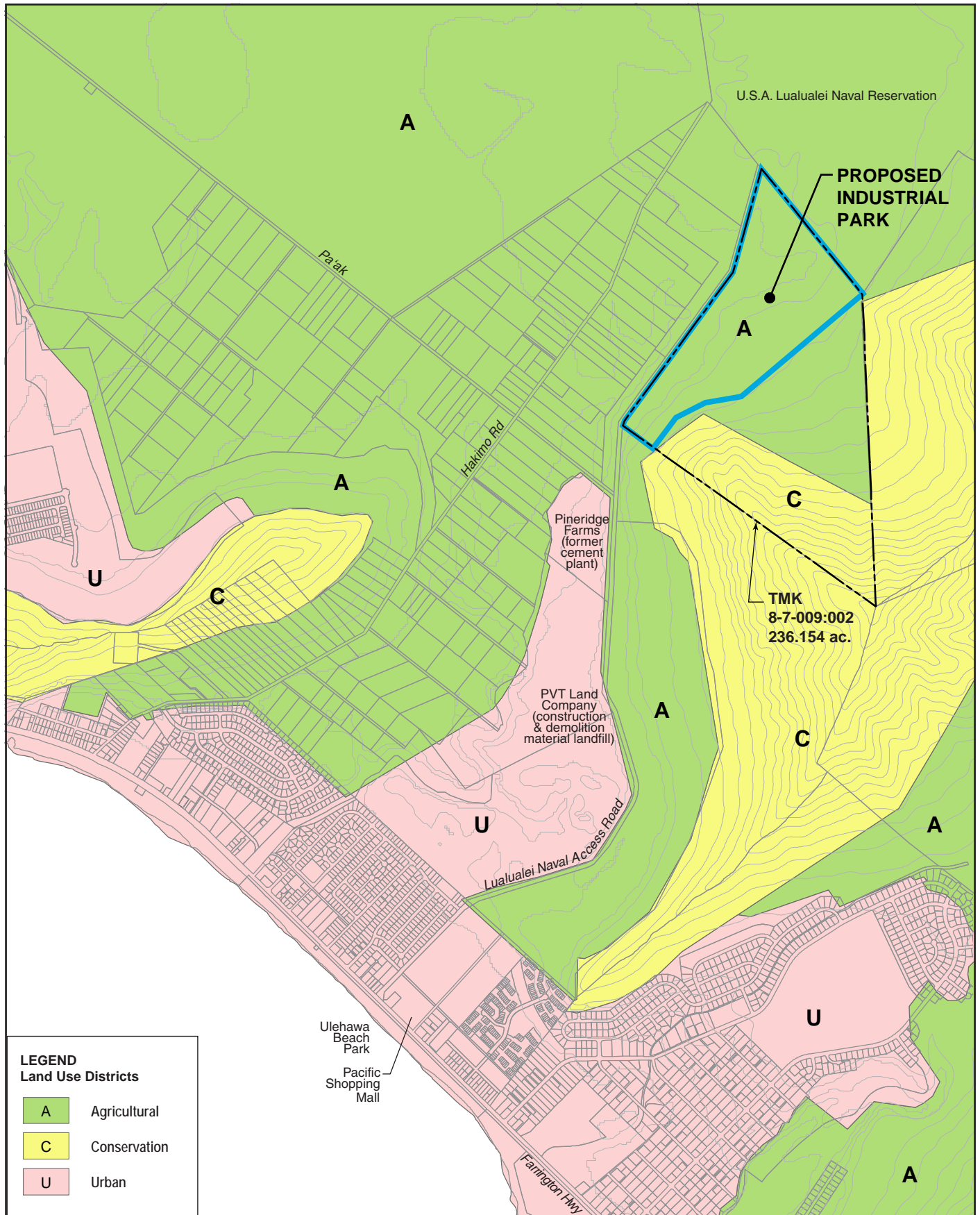
Policy: (A.2.1) Stimulate and promote greater energy efficiency and conservation in the transportation sector.

***Discussion:*** As discussed under the Transportation Functional Plan above, the proposed project will expand business and employment opportunities closer to where people live, reducing the need to commute to other areas of the island for work, or to buy appropriate goods and services.

## **5.3 State Land Use Classification**

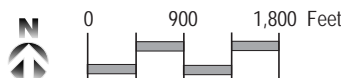
The State Land Use Commission, pursuant to Chapter 205 and 205A, HRS and Chapter 15-15, Hawai'i Administrative Rules, is empowered to classify all lands in the state into one of four land use districts: Urban, Rural, Agricultural, and Conservation.

Figure 22 shows the State land use districts of the project area and vicinity. Currently, TMK 8-7-09: 02 is partially located in the Agricultural District (168.764 acres) and partially located in the Conservation District (67.439 acres). The Conservation District land, consisting of a steep ridge of Pu'u Heleakala, is not affected by the proposed action. The proposed industrial park site is wholly located within the Agricultural District. Tropic Land will petition the State Land Use Commission to reclassify approximately 96 acres from Agricultural to Urban (Table 16).



**Figure 22**  
**State Land Use Map**

November 2009



**Table 16**  
**Current and Proposed State Land Use Classifications**  
**TMK: 8-7-09: 02**

<b>Land Use Districts</b>	<b>Current Acres</b>	<b>Proposed Acres</b>
Agricultural	168.764	72.764
Conservation	67.439	67.439
Urban	0	96.000
<b>Total</b>	<b>236.154</b>	<b>236.154</b>

The State Land Use Commission Rules require that an application for a boundary amendment show that it is “reasonable, not violative of Section 205-2, HRS, and consistent with the policies and criteria established pursuant to Sections 205-16, 205-17, and 205A-2, HRS.” (Hawai‘i Land Use Commission Rules, Section 15-15-77). In reviewing petitions for reclassification of district boundaries, the Commission must specifically consider the following:

- (1) **The extent to which the proposed reclassification conforms to the applicable goals, objectives and policies of the Hawai‘i State Plan and relates to the applicable priority guidelines of the Hawai‘i State Plan and the adopted functional plans.**

**Discussion:** As discussed in Sections 5.1 and 5.2 above, the project conforms to the most applicable goals, objectives and policies and the guidelines of the Hawai‘i State Plan and State Functional Plans.

- (2) **The extent to which the proposed reclassification conforms to the applicable district standards.**

**Discussion:** The applicable standards for the Urban District are found in HAR Section 15-15-18 of the Land Use Commission Rules. The eight (8) standards are discussed below:

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

*(C) Sufficient reserve areas for foreseeable urban growth;*

The project is consistent with the urban standards, including the proposed “city like” concentration of people, structures, streets, urban level of services and other related land uses and proximity to employment centers. Services such as sewers, water, sanitation, schools, parks and police and fire protection are or will be available to serve the project.

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

The project area includes lands with satisfactory topography, drainage, which are reasonably free from danger of flood, tsunami, unstable soil condition, 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;*

*(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 general plans;*

The project site is contiguous to the Naval Munitions Center (NMC) Lualualei, a military ordnance storage facility, which although not in the Urban District, is an urban type activity. It is also very close to industrial lands owned by Pineridge Farms and the PVT Land Company, which are in the Urban District. The WSCP was in the process of being updated when this DEIS was prepared, and an application is pending to change the Rural Community Boundary to incorporate the proposed industrial park site. The Department of Planning and Permitting’s Draft Wai‘anae Sustainable Communities Plan Revision for 2009 identifies “industrial” as an alternative land use for this site. The project directly supports the Wai‘anae Sustainable Communities Plan’s stated Community Values to provide economic choices in Wai‘anae, including jobs in Wai‘anae which will allow families to spend less time commuting.

*(6) It may be 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;*

As indicated above, the project site is adjacent to the Naval Munitions Center (NMC) Lualualei, Pineridge Farms, and the PVT Land Company landfill, which can all be characterized as urban and industrial uses. Although the site and surrounding areas are within the Agricultural land use district, the University of Hawai‘i Land Study Bureau has rated 80% of the site as Class E, or “marginally” suitable for agricultural use. Much



of the parcel is stony, and agricultural use would require soil amendment and modification. The remainder of the site is rated Class B, “prime” or “good” agricultural land if it is irrigated. This would require water sources that are not readily available to new agricultural operations on the Wai‘anae coast.

The site is only a minor portion of the Agricultural designated lands on O‘ahu. With the availability of more favorable options, including several thousand acres of Campbell land in Kunia, Dole land in Wahiawa and Waialua, and Galbraith Estate land in Wahiawa, there are more affordable options with better access to irrigation water resources than the subject property or other areas along the Leeward coast.

(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; and*

As indicated above, the project site is adjacent to the Naval Munitions Center (NMC) Lualualei, Pineridge Farms, and the PVT Land Company landfill, which are considered urban and industrial uses. Petitioner proposes to construct utilities necessary to support the project.

(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...*

Not applicable. The project site is relatively flat, sloping at a 12% rate from Lualualei Access Road upward to the foothills of Pu‘u Heleakala ridge.

**(3) Impact on the following areas of Statewide concern:**

- **Preservation or maintenance of important natural systems and habitats;**
- **Maintenance of valued cultural, historical, or natural resources;**
- **Maintenance of other natural resources relevant to Hawai‘i’s economy, including but not limited to agricultural resources;**
- **Commitment of state funds and resources;**
- **Provision of employment opportunities and economic development; and**
- **Provision for housing opportunities for all income groups, particularly the low, low-moderate, and gap groups.**

**Discussion:** There are no threatened or endangered species or significant historic or archaeological resources within the project area. The State Historic Preservation Division has concurred that the project will have “no effect” on historic sites. Although the site is on agricultural land, the UH Land Study Bureau has found that 14% of the 96-acre project site is classified as containing Class B (prime or good) agricultural lands, while 86% of the site contains Class E lands, which are only marginally suitable for

agricultural use according to the LSB soils rating system. It is believed that in the early 1900's, the site was used primarily for pasturage rather than agriculture. Other than a small truck farm that ceased operation in 1988, no other crop production has occurred on the site since that time.

The project will not require a commitment of state funds or resources. The proposed industrial park will support local start up businesses, resulting in a positive impact on employment opportunities and economic development for the Wai'anāe Coast. The project will not directly affect housing opportunities. It will, however, provide needed jobs and economic opportunities for small businesses, enhancing the ability of local families to remain adequately housed.

- (4) **In establishing the boundaries of the districts in each county, the commission shall give consideration to the general plan of the county in which the land is located.**

*Discussion:* The City and County of Honolulu General Plan is discussed in Section 5.6 below. The project is consistent with the General Plan objectives and policies in the areas of Economic Activity, Natural Environment, and Physical and Urban Design.

- (5) **The representations and commitments made by the petitioner in securing a boundary change, including a finding that the petitioner has the necessary economic ability to carry out the representations and commitments relating to the proposed use or development.**

*Discussion:* The petitioner, Tropic Land LLC, has reported that it has the financial ability to implement the project.

- (6) **Lands in intensive agricultural use for two years prior to the date of filing of a petition or lands with a high capacity of intensive agricultural use shall not be taken out of the agricultural district unless the commission finds either that the action:**  
(A) **will not substantially impair actual or potential agricultural production in the vicinity of the subject property or in the county or State; or**  
(B) **is reasonably necessary for urban growth.**

*Discussion:* Not applicable. As noted above, the property has not been used for agriculture for more than twenty years, since a small truck farm on the site ceased operation in 1988.

## 5.4 Coastal Zone Management Act (CZMA)

Objectives and policies of the Coastal Zone Management Program are described in Chapter 205A-2, Hawai'i Revised Statutes, Part I. The site is within the State's Coastal Zone Management Area, which includes all lands with the exception of forest reserves.

Special Management Area guidelines are found in Part II of the same chapter. The site lies approximately two miles from the coastline, and is outside the City and County of Honolulu's Special Management Area (see Section 5.9). The project's conformance with the policies and objectives of the Coastal Zone Management Program is discussed below:

### ***Recreational Resources***

**CZM Objective:** Provide coastal recreational opportunities accessible to the public.

**Discussion:** The project will not affect existing fishing, surfing or other nearby recreational opportunities accessible to the public. The site is located approximately two miles from the coastline.

### ***Historic Resources***

**CZM 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.

**Discussion:** The project will not have an adverse effect on natural or man-made historic or prehistoric resources in the CZM area. An archaeological survey of the project site was conducted in 1990 for the formerly proposed golf course development. A total of seven archaeological sites were identified in and around what is now the proposed industrial park. Only two of the sites were interpreted as attributable to traditional Hawaiian activity; a remnant of an agricultural wall and a probable hearth feature. The five other sites are attributable to historic land usage, primarily cattle ranching. The DLNR State Historic Preservation Division was consulted during the environmental review for the previously proposed golf course. At that time, the SHPD determined that the golf course project would have no adverse impact on significant historical resources. The currently proposed industrial park is within the boundaries of the proposed golf course, and is not expected to adversely affect historic resources.

### ***Scenic and Open Space Resources***

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

**Discussion:** The project site is currently open space. The project area is not visible from any public highway or the coastal area, and is not located within any designated scenic corridor.

### ***Coastal Ecosystems***

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

**Discussion:** The project will not adversely impact coastal ecosystems or water quality. The site is located two miles from the coastline. During construction, erosion control measures will be required to eliminate any potential for stormwater runoff to reach nearshore areas.

### ***Economic Uses***

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

**Discussion:** The development of a light industrial park with business incubator space will be an asset to the rural economy of the Leeward Coast. The project location is appropriate, as it is tucked away on Lualualei Access Road, away from the scenic coastline and near the Naval Munitions Command reservation and other light industrial uses.

### ***Coastal Hazards***

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

**Discussion:** The project site is located outside the tsunami inundation zone, and is located within the area designated as Zone D, areas of undetermined flood hazard, on the Flood Insurance Rate Map (FIRM). The proposed industrial park will not affect the occurrence or likelihood of damage from various natural disasters on adjacent properties.

### ***Managing Development***

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

**Discussion:** The project has no impact on this CZM objective.

### ***Public Participation***

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

**Discussion:** The project has no impact on this CZM objective. However, the proposal for a light industrial park was developed through consultation with the Nānākuli/Mā'ili and Wai'anāe Neighborhood Boards and various community groups, who were asked for recommendations on an appropriate use for the property. Several suggestions were made, but the community consensus was for development of a light industrial park.

### ***Beach Protection***

**CZM Objective:** Protect beaches for public use and recreation.

**Discussion:** The project has no impact on the use or protection of public beaches.

## **5.5 Hawai‘i Enterprise Zone (EZ) Partnership Program**

The Hawai‘i Enterprise Zone (EZ) Partnership Program was established by the State Legislature to help stimulate business activity and employment in areas where they are most needed or most appropriate. Each county can select up to six zones that satisfy statutory income or unemployment criteria, and each zone designation is valid for a period of 20 years. Qualified businesses that locate within a designated enterprise zone can receive tax and other incentives. Since 1994, 21 zones have been created statewide, including one on the Leeward Coast. On O‘ahu, 132 firms were enrolled in the EZ program in 2006, the last year for which data have been reported. On the Leeward Coast, however, there were zero participants.<sup>1</sup>

The economic development impact of the EZ program has been significant. In 2006 alone, participating firms produced a combined total of 830 new jobs. Since job creation occurred in areas targeted by unemployment or income criteria, the benefits of the EZ program are all the more noteworthy.

The enterprise zones on O‘ahu are typically oriented around new or established employment centers. For example, Zone 1 includes the former O‘ahu Sugar Mill site in Waipahu, Campbell Industrial Park, and all of Kapolei. Zone 2 includes the Mililani Tech Park and parts of Wahiawā. Zone 3 includes the former Waialua Sugar Mill site. Zone 4 is in urban Honolulu from the airport through Kalihi to the Kaka‘ako redevelopment area. Zone 5 is the Leeward Coast, but in contrast to the other zones, does not have a well-defined place to incubate and grow new businesses, provide training activities, and promote other types of economic development activities.

The western portion of the amendment area (23 acres) is already located within the existing Leeward Coast Enterprise Zone. The eastern portion of the amendment area, including the area proposed for the light industrial park, is in a census tract that is eligible for EZ designation. As the proposed industrial park site moves forward in the entitlement process, Tropic Land will seek to expand the EZ boundary to encompass the industrial park.

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<sup>1</sup> State of Hawai‘i, Department of Business, Economic Development & Tourism. 2006. “Enterprise Zones Partnership, Report to the Governor for Calendar Years, 2003-2006.” See Appendix B: Firms Enrolled by County, Zone, and Type.

## 5.6 City and County of Honolulu General Plan

The City and County of Honolulu General Plan was adopted in 1977 and subsequently amended through a series of amendments. The General Plan sets forth long-term goals and objectives, and strategies to achieve them. The proposed action is consistent with the following objectives and policies from the General Plan.

### *Economic Activity*

#### **Objective A To promote employment opportunities that will enable all the people of O‘ahu to attain a decent standard of living.**

- |          |   |
|----------|---|
| Policy 1 | Encourage the growth and diversification of O‘ahu’s economic base.  |
| Policy 2 | Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of O‘ahu residents. |
| Policy 3 | Encourage the development in appropriate locations on O‘ahu of trade, communications, and other industries of a nonpolluting nature.                |

**Discussion:** The amendment will provide an inventory of industrial space on the Wai‘anae Coast, which does not have a similar facility. The proposed project will be attractive to a mix of light industrial businesses and provide open yard space for storing materials, trucks, and heavy equipment.

#### **Objective C To maintain the viability of agriculture on O‘ahu.**

- |          |   |
|----------|---|
| Policy 1 | Assist the agricultural industry to ensure the continuation of agriculture as an important source of income and employment.   |
| Policy 5 | Maintain agricultural land along the Windward, North Shore, and Wai‘anae coasts for truck farming, flower growing, aquaculture, livestock production, and other types of diversified agriculture. |

**Discussion:** The importance of agricultural production is recognized; however, the amendment area has clayey and rocky soils that are poorly suited for diversified agricultural. It is situated between industrial uses and the military installation in a location that has not experienced economically viable agricultural activity for decades.



**Objective G To bring about orderly economic growth on O‘ahu.**

- |          |   |
|----------|---|
| Policy 2 | Permit the moderate growth of business centers in the urban-fringe areas.   |
| Policy 3 | Maintain sufficient land in appropriately located commercial and industrial areas to help ensure a favorable business climate on O‘ahu. |

**Discussion:** The region has demonstrated an ability to nurture small businesses involved in trucking, distribution, light manufacturing, construction trades, repair and related services. The proposed industrial park is intended to meet their current and future demand for industrial space with an affordable product.

***Natural Environment***

**Objective A To protect and preserve the natural environment.**

- |          |   |
|----------|---|
| Policy 1 | Protect O‘ahu’s natural environment, especially the shoreline, valleys, and ridges, from incompatible development.  |
| Policy 4 | Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water-recharge areas, distinctive land forms, and existing vegetation. |
| Policy 6 | Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.  |

**Discussion:** The preliminary site plan (see Figure 3 in Chapter 3) shows a development pattern that is compatible with the topography of the site. The light industrial park is confined to areas with flatter slopes. The development footprint is smaller than the golf course previously proposed for the site, and will leave a larger expanse of the foothills undeveloped. Surface drainage, flood and erosion hazards, and rockfall hazards will be addressed in detail in the environmental assessment.

***Physical Development and Urban Design***

**Objective A To coordinate changes in the physical environment of O‘ahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.**

- |          |  |
|----------|--|
| Policy 2 | Coordinate the location of timing of new development with the availability of adequate water supply, sewage treatment, drainage, transportation, and public safety facilities. |
|----------|--|

- Policy 3      Phase the construction of new developments so that they do not require more regional supporting services than are available.
- Policy 7      Locate new industries and new commercial areas so that they will be well related to their markets and suppliers, and to residential areas and transportation facilities.

**Discussion:** The proposed development will be designed to minimize impacts on public utility systems and services. The industrial park will need to be connected to the City's water system, but demand is expected to be lower than the previous plan for a golf course and clubhouse. City water lines are provided to the property's boundaries. An independent wastewater system will be developed on site. Safety systems will be provided on site and complement ongoing security provided by the adjacent military installation and local police.

**Objective D   To maintain those development characteristics in the urban fringe and rural areas which make them desirable places to live.**

- Policy 1      Develop and maintain urban-fringe areas as predominantly residential areas characterized by generally low rise, low density development which may include significant levels of retail and service commercial uses as well as satellite institutional and public uses geared to serving the needs of households.
- Policy 4      Maintain rural areas as areas which are intended to provide environments supportive of lifestyle choices which are dependent on the availability of land suitable for small to moderate size agricultural pursuits, a relatively open and scenic setting, and/or a small town, country atmosphere consisting of communities which are small in size, very low density and low rise in character, and may contain a mixture of uses.

**Discussion:** The proposed industrial park is located off the main highway, where it will not detract from either the scenic views of the coast or the ambiance of small commercial villages in nearby Nānākuli and Mā'ili. The industrial park is also favorably situated from a transportation standpoint. Lualualei Naval Access Road was designed and constructed for truck transport. Compared to other mauka-makai roadways in the district, there is a low volume of residential traffic on Lualualei Naval Access Road and the uses adjoining the road are similarly industrial in nature. In terms of the regional roadway network, the location has ease of access to the freeway and the location near the gateway to the Wai'anae district would minimize truck traffic farther up the coast.

## 5.7 Wai‘anae Sustainable Communities Plan

The Wai‘anae Sustainable Communities Plan (WSCP), is one of eight City and County of Honolulu Development Plans that were revised to reflect a 1992 City Charter amendment that called for conceptual, visionary plans to replace the parcel-specific, map oriented Development Plans adopted in the 1980s.

The WSCP was in the process of being updated when this DEIS was prepared. As part of the WSCP update, Tropic Land submitted an application to amend language in the plan and change the Rural Community Boundary to incorporate the proposed industrial park site. A public review draft of the updated WSCP has been released, but not yet adopted by City Council.

The following sections, based on Tropic Land’s WSCP amendment application, describe the proposed project’s consistency with various chapters of the WSCP (2000). Figures 23 and 24 are from the Draft WSCP (2009) released for public review. The land use map in Figure 23 is essentially unchanged from the 2000 WSCP. Figure 24 shows the industrial park as an option.

## Chapter 2, The Vision for Wai‘anae’s Future

Chapter 2 of the WSCP presents a community-based vision statement for the Wai‘anae District. The basis for this vision covers the areas of *Community Values, Rural Values and Qualities, the Community Participation Process, the Ahupua‘a/Ecosystem Concept, and Environmental Criteria for Land Use Planning*.

### ***Vision Statement***

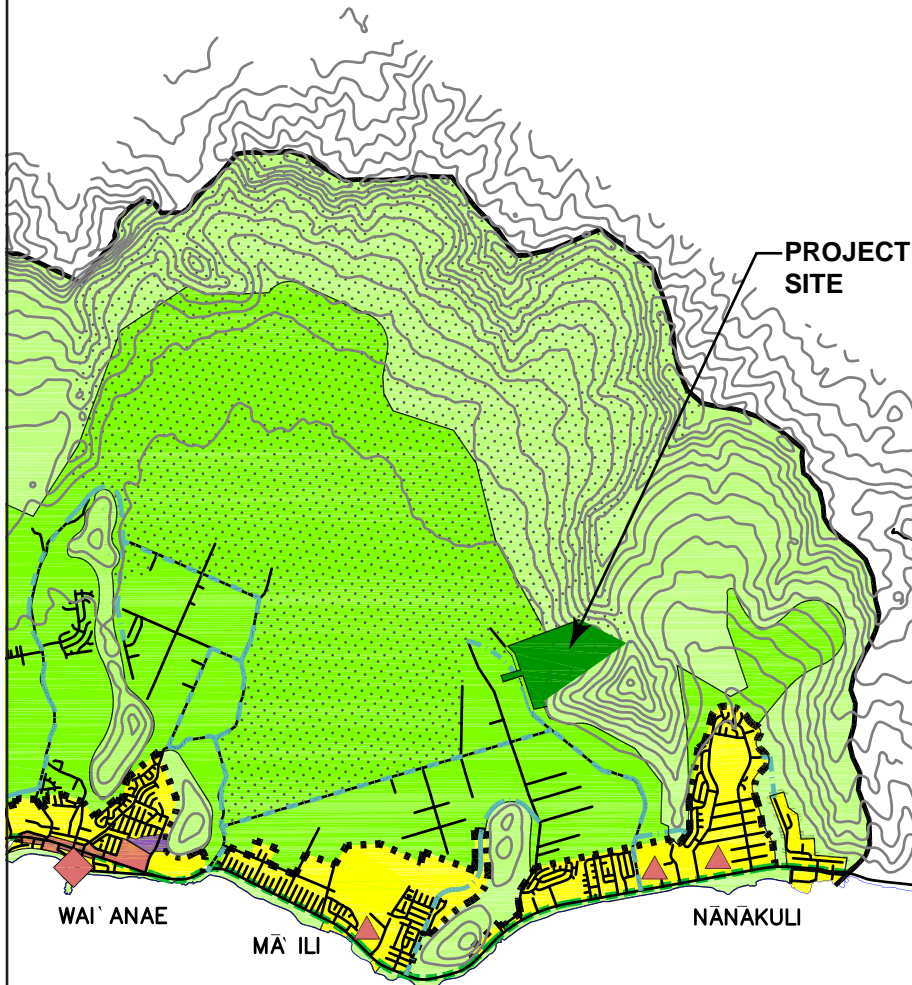
*The vision for the future of Wai‘anae is a vision of a community living by values and customs that are firmly embedded in the rural landscape, the coastal shorelands, the ocean waters, the forested mountains, the diversity of cultures, the warmth of family and friends, and the Wai‘anae traditions of independence, country living, and aloha. (WSCP, p. 2-1)*

**Discussion:** The proposed amendment seeks to establish an employment center in the Wai‘anae District. The proposal will amplify the district’s sense of independence, specifically economic independence and expand local employment opportunities. For some district residents, this key element of the vision is not yet fully realized, as the Wai‘anae Coast historically has experienced disproportionately high rates of unemployment and underemployment. There are ongoing efforts in the local schools and by non-profit organizations to encourage young people to strive for economic independence. At the same time, there are many on the Wai‘anae Coast who have successfully created small businesses, for example, in contracting, services, and trucking. The proposed development offers a potential venue for these businesses to operate within the community.

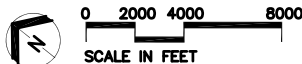
# LAND USE MAP A SAME LAND USE MAP IN WSCP 2000

## WAI'ANAE *SUSTAINABLE* COMMUNITIES PLAN (Revised 2009)

### LAND USE MAP



- ■ ■ ■ ■ RURAL COMMUNITY BOUNDARY
- ..... SPECIAL AREA PLAN BOUNDARY
- FARRINGTON HIGHWAY BEAUTIFICATION
- - - - - POSSIBLE RELIEVER ROAD ROUTES
- RURAL COMMUNITY
- MEDIUM DENSITY RESIDENTIAL
- RESORT
- INDUSTRIAL
- GOLF COURSE
- AGRICULTURE
- PRESERVATION
- MILITARY
- COUNTRY TOWN
- ▲ RURAL COMMUNITY COMMERCIAL CENTER



Department of  
Planning and Permitting  
City & County of Honolulu  
October 2008

FIGURE A-1  
Appendix A-13

**Figure 23**  
**Waianae Sustainable Communities Plan Map (A)**

November 2009

# LAND USE MAP B POTENTIAL LIGHT INDUSTRIAL USE IN LUALUALEI VALLEY

## WAI'ANAE SUSTAINABLE COMMUNITIES PLAN (Revised 2009)

### LAND USE MAP

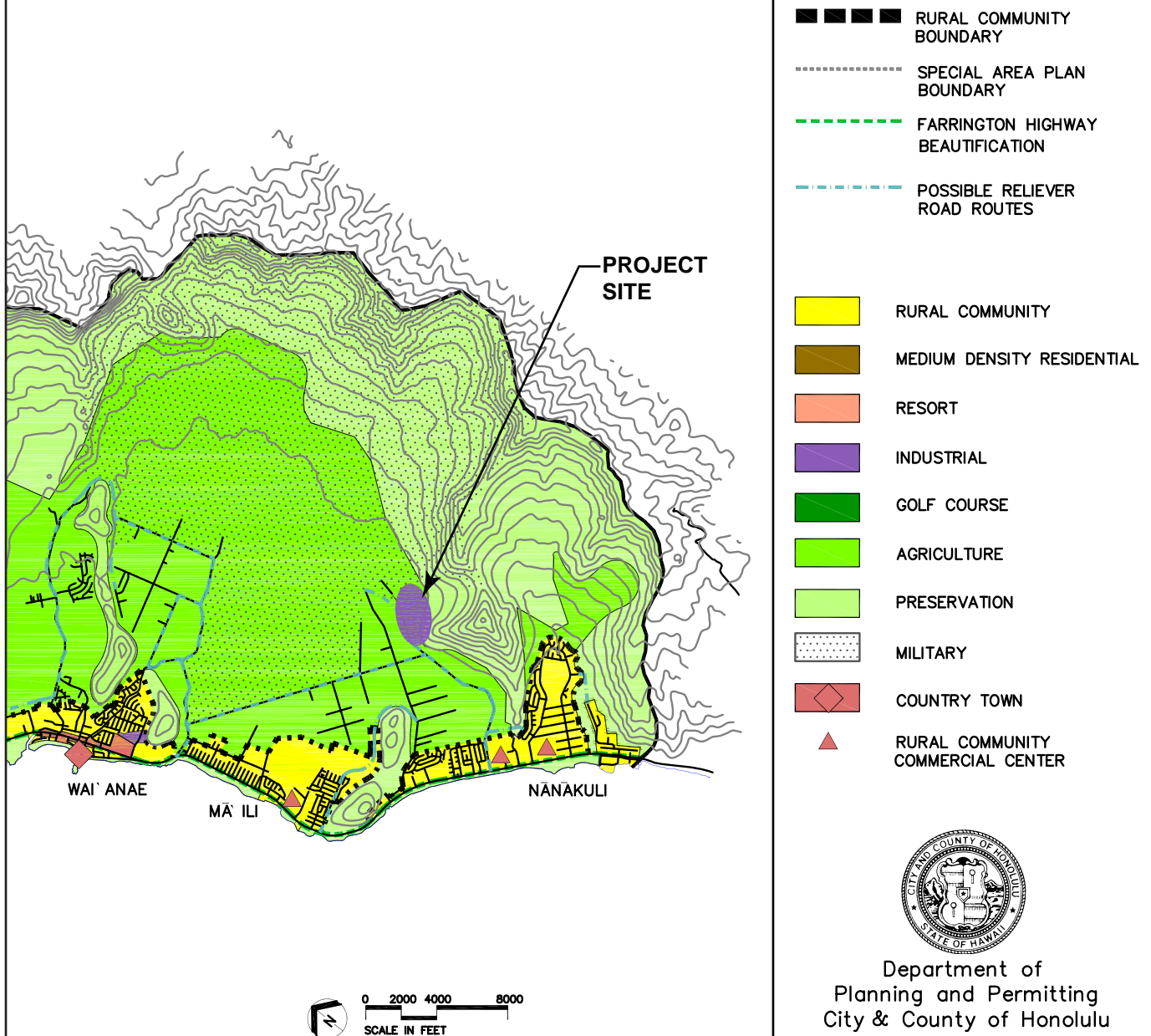


FIGURE A-1  
Appendix A-13

**Figure 24**  
**Waianae Sustainable Communities Plan Map (B)**

November 2009

### ***Community Values***

The WSCP vision statement was developed through an understanding of important community values. Although the community is diverse, the WSCP states that these seven values were frequently referred to or expressly stated during preparation of the plan, and embody the spirit of the community.

- Ours is a living culture of the land and the sea.
- Relationships are fundamental to our values and identity
- We are a rural community.
- We are a community with small town values.
- **We value economic choices in Wai‘anae.**
- Our elderly have much to teach us.
- We value our children.

#### **“We value economic choices in Wai‘anae.”**

*For Wai‘anae, economic choices within the region are vital to the community’s well-being. Having jobs in Wai‘anae allows families to spend less time commuting and more time with each other. It reduces traffic and stress. Economic choices also mean more convenience in acquiring necessary goods and services. (WSCP, p. 2-3)*

**Discussion:** The proposed light industrial park and baseyard is directly applicable to this stated WSCP value. The proposed action is a job-producing and economy sustaining land use. The industrial park has the potential to become an employment center offering well-paid jobs that are within convenient commuting distance of Wai‘anae Coast communities, and will ultimately provide greater economic choice to families living in the WSCP area.

### ***Wai‘anae District: Rural Values and Qualities***

*Population growth and land development in the Wai‘anae District over the past 40+ years have been more typical of a suburbanizing urban fringe community than that of a stable rural community. ... Continued urban and suburban development will consume agricultural lands and put still more stress on Wai‘anae’s roads, schools, parks, and other facilities, which are already overcrowded. (WSCP, p. 2-5)*

**Discussion:** Although the amendment area is undeveloped, it is not necessarily suited for commercial agriculture. Because of the clayey soils with poor drainage, the site is unable to sustain commercial agricultural operations, particularly in light of alternative areas available that have better growing conditions. The Wai‘anae SCP itself recognizes that the highly expansive clay soils on the lower slopes of the ridges are not good for agriculture (p. 2-10).



The proposed industrial park will not generate a need for public facilities, such as schools and parks. Truck traffic is expected to increase in the vicinity of the industrial park, but roads will be used more efficiently. The industrial park site is located close to the freeway and is likely reduce the volume of trips made further up the coast. Industrial park employees who live in the Wai‘anae District will not have to commute to more distant locations, such as Hālawā, Kalihi, or Airport/Māpunapuna.

There are important natural and cultural resources in the Wai‘anae District that should be protected and managed. The proposed development will not have an adverse affect on these resources.

### **Consistency with Chapter 3, Land Use Policies and Guidelines**

Chapter 3 of the WSCP presents policies and planning guidelines for the types of land uses that should be provided in the Wai‘anae district. This chapter identifies several types of land use “boundaries” that have been established by the WSCP to guide land use, future development, redevelopment or resource management. The boundaries include a “rural community,” “agriculture,” and “preservation” boundary, with the intent of confining urban development and preserving open space and other natural resources.

The following discusses the proposed amendment’s consistency with various sections of Chapter 3 of the WSCP:

#### ***Section 3.1.1, Rural Community Boundary***

*The rural community boundary is established to define, protect, and contain communities in areas which the General Plan designates “rural” and which exhibit the physical characteristics of rural lifestyles. The purpose of this boundary is to provide adequate lands for facilities needed to support established communities, to protect such communities from more intense land uses and patterns of development associated with more urban areas and to protect areas outside the boundary for agriculture or other resource or open space values. Where appropriate, this boundary also contains open space elements, the preservation of which is essential to the character of the rural community being defined. They may include lands designated “park,” “agriculture,” “preservation,” or areas with development-related hazards such as steep slopes or unstable soils.*

*Rural communities defined by this boundary consist of smaller, more dispersed, less intensively developed residential communities and towns, and minor industrial areas that are smaller than those of urban or urban fringe areas.*

*Development character is generally low-density, low-rise, small scale, and reflective of a “country” setting. Within residential areas, the landscaping and front yards which*

*provide the foregrounds to their respective residences are the principal visual elements. In commercial areas, the pedestrian environment and associated amenities predominate, and storefronts on both sides of the street are simultaneously perceivable. Buildings are oriented principally toward the street, relate readily to a human scale, and are organized to encourage interaction between the public and private domains. (WSCP, p. 3-7 and 3-8)*

**Discussion:** The rural community boundary is a line that generally encompasses the built environment along the Farrington Highway corridor. The boundary provides for a limited amount of infill residential and commercial development. Except for a small number of isolated farm lots that are already surrounded by housing development, no other agricultural lands are to be included within the developed areas.

### ***Section 3.2.2.3, Limits on Urban Development***

*Future urban and suburban development in the Wai‘anae District should be limited to the Rural Community areas, and should not be allowed to intrude into the Coastal area, the Agricultural area, or the Preservation area. (WSCP, p. 3-11)*

**Discussion:** As it is currently laid out, the rural community boundary circumscribes a fairly narrow set of land uses; namely, small-scale retail and service businesses and residences that create a compact physical form. “Small-scale” and “compact” are important characteristics for country towns and village centers (p. 2-19). Zones of “human-scale” interaction suggest a walkable, pedestrian scale. Elsewhere, the SCP endorses clustering to “alleviate the strong ‘strip commercial’ development pattern that presently exists along Farrington Highway.” (p. 2-20)

To promote compact development, the rural community boundary excludes agricultural land, which is a land-extensive type of use. The SCP allows for minor industrial areas within the rural community boundary, but industrial areas generally require more space, and allow buildings with larger footprints than would be found in a country town or village. Even a small industrial park, at a scale that is financially viable, would have to be land extensive. Therefore, a location along Farrington Highway or in the residential areas surrounding the highway would not be appropriate.

The problem encountered is that the SCP requires non-agricultural development to occur within the rural community boundary. This stricture creates a situation in which industrial development is limited to inappropriate locations with inadequate separation from incompatible uses.

## ***Section 3.9, Commercial and Industrial Uses***

### ***Section 3.9.1, Overview of Commercial and Industrial Uses***

*In keeping with the overall theme of ‘rural Wai‘anae,’ the General Plan does not foresee significant growth in commercial or industrial land use for the area. The projected*

*growth in population may create a need for more support retail commercial and industrial acreage, although recent trends indicate a shifting of shopping habits away from local stores to the larger commercial centers in the 'Ewa District. Some local leaders have voiced the need for more local industrial parks. The potential size, financing, and tenant mix of any such industrial parks, however, have not been thought out in any detail.*

*Local small businesses and light industrial operations are an important source of jobs for Wai'anae's people. A healthy level of small local businesses is essential for the local economy and also lessens the volume of commuter traffic that causes severe congestion on Farrington Highway during morning peak traffic periods. (p. 3-39)*

**Section 3.9.2.3, Encourage Light Industrial Businesses**

*Encourage the establishment of light industrial businesses that provide jobs for local people, and that are generally compatible with the predominantly residential uses of the Rural Community areas along the coast, but not in Makaha Valley. Light industrial uses should be allowed only in the Rural Community areas. Such areas such as the Wai'anae Small Boat Harbor may provide opportunities for ocean-related light industrial and research uses. (p. 3-40)*

**Section 3.9.2.4, No Heavy Industry**

*Heavy industrial uses should not be permitted in the Wai'anae District. Such uses should be sited in the Campbell Industrial Park in 'Ewa. (p. 3-41)*

**Section 3.9.3, Planning Guidelines for Commercial and Industrial Uses**

[No planning and/or design guidelines are provided for industrial uses.]

**Discussion:** As part of its internal planning process, Tropic Land LLC has consulted informally with members of the Wai'anae community and with the Wai'anae Neighborhood Board. There has been clear and consistent support for a light industrial park and baseyard that will provide a locally accessible, convenient, and affordable place for some types of Wai'anae businesses. Anecdotal information indicates that Campbell Industrial Park is transforming into a higher intensity manufacturing and distribution center with concomitant increases in the unit cost of industrial land. A detailed supply and demand study for industrial space in the Nānākuli area is being prepared.

It is the landowner's intent to seek a zone change to the I-1 district for approximately 96 acres of the parcel on the east side of Lualualei Naval Access Road. As defined by the Honolulu Land Use Ordinance, I-1 is a limited industrial district and would be compatible with the rural milieu and lifestyle of the Wai'anae District. The proposed industrial development is expected to have few environmental impacts and uses are intended to complement the development scale of the communities they would serve. Land uses permitted within the industrial park will be further specified in the project's covenants, conditions, and restrictions.

### ***Section 3.11, Parks and Recreational Areas***

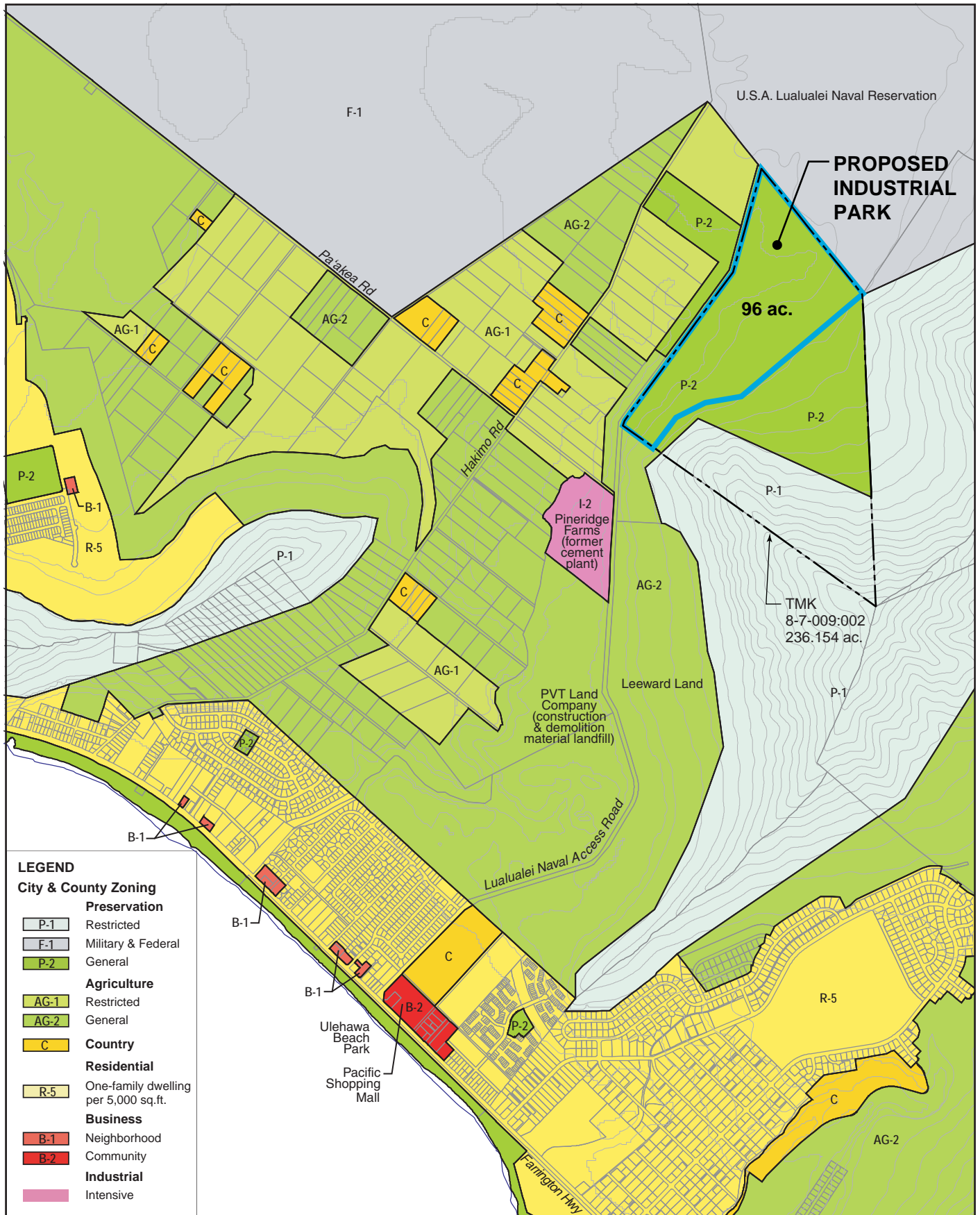
#### **Section 3.9.3, No More Golf Courses**

*There is no land available within the Rural Community areas of the Wai‘anae Land Use Map that would be large enough for a golf course. Golf courses are considered to be incompatible with Agricultural lands or Preservation lands of the Wai‘anae District. Therefore, public agencies should enforce a policy of no new golf courses within the Wai‘anae District. (WSCP, p. 3-52)*

**Discussion:** As part of the permitting process for the light industrial park, Tropic Land LLC will amend the existing Unilateral Agreement which entitles golf course development on the property. Economic and land use conditions have changed since 1996, when the agreement was executed, and a golf course is not the most feasible use.

## **5.8 Land Use Ordinance (Zoning)**

Chapter 21, Revised Ordinances of Honolulu (ROH) is the Land Use Ordinance (LUO), the City and County of Honolulu’s Zoning Code. Figure 25 shows zoning in the project area and vicinity. The project site is currently zoned P-2, Preservation with a Unilateral Agreement allowing golf course use. This zoning designation was obtained in 1999 by the previous landowner, who proposed a golf course on the site and surrounding areas. At that time, the subject parcel and two other parcels were rezoned from AG-1 Restricted Agricultural and AG-2 General Agricultural to General Preservation with a 25-foot height limit. A Unilateral Agreement and Declaration for Conditional Zoning was recorded as Document No. 2337653 on September 24, 1996.



**Figure 25**  
**Zoning Map**  
November 2009

The proposed light industrial park requires rezoning of 96 acres of TMK 8-7-09:02 to I-1, Limited Industrial (Table 17).

**Table 17**  
**Current and Proposed Zoning**  
**TMK: 8-7-09: 02**

<b>Zones</b>	<b>Current Acres</b>	<b>Proposed Acres</b>
Preservation P-2	236.154	140.154
Industrial I-1	0	96.000
Total	236.154	236.154

According to ROH Chapter 21, Land Use Ordinance, the purpose and intent of the City's I-1 limited industrial district:

*“is to provide areas for some of the industrial employment and service needs of rural and suburban communities. It is intended to accommodate light manufacturing, including handcrafted goods as well as "high technology industries" such as telecommunications, computer parts manufacturing, and research and development. Uses in this district are limited to those which have few environmental impacts and those which complement the development scale of communities they would serve.” (LUO, Sec. 21-3.130)*

The proposed light industrial park complements and is consistent with the purpose of the I-1 limited industrial district. The site is currently vacant and is located on Lualualei Naval Access Road, which has a distinctly industrial character. Surrounding land uses include a former construction landfill which is now a waste processing facility, and a Navy munitions storage area. Environmental impacts will be minimal, and impacts on circulation and traffic can be mitigated.

The light industrial park will create a new employment center in an area which has historically experienced high levels of unemployment, and where residents endure long daily commutes to workplaces outside the community. The Wai‘anae Sustainable Communities Plan expressly states that greater economic choices are needed. Specifically, the plan mentions the need for jobs in Wai‘anae and more convenience in acquiring necessary goods and services.

## **5.9 Special Management Area**

Coastal Zone Management objectives and policies (Section 205A-2, HRS) and the Special Management Area (SMA) guidelines (Section 25-3.2 ROH) have been developed to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawai‘i. The CZM goals and objectives were discussed in Section 5.1.4. The project area is located outside of the City and County designated SMA.



## **6. SUMMARY OF ENVIRONMENTAL ANALYSIS**

### **6.1 Unavoidable Short-term Adverse Impacts**

- Soils will be temporarily disturbed by grading and excavating during construction.
- Temporary increases in soil erosion will also result from construction operations and minor amounts of soil will be carried off-site in surface runoff water.
- Vegetation will be removed from 96 acres for industrial development.
- Wildlife utilizing the site and immediate adjacent areas may be displaced by construction activities; construction activities will discourage wildlife from feeding in or migrating through the site.
- Negligible releases of air contaminants will occur from construction equipment. Emissions of fugitive dust may occur during dry periods as a result of construction activities.

### **6.2 Unavoidable Long-term Adverse Impacts**

- Modification of current topography to accommodate portions of the project.
- Approximately 40 acres of farmable lands will be converted to urban use from their current non-use.
- Approximately 22,550 GPD of potable water from the Board of Water Supply's Wai'anāe water system will be used.
- Vehicles using Farrington Highway and Lualualei Naval Access Road will have an affect on traffic flow.
- Increased truck traffic along Lualualei Naval Access Road will cause slight increases in noise levels as they approach and leave the industrial park.
- Air quality in the vicinity of area roadways will receive a minor addition of traffic-related emissions.
- The visual character at the base of the mountain range will be affected by the light industrial park.
- There will be an additional 1 ton/day of refuse generated by the project which must be accommodated by solid waste management facilities.

### 6.3 Proposed Mitigation Measures

**Topography and Soils.** All grading operations will be conducted in compliance with the dust and erosion control requirements of the County. Specific conditions may be attached to the grading permit when grading plans are reviewed by the Department of Planning and Permitting.

**Roadways and Traffic.** Tropic Land will discuss appropriate traffic mitigation measures with the State and City, and is willing to participate in a fair-share arrangement to construct off-site roadway improvements to the intersection of Farrington Highway and Lualualei Naval Access Road to accommodate the traffic needs of the built-out development—anticipated within 10 years of project implementation. Possible mitigation measures recommended in the TIAR include:

- Addition of a dedicated left-turn lane from Farrington Highway southbound onto Lualualei Naval Access Road
- Addition of a second left turn lane from Lualualei Naval Access Road onto Farrington Highway

**Air Quality.** Construction impacts on air quality will be mitigated by complying with State Department of Health dust control measures. Fugitive dust emissions can be controlled by watering active work areas, using wind screens, keeping adjacent paved roads clean, limiting the amount of area that can be disturbed at one time, mulching or stabilizing inactive areas, and covering stockpiled materials and open truckloads. Timely paving and landscaping of project areas early in the construction schedule will also reduce dust emissions.

**Noise.** Construction activities will meet State Department of Health standards for noise.

**Rockfall.** To mitigate the rockfall hazard from cliffs near the project area, a 100-foot wide buffer will be implemented along the entire *mauka* boundary. The buffer will be designed to prevent falling rocks from rolling into the developed area. The multi-purpose buffer will be incorporated into the system of drainage improvements and also serve as a fire break.

**Drainage.** Drainage improvements will be designed to alleviate potential flooding. These improvements include the *mauka* buffer, functioning as a drainage swale, and catch basins. Permeable surfaces will be integrated into project development to minimize runoff. To minimize adverse impacts on Ulehawa Stream, which cuts across the northwest corner of the project area, the stream has been included in the setback fronting Lualualei Naval Access Road. The stream lies outside the development area.

**Visual Impacts.** To reduce the footprint of the proposed industrial park, no development will occur above the 200-foot elevation. Palm trees that have been planted along the front and sides of the property will continue to mature, thereby softening the view of the project from the street. Planned accent landscaping at the front gate and street trees along the internal streets will convey a quality industrial location.

**Water Use.** The proposed industrial park will be connected to the Board of Water Supply's transmission system via a new 16-inch water main. The new pipeline will be capable of satisfying the fire flow requirement. To reduce the potable water demand, recycled effluent will be used for irrigation purpose.

**Wastewater.** The proposed industrial park will be served by an independent wastewater treatment system that is privately owned and maintained.

**Solid Waste.** A solid waste management plan will be developed including efforts to minimize waste generated at the proposed industrial park during construction and operation. To the extent practical, the project will encourage recycling and landfill diversion practices by construction contractors and businesses located at Nānākuli Community Baseyard.

**Electricity Use.** Energy efficiency design guidelines will be incorporated into the Covenants, Conditions, and Restrictions that will apply to development within the proposed industrial park.

**Community Benefit.** Tropic Land has pledged to establish a \$1 million community benefits fund as part of its overall plan to develop Nānākuli Community Baseyard. The objective of the community fund is to enhance the welfare of the surrounding community through education and economic development. Administration of the fund will be determined in consultation with community leaders.

## 6.4 Secondary and Cumulative Impacts

Based on business owners and community members who expressed interest during the scoping process, the proposed project will be attractive to a mix of light industrial businesses and provide open yard space for storing materials, trucks, and heavy equipment. Consequently, the proposed development is likely to generate truck traffic that will have adverse cumulative impacts on Farrington Highway and Lualualei Naval Access Road. On the one hand, the increase will add to the existing level of truck traffic on these roadways. On the other hand, the proposed industrial park is consistent with land uses already existing along Lualualei Naval Access Road, thereby limiting impacts to this specific corridor. Nānākuli Community Baseyard is a self-contained project and is not related to any other project in the region.

In petitioning to amend the Land Use District boundary, Tropic Land recognizes the loss of land from future agricultural production and the cumulative impact of urbanization on the regional agricultural economy. However, the petition area, with clayey and rocky soils, has not experienced economically viable agricultural activity for decades.

## **6.5 Irreversible and Irretrievable Commitments of Resources**

The construction and operation of the industrial park will involve the irretrievable commitment of certain environmental resources. The largest resource commitment will be the 96 acres of land required for the project development. (In comparison, however, the golf course called for using 259.5 acres of land). Construction materials, labor, and energy will be expended to construct and operate the facility. The impact of utilizing these resources need to be weighted against the economic benefits to the residents of the region, the City and County of Honolulu, and the state, and the foregone opportunities of not proceeding with the project.

The lands involved in the project will not be available for agricultural use. Yet future agricultural use of the project site is questionable in light of the long-standing undeveloped and unused character of the site. Feasibility of agricultural use is undemonstrated.

There will be a permanent commitment of private funds and resources to plan, design, construct, and operate the industrial park. However, this investment will result in a permanent increase in jobs and other employment-related benefits and resources.

It is expected that increased tax revenues will be generated along with increases in economic activity.

Beyond the on-site and off-site improvements constructed and operated by the developer, there will be the increased usage of certain public facilities, namely potable water, local roadways, electricity and telecommunications, and greater load on City facilities for solid waste disposal. (Relocation in use versus net new generation. To the extent that new demand, it's a good thing since this would indicate formation of new business or business expansion.)

The commitment of resources required to accomplish the project includes labor and materials, which are mostly non-renewable and irretrievable. The operation of the project will also include the consumption of potable water and petroleum-generated electricity which also represents irretrievable commitments of resources.

## **6.6 Summary of Unresolved Issues**

As described above, the Navy is willing to extend access to Tropic Land and its buyers to use Lualualei Naval Access Road. By letter dated July 6, 2009, Tropic Land has received a written offer from Commander, U.S. Navy Region Hawai'i for an annual license agreement, with possibility of automatic extensions, to use Lualualei Naval Access Road. The letter states that this arrangement is consistent with access rights granted to other adjacent landowners, including PVT Land Company, Pineridge Farms, and Pacific Shopping Mall. These users have been operating satisfactorily under this arrangement for decades. An unresolved issue is the form of the definitive access agreement, which is under discussion with the Navy.

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## **8. CONSULTATION AND COORDINATION**

### **8.1 Scoping and Community Outreach**

Beginning in September 2007, representatives of Tropic Land LLC have communicated with residents of the Wai‘anae Coast about future development of the Lualualei project site. The initial meeting with the Wai‘anae Neighborhood Board began with suggestions for development proposals that would benefit the community. During subsequent meetings with the Planning and Zoning Committee and the full board, Tropic Land has explained the project concept and addressed community concerns. Discussions continued with the Nānākuli-Mā‘ili Neighborhood Board after it was formed in the spring of 2008. Board members adopted two separate resolutions in July and October 2008 expressing support for the project.

#### Wai‘anae Coast Neighborhood Board, No. 24

September 4, 2007	Presentation to full board
October 10, 2007	Presentation to Planning & Zoning Committee
November 15, 2007	Discussion with Planning & Zoning Committee
December 4, 2007	Discussion with full board

#### Nānākuli-Mā‘ili Neighborhood Board, No. 36

May 20, 2008	Presentation to full board
June 24, 2008	Presentation to Planning & Zoning Committee
July 15, 2008	Presentation to full board, unanimous adoption of resolution to support development of the industrial park
October 21, 2008	Presentation to full board, adoption of resolution to amend the Wai‘anae Sustainable Communities Plan to provide for the development of a light industrial park in the Lualualei Valley

#### Other Organizations

Leeward Coast Chamber of Commerce  
Wai‘anae Rotary Club

### **8.2 Early Consultation**

Prior to preparing the EISPN, the following agencies were contacted:

#### Planning

- State of Hawai‘i, Land Use Commission
- State of Hawai‘i, Office of Planning
- City and County of Honolulu, Department of Planning and Permitting



### Engineering

- State of Hawai‘i, Department of Health
- City and County of Honolulu, Board of Water Supply

## **8.2.1 Environmental Impact Statement Preparation Notice (EISPN)**

Availability of the EISPN was announced in the May 23, 2009 issue of the OEQC *Environmental Notice*, which initiated a 30-day public comment period that ended on June 23, 2009.

Copies of the EISPN were mailed to the federal, State, and County agencies; elected officials; and other stakeholders listed below. In addition, copies of the EISPN were mailed to the Wai‘anae and Kapolei Public Libraries. All recipients were asked to provide comments.

### **Federal Agencies**

- U.S. Army Corps of Engineers, Honolulu District
- U.S. Fish and Wildlife Service
- U.S. Navy

### **State Agencies**

- Department of Agriculture
- Department of Accounting and General Services
- Department of Business, Economic Development & Tourism
- DBEDT, Energy Resources and Technology Division
- DBEDT, Planning Office
- Department of Defense
- Department of Health, Environmental Management Division
- Department of Land and Natural Resources
- DLNR, State Historic Preservation Division
- Office of Environmental Quality Control
- Office of Hawaiian Affairs
- University of Hawai‘i-Mānoa, Environmental Center

### **City and County of Honolulu**

- Board of Water Supply
- Department of Design and Construction
- Department of Environmental Services
- Department of Facility Maintenance
- Department of Planning and Permitting
- Department of Transportation Services
- Fire Department
- Police Department

### **Elected Officials, Community Organizations, and Other Organizations**

#### **Honolulu City Council**

Councilmember Todd Apo, District 1

#### **State Legislators**

Representative Karen Awana, District 44

Senator Colleen Hanabusa, District 21

### **Community and Business Organizations and Individuals**

Nānāikapono Civic Club

Nānākuli/Mā‘ili Neighborhood Board

Wai‘anae Coast Neighborhood Board

Native Hawaiian Legal Corporation

Sierra Club

Wai‘anae Coast Rotary Club

Wai‘anae Coast Coalition

Leeward Coast Chamber of Commerce

Concerned Elders of Wai‘anae

PVT Land Company Ltd.

Pineridge Farms, Inc.

Leeward Land LLC

Mr. Leon Lapina

Ms. Elizabeth Stack

### **Utility Companies**

Hawaiian Electric Co.

Hawaiian Telcom

Oceanic Time Warner Cable

### **Libraries**

Wai‘anae Public Library

Kapolei Public Library

### **Newspapers**

Honolulu Advertiser

Honolulu Star Bulletin

### **8.2.2 EISPN Comments**

A total of 23 agencies, organizations, and individuals responded to the request for pre-assessment consultation. The matrix at the end of this chapter summarizes substantive comments and indicates relevant sections in the DEIS where comments were addressed and/or incorporated into the document. The table is followed by reproductions of correspondence received.

### **8.3 Draft Environmental Impact Statement (DEIS)**

This DEIS will be sent to all public agencies designated as “mandatory” or “recommended” on the OEQC distribution list and to public libraries and depositories on the list. Copies also will be sent to parties that expressed interest in the proposed action during the EISPN comment period.

#### **Federal Agencies**

- U.S. Army Corps of Engineers, Honolulu District
- U.S. Fish and Wildlife Service
- U.S. Navy

#### **State Agencies**

- Department of Agriculture
- Department of Accounting and General Services
- Department of Business, Economic Development & Tourism
- DBEDT, Energy Resources and Technology Division
- DBEDT, Planning Office
- Department of Defense
- Department of Hawaiian Home Lands
- Department of Health
- Department of Human Services
- Department of Labor and Industrial Relations
- Department of Land and Natural Resources
- DLNR, State Historic Preservation Division
- Department of Transportation
- Hawai‘i Housing Finance and Development Corporation
- Office of Environmental Quality Control
- Office of Hawaiian Affairs
- University of Hawai‘i-Mānoa, Environmental Center

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Nānākuli/Mā‘ili Neighborhood Board

Native Hawaiian Legal Corporation

Sierra Club

Wai‘anae Coast Rotary Club

Leeward Coast Chamber of Commerce

Concerned Elders of Wai‘anae

Princess Kahanu Estates Association

PVT Land Company Ltd.

Pineridge Farms, Inc.

Leeward Land LLC

Mr. Leon Lapina

Ms. Elizabeth Stack

### **Utility Companies**

Hawaiian Electric Co.

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### **Newspapers**

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## Honolulu Star Bulletin

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## Appendices

- A. Preliminary Engineering Report for Nanakuli Community Baseyard. Hida, Okamoto & Associates, Inc. October 2009
- B. Market Analysis and Employment Forecast, Proposed Tropic Land LLC Industrial Park. Hastings, Conboy, Braig & Associates, Ltd. March 2008
- C. Agricultural Feasibility Report, TMK 8-7-009: 002, Nanakuli, Oahu, Hawaii. John J. McHugh, Jr. Ph.D., May 2008
- D. Biological Surveys Conducted on the Tropic-Land LLC, Nānākuli Light Industrial Park Site, Waiʻanae District, Oʻahu, Hawaiʻi. Reginald E. David and Eric Guinther, June 2008
- E. Draft Traffic Impact Analysis Report for the Proposed Nanakuli Industrial Park. Traffic Management Consultant, September 2008
- F. An Archaeological Inventory Survey for the Proposed Lualualei Golf Course, Lualualei, Waiʻanae, Oʻahu. Hallet H. Hammatt, Ph.D., Jennifer J. Robins, and Mark Stride, January 1991
- G. Cultural Impact Assessment—Final Report. Janelle L. Kaohu, Angelita S. Aipoalani, and Hanalei Y. Aipoalani, July 2009
- H. Correspondence from the State Historic Preservation Division Related to Chapter 6E-42, Historic Preservation Review for TMK: (1) 8-7-009: 002
- I. Nānākuli/Māʻili Neighborhood Board Resolutions



## **APPENDIX A**

Preliminary Engineering Report for Nanakuli Community Baseyard.  
Hida, Okamoto & Associates, Inc. October 2009

# **PRELIMINARY ENGINEERING REPORT**

**for**

**NANAKULI COMMUNITY BASEYARD**

**Lualualei, Nanakuli, Oahu, Hawaii**

Tax Map Key: 8-7-9: por. 02

Prepared for

Tropic Land, LLC

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## **I. INTRODUCTION**

Nanakuli Community Baseyard project, proposed by Tropic Land, LLC, is an approximately 41 lots light industrial horizontal condominium development in Lualualei Valley, Nanakuli, situated just makai of the Lualualei Naval Ammunition Depot and lies approximately 9000 feet into Lualualei Naval Access Road (Lualualei Road) from Farrington Highway intersection. It is bounded along its southerly (makai) and westerly boundary by the Lualualei Road. The northerly (mauka) and northeasterly boundary of the site runs along the edge of Lualualei Naval Ammunition Depot complex. To the east, the project is bounded by privately-owned and State lands comprising Puu Haleakala ridge. (see Figure 1–Location Map). The project area is approximately 96 acres on the east side of Lualualei Road (TMK: 8-7-09: portion 02).

This report will present information on infrastructure requirements for the proposed Nanakuli Community Baseyard. Specifically, this report will address:

1. Background information on the proposed project;
2. Existing conditions;
3. Modifications after development; and
4. Potential impact due to development and proposed mitigation measures.

## **II. PROJECT BACKGROUND**

### **2.1 Proposed Project**

The proposed industrial park would consist of approximately 41 lots, averaging two acres each. The project would have a single secured entry off of Lualualei Road and secondary access for fire and emergency purposes. The existing linear tree farm along the Lualualei Road will remain as a 30-foot landscaped setback area. The north and south property lines have 15-foot setbacks. An additional strip of land, approximately 100feet wide and mauka of the industrial lots, will be used for drainage improvements and rock fall hazard mitigation measure.

### **2.2 Topographic Features**

The project site ranges in elevation from about 60 feet mean sea level (MSL) at Lualualei Road, to an elevation of 1,864 feet at Puu Haleakala ridge. Generally, the project site slopes in a southwesterly direction towards the Lualualei Road (see Figure 2 – Topographic Map). Approximately 1/3 of the site, situated below the 200 foot above sea level elevation, is relatively flat, sloping at a 12% rate from Lualualei Road upward to the foothills of Puu Heleakala ridge. Ulehawa Stream, an intermittent stream, may cross the site along a course that is generally parallel to Lualualei Road.



Above the 200-foot elevation level, the site takes on a more abrupt slope upward toward the back of the subject site. It is estimated that the slope within this "second tier" of the subject site is within the 10-30% range. The rest of the site along the foothills of Puu Haleakala ridge and the rear portions of the project site slope radically upward towards the peak of the ridge; however, no construction will occur on this portion of the site as it will be left in its current, undeveloped state and will remain in the preservation zone.

### **2.3 Existing Uses**

The project site is currently undeveloped land. The site is vacant and covered mostly with grasses, haole koa bushes, and isolated kiawe trees. The property has remained largely vacant and unused. A truck farm operated on 15 acres for a brief period in the 1980s, closed voluntarily in 1988. There is limited use of the property at present time. Grasses are mowed periodically for fire control purpose. 30-foot wide landscape buffer on the east side of Lualualei Road is provided, trees were planted in a linear strip fronting the roadway in the summer of 2007.

### **2.4 Climate**

The climate in the Lualualei region is relatively warm and dry. Trade winds from the north east occur much of the time, with occasional Kona winds. Temperature range in this area usually varies between the lower 60's (degrees Fahrenheit) to the upper 80's. rainfall in the region is generally light, with a mean annual rainfall of approximately 26 inch near the project site.

### **2.5 Land Use and Zoning**

The proposed Nanakuli Community Baseyard will require zoning changes from P-2 (Preservation) to an I-1 (Limited Industrial) and State Land Use Re-classification from Agricultural to Urban for approximately 96 acres. The remaining acreage will remain in Preservation use. The proposed changes in land use require change to the Land Use Map of Waianae Sustainable Communities Plan and amend to Urban District boundary by the State Land Commission.

### **2.6 Soils**

The soil types within the project site are identified in the U.S. Department of Agriculture, Soil Conservation Service, Soil Survey. The soil types are listed below and depicted on Figure 3 – Soils Map.

Lualualei extremely stony clay (LPE)  
Lualualei clay (LuB)  
Rock land (rRK)  
Pulehu very stony clay loam (PvC)  
Lualualei stony clay (LvA)

### **III. DRAINAGE**

#### **3.1 Watershed Hydrology**

The proposed development is situated within a 3,178-acre watershed in southwestern Oahu. Located on the leeward side of the island, the climate is warm and relatively dry with an annual average of 26 inches of rainfall across the watershed. Originating in the Waianae mountain ridge at the 3,098 feet elevation of Palikea, the watershed slopes westerly towards its lower bound at Ulehawa Beach Park a distance of over 4.5 miles.

Land use in the watershed is primarily undeveloped, the lower valley is characterized by a mix of residential and commercial area along Farrington Highway. The upper valley is occupied by the Naval Magazine – Lualualei. The western area is dominated by numerous agricultural lots and lower Lualualei Road corridor has an industrial character including landfill and a waste processing facility.

#### **3.2 Drainage Criteria/Standards**

The City and County of Honolulu Drainage Standards (Drainage Standards) will apply to this development. Rainfall intensity Plate Maps from Drainage Standards were used to calculate rainfall intensities. These intensities were then used to estimate peak flows for a 10-year, 50-year and 100-year period event.

The rational Method was used to calculate peak flows for the 10-year and 50-year event, based on a 1-hour rainfall duration with rainfall intensities of 1.8 inches/hour and 2.7 inches/hour, respectively (as per Plate 1 and 2 of the Drainage Standards). Using these 1-hour intensities, a correction factor was applied (as per Plate 4 of Drainage Standards) to estimate peak intensities for varying time of concentrations as summarized in Table 1.

**TABLE 1**  
**RAINFALL INTENSITY FOR VARIOUS DURATIONS**

Time of Concentration (min)	Correction Factor	Intensity (inches/hour)	
		10-Year	50-year
5	2.8	5.0	7.6
10	2.35	4.2	6.4
15	1.9	3.4	5.1
30	1.45	2.6	3.9
60	1.0	1.8	2.7

Peak flow estimates with tributary area greater than 100 acres, were developed using Plate 6 from Drainage Standards.

In this report, the peak flow estimate using Plate 6 are referred to as the “100-year” event. Table 2 below summarizes the peak discharge versus area relationship obtained from Plate 6, with the proposed site being located in the Group C area.

**TABLE 2**  
**“100-YEAR” PEAK DISCHARGE VS. AREA RELATIONSHIP**  
**(FOR AREAS LARGER THAN 100 ACRES)**

Area (acres)	“100-year” Peak Discharge (cfs)
100	500
200	825
400	1,400
600	1,850
800	2,250
1,000	2,700
1,500	3,600
2,000	4,500

Time of concentration was estimated for a subcatchment, based on the overland slope and length; as well as Plates 3 and 5 in the Drainage Standards.

### 3.3 Existing Conditions

The watershed originates above the proposed development site and runoff from offsite area is conveyed through the development via the gulchs and overland flow. Runoff from the site and upstream offsite regions is conveyed across Lualualei Road through 4 culverts, eventually draining on to Ulehawa stream.

The watershed was divided into 3 subcatchment areas in an effort to determine the peak discharge using the Drainage Standards. Figure 4 illustrates the pre-development subcatchments' boundaries and corresponding drainage area ID's. Runoff peak flow estimates were developed for each subcatchment areas for the 100-year recurrence events. The peak flow estimates are summarized in Table 3.

**TABLE 3**  
**PRE-DEVELOPMENT PEAK FLOW**

<b>Tributary Area ID</b>	<b>Area (acres)</b>	<b>100-year Flow (cfs)<sup>1</sup></b>
A	1.084	2,800
B-1	370	1,350
B-2	236	840
C	1,488	3,600
<b>Total</b>	<b>3,178</b>	<b>8,590</b>

1. "100-year"flows were determined using Plate 6 from Drainage Standards.

### 3.4 Modifications After Development

Development will impact the hydrology of the watershed as sections of undeveloped areas and land will be replaced with impervious surfaces (roads, building, parking, etc.) and the vegetative surface cover will be altered. The corresponding impact will result in higher runoff volumes and peak flows. Since large areas in the upper watershed will remain undeveloped, the impact on peak flows downstream of the site should not be significant.

The construction of new roadways and industrial subdivision transecting across the hillside, however, the existing drainage patterns and subcatchment areas will likely be remained. Figure 5 illustrates the post-development subcatchment area for B-2 and drainage node ID's with proposed road network and lot layout superimposed. The estimated 10-year, 50-year and 100-year peak flows through the development are summarized below in Table 4.

**TABLE 4**  
**POST-DEVELOPMENT PEAK FLOWS**

<b>Area ID</b>	<b>Tributary Area (acres)</b>	<b>10-year Flow (cfs)</b>	<b>50-year Flow (cfs)</b>	<b>100-year Flow (cfs)</b>
A	1.08			2,800
B-1	370			1,350
B-2-1	52	72	90	
B-2-2	88	121	152	
B-2-3	52	135	169	
B-2-4	44	115	143	
C	1,488			3,600
<b>Total</b>	3,178			

### 3.5 Impacts and Mitigation Measures

Retention (or detention) facilities are typically constructed to retain increases in storm drainage runoff that occurs as a result of development. These facilities include: open basins, detention ponds, underground storage tanks and lakes. Drainage improvements in approximately 100 feet wide strip of land mauka of the industrial lots will be designed to accommodate peak runoff from the hillside. It is intended that the strip of land serve as detention facilities, dampening the peak runoff generated from hillside. By incorporating these improvements into industrial park design, the discharge of peak storm runoff from the project site is not expected to increase from the existing conditions.

### 3.6 Stormwater Quality

The project will be meet the City and County of Honolulu stormwater quality requirements as outlined in the Rules Relating to Storm Drainage Standards, dated January 2000.

During the more detailed design of the infrastructures to service the site, engineer will work with the City and County of Honolulu to determine the necessary water quality standards and which BMP's would be most effective for the project. The objectives of the water quality BMP's would be to mitigate the impact of pollutants (sediment, grit, oil, heavy metals) that enter the drainage system from the frequent, smaller rainfall. Plants and landscaping can be incorporated into the design to absorb particles and filter heavy metals. Additional water quality BMP's includes construction of infiltration swales alongside the roadway. These swales collect runoff, filter particles and provide infiltration to recharge the groundwater.

### **3.7 Off-Site Improvements**

Runoff from the proposed development will be conveyed across Lualualei Road through the existing culverts. On the northern side of Lualualei Road, runoff flow through Ulehawa Stream. Capacity of the culverts across Lualualei Road will be examined during the preliminary design stage to assess whether improvements are required to convey peak flows from the project site.

## **IV. GRADING AND SOIL EROSION**

### **4.1 Grading**

The grading concept for lots will be to provide relatively level lot. Total earthwork quantities of cut and fill for the development is anticipated to be approximately 450,000 cu. yds. An effort to balance earthwork quantities is expected to minimize the cost of purchasing offsite borrow material and disposing excess excavated material at an offsite location. Grading operations will be in conformance with the applicable ordinances of the City and County of Honolulu. Soils investigations will be performed as the project proceeds. The project soils engineers will recommend mitigation measures as roadway and lot locations are further defined.

### **4.2 Site Characteristics**

The project site is divided into two subareas for the purpose of calculating soil erosion potential (see Figure 6). These subareas represent sites within the project area that vary in soil erosion potential characteristics such as terrain and/or drainage network.

Subarea A, a part of the Ulehawa Stream drainage basin, is directly abutting the Lualualei Road and covering the flatter portion of the project site. The subarea occupies approximately 96 acres and is bounded north by Lualualei Naval Ammunition Depot, south by the ridge line of Puu Haleakala and west by the Lualualei Road and east by an approximately 190 foot contour. The entire area of subarea A will be graded for industrial park development.

Subarea B is located south of subarea A and is bounded on south and east by ridge line, and north by 190 foot contour and occupies approximately 140 acres. The subarea is currently a medium-dense and rocky outcropping becoming numerous with slopes ranging 25 to 60 percent. The development is not planned for this subarea and will remain for preservation.

### 4.3 Calculation of Soil Erosion Potential

The U.S. Department of Agriculture, Soil Conservation Service, uses the Universal Soil Loss Equation (USLE) to estimate long-term average annual soil losses from sheet and rill erosion. It is used to estimate erosion on forest land, farm fields, construction/development sites, and other areas. Soil losses can be estimated for present conditions or for a future condition. The soil loss equation is –

	A	=	rkls <sub>c</sub> p
where:	A	=	soil loss (tons per acre per year)
	R	=	rainfall factor
	K	=	soil erodability factor
	L	=	slope length factor
	S	=	slope gradient factor
	C	=	cover and management factor
	P	=	erosion control practice factor

Based on the U.S. Soil Conservation Service (SCS) Erosion and Sediment Control Guide for Hawaii, the rainfall factor (R) is 220. A soil readability factor (K) was selected for each subarea after evaluating the U.S. Department of Agricultural Soil Survey and the City and County of Honolulu Soil Erosion Standards and Guidelines. The K values for the site are based on a weighted average of all K values for soil types in each subarea.

The cover and management factor (C) is also based on a weighted average for C values within each subarea and will be recalculated accordingly after development. Both R and K factors will remain the same for the site before and after the proposed industrial park is constructed. The slope length factor (L) and slope gradient factor (S) are combined into a LS factor for calculations. This factor also remains constant before and after development. However, each subarea will have different factors to reflect the differences in topography.

### 4.4 Existing Soils Erosion Potential

The existing soil erosion potential for the site can be estimated by the USLE using the following parameters:

		SUBAREA	
USLE			
Parameters	A	B	
R	200	200	
K	0.20	0.28	
LS	6.3	56	
C	0.015	0.011	
P	1	1	



The existing soil erosion potential for each subarea is listed below.

**TABLE 4**  
**Soil Erosion Potential (Existing Conditions)**

<b>Subarea</b>	<b>Acres</b>	<b>Tons/Acre/Yr</b>	<b>Tons/Yr</b>
A	96	4.2	403
B	140	37.9	5,306
<b>Total</b>	<b>236</b>		<b>5,706</b>

Thus, for the entire project, the existing erosion potential is 5,709 tons/year.

#### **4.5 Soil Erosion Potential After Development**

The long-term change in soil erosion potential can be estimated by the USLE for the new land use at the site. Appropriate USLE factors for the site after industrial park development are –

<b>USLE Parameters</b>	<b>SUBAREA</b>	
	<b>A</b>	<b>B</b>
R	220	220
K	0.20	0.28
LS	6.3	56
C	0.01	0.011
P	1	1

The C factor for subareas have decreased to account for industrial park development.

**TABLE 5**  
**Soil Erosion Potential (Developed Conditions)**

<b>Subarea</b>	<b>Acres</b>	<b>Tons/Acre/Yr</b>	<b>Tons/Yr</b>
A	96	2.75	264
B	140	37.9	5,306
<b>Total</b>	<b>236</b>		<b>5,570</b>

Thus, for the entire project, the estimated soil erosion potential after development is 5,570 tons/year.

## 4.6 Impacts and Mitigation Measures

### 4.6.a Long-Term Impacts

Based on the USLE, soil erosion potential at the project site should decrease after development of the industrial park. The erosion potential of subarea A is estimated to decrease by 0.55 tons/acre/year (139 tons/year), or 34 percent. Thus, sediment transport to the Ulehawa Stream should decrease after development.

**TABLE 6**  
**Summary of Soil Erosion Potential**

Subarea	Existing Conditions (ton/yr)	Developed Conditions (ton/yr)	Percent Decrease (%)
A	403	264	66
B	5,306	5,306	0
<b>Total</b>	5,709	5,570	2.0

### 4.6.b Short-Term Impacts and Mitigation Measures

Construction of the industrial park will involve land disturbing activities that result in soil erosion. These land disturbing activities include removal of existing vegetation (clearing and grubbing) and leveling, removing, and replacing soil. Short-term impacts due to construction are estimated to last 18 months.

The USLE can be used to estimate soil erosion potential based on these short-term construction impacts. For purposes of calculation, it is assumed that the areas will be exposed for a period of one year (January through December). The rainfall factor, R, is revised to represent the fraction of annual rainfall falling within the grading period. The CP factor is 0.7 for bare soil without mitigation measures.

Thus, in the short term 36,861 tons of soil erosion are calculated for a one-year period. Of this amount, approximately 10 percent (3,690 tons) will impact Ulehawa Stream.

Mitigation measures can be implemented to reduce short-term soil erosion. For example, limiting grading to not more than 15 consecutive acres at a time and installation of a sedimentation basin at least 12,000 square feet in size at the onsite of grading will reduce estimated soil erosion potential for the site by 89 percent to 29 tons. Thus, the estimated impact on the Ulehawa Stream is reduced by 2.5 tons/acres/year (235 tons).

Additional control measures could be taken to lessen construction impacts even further. These are –

1. Minimize time of construction.
2. Retain existing ground cover until latest date before construction.
3. Early construction of drainage control features.
4. Use of temporary area sprinklers in nonactive construction areas when ground cover is removed.
5. Station water truck on site during construction period to provide for immediate sprinkling, as needed, in active construction zones (weekends and holidays included).
6. Use temporary berms and cutoff ditches, where needed, for control of erosion.
7. Thorough watering of graded areas after construction activity has ceased for the day and on weekends.
8. Sod or plant all cut and fill slopes immediately after grading work has been completed.
9. Implementing Sedimentation basins.
10. Use of slope stabilization materials where needed.

Grading and Erosion Control Plans will be prepared in compliance with Chapter 23, Revised Ordinances of Honolulu. Further, the contractor will be required to perform all grading and stockpiling operation in conformance with the applicable provisions of Chapter 54 (Water Quality Standards) and Chapter 55 (Water Pollution Control) of Title 11 Administrative Rules of the State Department of Health.

## **V. ROADS**

### **5.1 Existing Conditions**

The project site is located in the Lualualei Valley, north of Farrington Highway and south of U.S. Naval Magazine Lualualei. The property is approximately 2.2 miles north of Lualualei Road and Farrington Highway intersection. Current formal access to the property is via Hakimo Road. An easement from the Navy links the property across Lualualei Road. The City and County of Honolulu formally declined to acquire Lualualei Road from the Navy. The current status is that the Navy has granted Tropic Land, LLC access through Lualualei Road as a direct access route from Farrington Highway. Tropic Land, LLC is currently working with the Navy (NAVFAC) to obtain for a definitive long term agreement.

### **5.2 Modifications After Development**

A Traffic Impact Assessment Report (TIAR) will be prepared for this project. The TIAR will outline the requirements and impacts for access to the development and improvements to supporting infrastructure.

On site roadways will consist of a collector road serving local roadway within the industrial park. A collector road will have a single secured connection to the Lualualei Road. It is also planned to provide secondary access for fire and emergency purposes.

### 5.3 Impacts and Mitigation Measures

Impact and mitigation will be identified in the TIAR. The project will generate additional traffic on the roadways in the vicinity of the project site. The TIAR will indicate impact to the existing traffic along Lualualei Road and Farrington Highway, also will address the roadway improvements if necessary.

## VI. WATER

### 6.1 Existing Condition

The property is vacant and covered with a weedy mixture of grasses and haole koa shrubs, and isolated kiawe trees. About 15 acres within the lower level portions of the site were cultivated for vegetable crops until early 1988. Currently, the property is not cultivated and there are no existing residences.

The Board of Water Supply's (BWS) Puu-O-Hulu systems services the properties along Hakimo Road. The storage facility located closest to the project site is Puu-O-Hulu Reservoir, with a 1.5 MG capacity and spillway elevation at 241.75 feet. The reservoir services through a 20-inch transmission line and 8-inch distribution main along Hakimo Road (see Figure 7 – Existing Water Transmission and Storage Map)). Currently, the Lualualei Booster Station has limited capacity of 25,000 gallon per day (GPD). The existing water system can only provide a flow of approximately 2,200 gallons per minute (gpm) to a fire hydrant at the intersection of Paakea road and Hakimo Road.

### 6.2 Projected Demand

**TABLE 7  
ESTIMATED POTABLE WATER USE DEMAND**

<b>Land Use</b>	<b>No. of Lot</b>	<b>Average No. of Employees</b>	<b>(gpd/capita)</b>	<b>Other Usage (gpd/lot)</b>	<b>Average Daily Demand (gpd)</b>
Industrial Subdivision	41	10	25	300	22,550

Based on the development information in the above Table 7, the Average Daily Demand for the development is estimated to be 22,550 GPD. The Maximum Daily Demand is estimated to be 45,100 GPD and a Peak Hour Demand of 67,650 GPD.

Since the Nanakuli Community Baseyard will be developed as a condominium, its CC&R (Covenants, Conditions and Restrictions) will control the type of the businesses and limit the water use demand for each lot and the total demand for the project. The Association of Owners will implement and enforce the CC&R.

The projected water demand for fire protection is 4,000 gallons per minute (GPM) over three-hour duration for the light industrial park and a fire hydrant to be located within 125 linear feet of each subdivided lot. This demand is based on the BWS Standards' Table 100-19, Fire Flow Requirement.

### **6.3 Proposed Potable Water System**

The proposed potable water system will be connected to the existing 20-inch BWS water main at the intersection of Paakea Road and Hakimo Road. A new 16-inch transmission line with new service road will be located along Paakea Road extension and cross the Lualualei Road and enter into the project site. BWS indicated that the installation of a new 16-inch watermain will provide adequate fire flow to the proposed industrial development. Design and construction of the potable water distribution system will be in accordance with the Board of Water Supply (BWS) Standards and the easements and the systems will be dedicated to the BWS. Refer to Figure 8 for the proposed potable water transmission and distribution system.

### **6.4 Potential Impact and Mitigation Measures**

Nanakuli Community Baseyard will impact the Waianae regional water system by increasing the demand for potable water. Introducing a dual water system; using non-portable water for irrigation, reduce the water demand. In addition, proposed project will upgrade the fire protection system for the vicinity. The development schedule for Nanakuli Community Baseyard will be governed by implementation of the BWS improvements in the Waianae region and will be coordinated with the Board of Water Supply.

## **VII. WASTEWATER**

### **7.1 Existing Conditions**

To date, there are no existing wastewater facilities within the project site. The adjoining residential areas between the project site and the junction of Waiolu Street and Hakimo Road are mainly served by the cesspools. Wastewater disposal by the cesspools is a major issue within the Waianae Sustainable Communities Plan areas. The City and County, Department of Environmental Services has no plans to serve the Agricultural District surrounding the proposed project areas.

The municipal sewer main nearest to the project site is 8-inch gravity sewer at Mohihi Street, some 2 mile south of the project site along Lualualei Road.

### **7.2 Projected Wastewater Flows**

Wastewater will be generated from the various facilities within the proposed Nanakuli Community Baseyard at an estimated average rate of 22,550 GPD or 0.023MGD and will be typical of domestic wastewater in composition. Projected wastewater flows are based on a de facto population of 410 with 25 GPD / capita and 300 gpd/lot. Since the project will be developed as a condominium, its CC&R will control the type of the businesses and limit the wastewater discharge for each lot and total discharge from the project. The Association of Owners will implement and enforce the CC&R.

### **7.3 Proposed Wastewater Infrastructures**

The major components of the proposed wastewater infrastructures are: (1) the gravity wastewater collection system; (2) the wastewater treatment unit; (3) the wastewater effluent disposal system. The proposed wastewater infrastructures will serve only the Nanakuli Community Baseyard project.

#### **7.3.a Collection System**

The proposed on-site wastewater collection system for the project is illustrated on Figure 10. The collection system will consist of gravity sewers, and sewer easements. Preliminary size sizes range from 8" to 10" mains. Design and construction of the system will be in accordance with City and County Standards. The on-site wastewater collection system will be remained private for operation and maintenance.

### **7.3.b Wastewater Treatment Unit**

The proposed location of wastewater treatment unit is shown in Figure 10. The cyclic biological treatment (CBT) is a single basin reactor with continuous activated sludge system. The treatment unit processes all the steps of flow equalization, biological oxidation, nitrification, denitrification and solids-liquids separation in the same basin. Thus, extensive piping and multiple task for those processes are not required. The clock/microprocessor automatically coordinates all the equipment and phases of each cycle.

In addition to the CBT unit, filtration and chlorination units, storage buildings, pumps, piping, and appurtenances will be required. A total fenced area of approximately 10,000 square feet should be sufficient for the wastewater treatment facility.

### **7.3.c Effluent Disposal**

The treated wastewater effluent will be chlorinated, disinfected and pumped to a non-potable water irrigation system. Effluent may be diluted with potable water for irrigation purpose. Ultimately 100 percent of the estimated irrigation water requirement can be supplied by the treated effluent.

## **7.4 Impacts and Mitigation Measures**

Irrigation of the project site with treated effluent will reduce the demand for irrigation water from potable sources.

With the proper operation, objectionable odors will not be generated from the WWTP. Pumps and blowers normally associated with WWTP will be enclosed within a control building to reduce the impact of operating noises.

Placement of the WWTP below ground level and landscaping the perimeter fence, the area will reduce the visual impact on the general public passing on Lualualei Road.

## **VIII. NON-POTABLE WATER**

### **8.1 Existing Condition**

The State of Hawaii Department of Health Wastewater Branch is the jurisdictional agency for the application of recycled water under HAR 11-62-27. According to the Guidelines for Treatment and Use of Recycled Water (hereinafter referred to as Guidelines), allowable R-1 irrigation uses include the following areas: golf courses, parks, playgrounds, schoolyards, athletic fields, residential property where managed by an irrigation supervisor, and roadside and medians.

There is not existing R- 1 distribution system or non-potable water tank located within the vicinity of the project site. BWS does not have any capital improvement project in the near future to develop the R-1 distribution system.

## 8.2 Proposed Non-Potable Water System

Ultimately 100 percent of the estimated irrigation water demand can be supplied by the treated effluent from wastewater treatment unit. A proposed pump system and non-potable water distribution main will dispenses non-potable water for irrigation (see Figure 9). Pipes and pump shall be sized to accommodate maximum daily irrigation flow with the residual pressure of 20 psi at the critical location.

## 8.3 Projected Demand

The potential non-potable water uses for this project include irrigation of the buffer area, commercial landscape, and roadway medians. This non-potable water demand is estimated to be 0.023 MGD. See Table 8 below. To accommodate the irrigation flow requirement for duration of one day the minimum irrigation water storage tank will be 0.03 MG.

**TABLE 8**  
**ESTIMATED NON-POTABLE WATER USE DEMAND**

<b>Land Use</b>	<b>Acre</b>	<b>gpd/acre</b>	<b>Daily Demand (gpd)</b>
Landscaped Setback Area	3.5	1,440	5,040
Roadway Median/Commercial Landscape Area	5.0	1,440	7,200
Rock Fall Hazard Mitigation Area	7.3	1,440	10,512
		<b>TOTAL</b>	22,750
		<b>CALL</b>	0.023 MGD

## 8.4 Impacts and Mitigation Measures

Positive impacts resulting from the proposed non-potable water system include: (1) using non-potable sources for irrigation and landscaping.

A water reuse plan will be developed since effluent water from the wastewater treatment plant will be used for irrigation. This plan would include additional information about the irrigation, management, public education, and other required information per the Recycled Water Guidelines.



## **IX. SOLID WASTE**

### **9.1 Existing Condition**

Currently, the site is undeveloped and does not generate solid waste. A refuse service does not presently serve the project site.

### **9.2 Projected Solid Waste Generation and Characteristics**

The proposed project will generate solid waste during construction and after development. The construction wastes will primarily be made up of vegetation and debris resulting from clearing the site prior to grading. Most of these wastes will be combustible. The typical range of per capita solid waste generated from occupancy source is approximately 2.0 to 5.0 pounds per capita per day (lb/capita/day).

It is anticipated that at full development the project site induce a de factor population of 410, who will generate approximately 2.0 pounds of refuse per capita, for a total 820 pound of solid waste per day. The solid waste composition is expected to be typical for a municipal source.

### **9.3 Modifications After Development**

It is anticipated that refuse generated by the proposed Nanakuli Community Baseyard development will be collected by a private refuse collection company. It is estimated that refuse collection from the site will necessitate 1 truck trip per week. The number of truck trip is based on a manually loaded 20 cubic yard compactor truck capable of achieving a typical compaction density of 500 pounds per cubic yard.

### **9.4 Impacts and Mitigation Measures**

Proposed development will be a new solid waste generator. Disposal of construction wastes due to clearing and grubbing of the site will be a short term impact. The contractor will be required to remove all debris from the project site to mitigate the environmental impact.

The City and County is currently operating a landfill site in Waimanalo Gulch and the H-Power waste energy recovery facility on the Campbell Industrial Park. The Land Use Commission has partially approved the City's request and has extend the life of the Waimanalo Gulch landfill from current 2008 permit expiration to 2011 (18 months). The City is currently exploring alternative means of handling solid waste since it is an ongoing island wide concern. Other programs being implemented are recycling and reuse of green waste.

## **X. ELECTRIC AND TELEPHONE SERVICES**

### **10.1 Existing Conditions**

There is an existing wood joint pole line along the Honolulu side of the Lualualei Road right-of-way that abuts the project site. All the poles contain HECO 3 ph, 11.5 kV, HTCOM, and OTWC lines. Power to this primary line is supplied by the Mikiloa Substation feeder No. 3 on Paakea Road which has available capacity to serve the subject expansion.

### **10.2 Modification After Development**

It is anticipated that Hawaiian Electric Company, (HECO), Hawaiian Telcom (HTCOM), and Oceanic Time Warner Cable (OTWC), will provide the necessary electrical, telephone, cable TV, and high-speed internet services to the project site. The total diversified electrical demand for the entire development is estimated to be 1.05 MVA. Power is planned to be supplied to the site via existing substation at Mikiloa Substation. The project site will not require its own substation.

### **10.3 Impacts and Mitigating Measures**

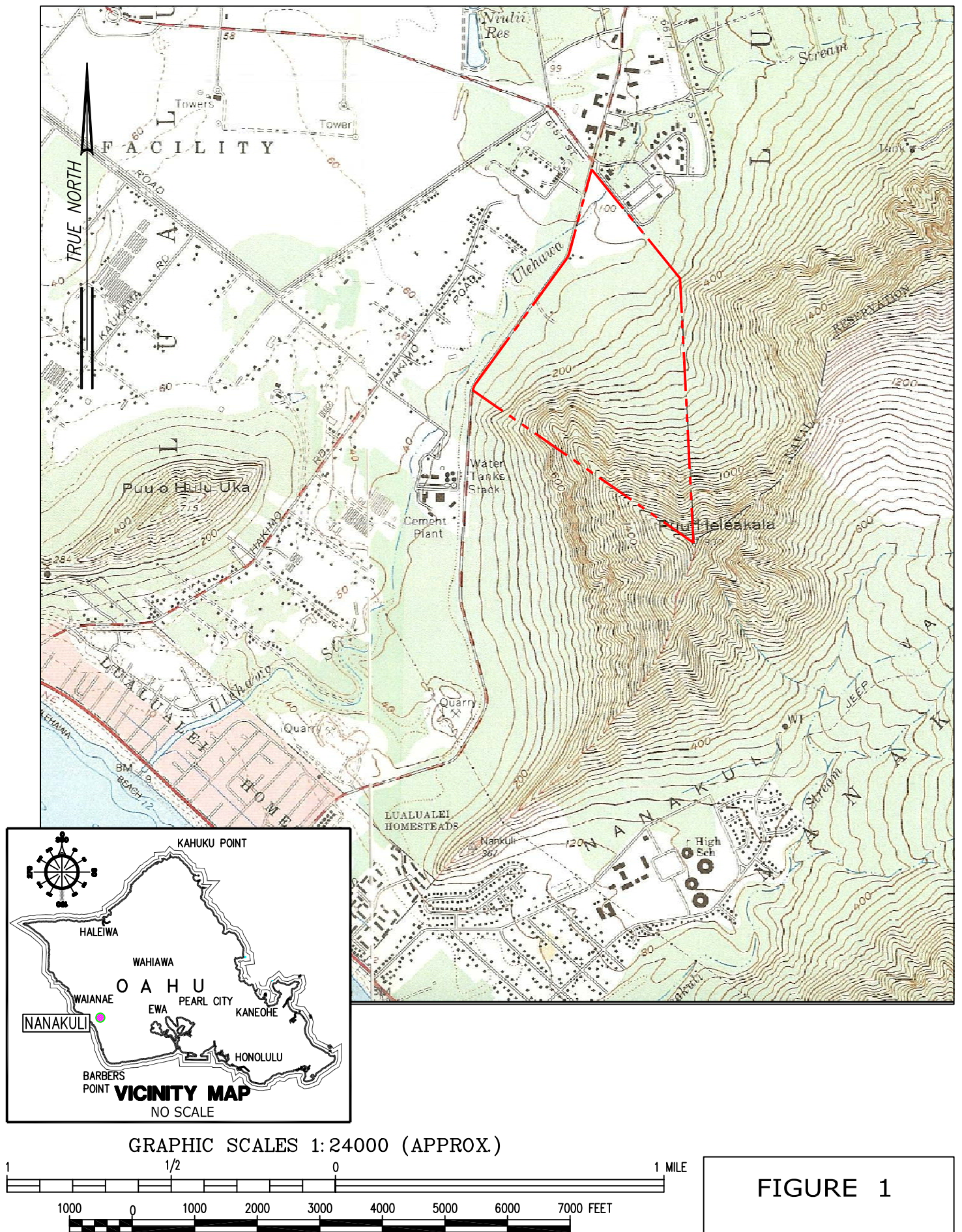
The proposed Nanakuli Community Baseyard will place additional demands on the utilities. The developer will work closely with HECO for timely design and construction of the utility infrastructure and delivery of required services.

No other mitigating measures are necessary since HECO has indicated that adequate service can be provided. However, the project will promote to use of alternative, renewable energy source such as the photovoltaic to reduce energy demand from HECO.

Utility lines will be placed underground to mitigate any visual impacts.

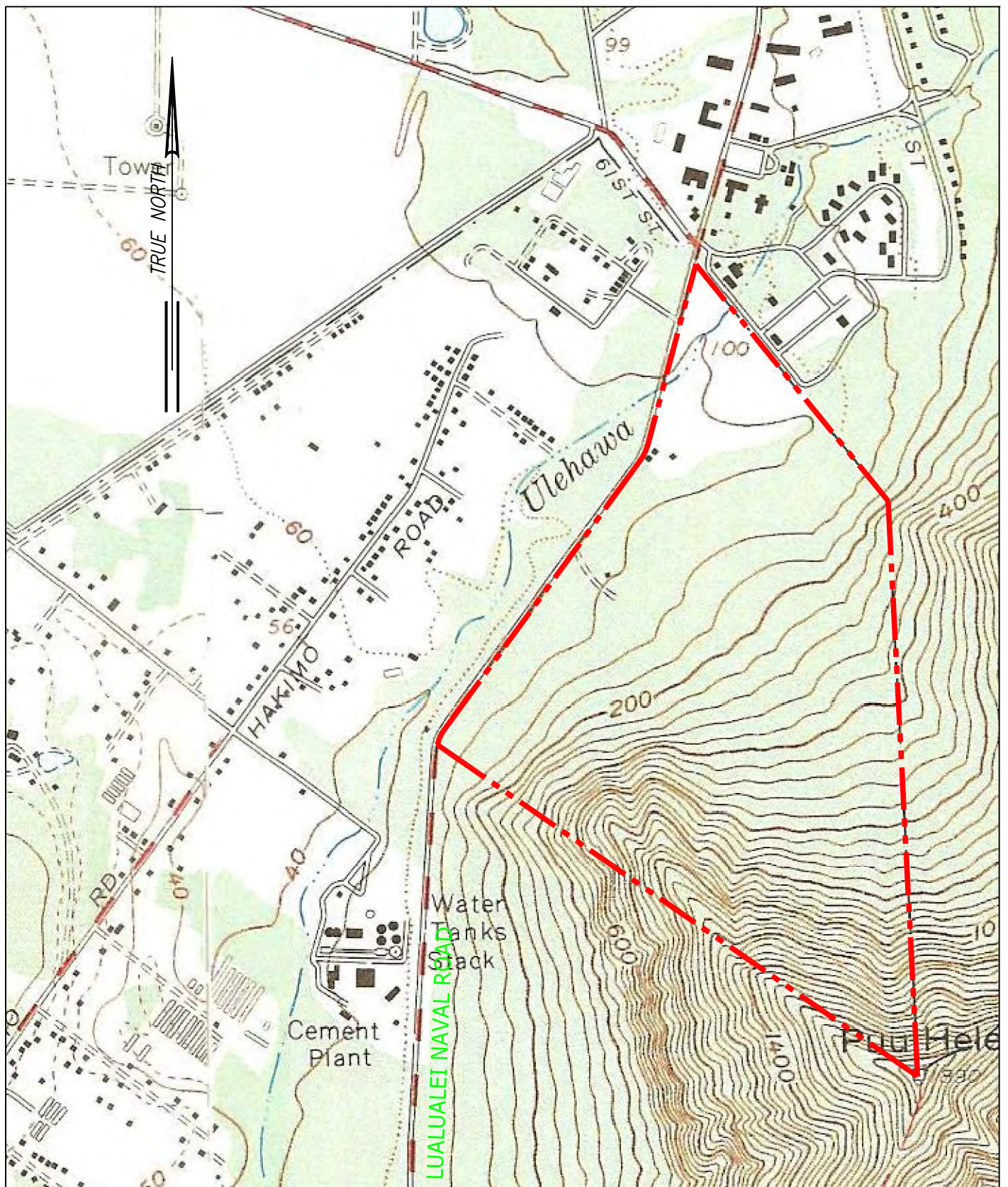
The developer will maintain contact with HTCOM and OTWC to assure necessary service levels.

# **FIGURES**



**FIGURE 1**  
**LOCATION MAP**





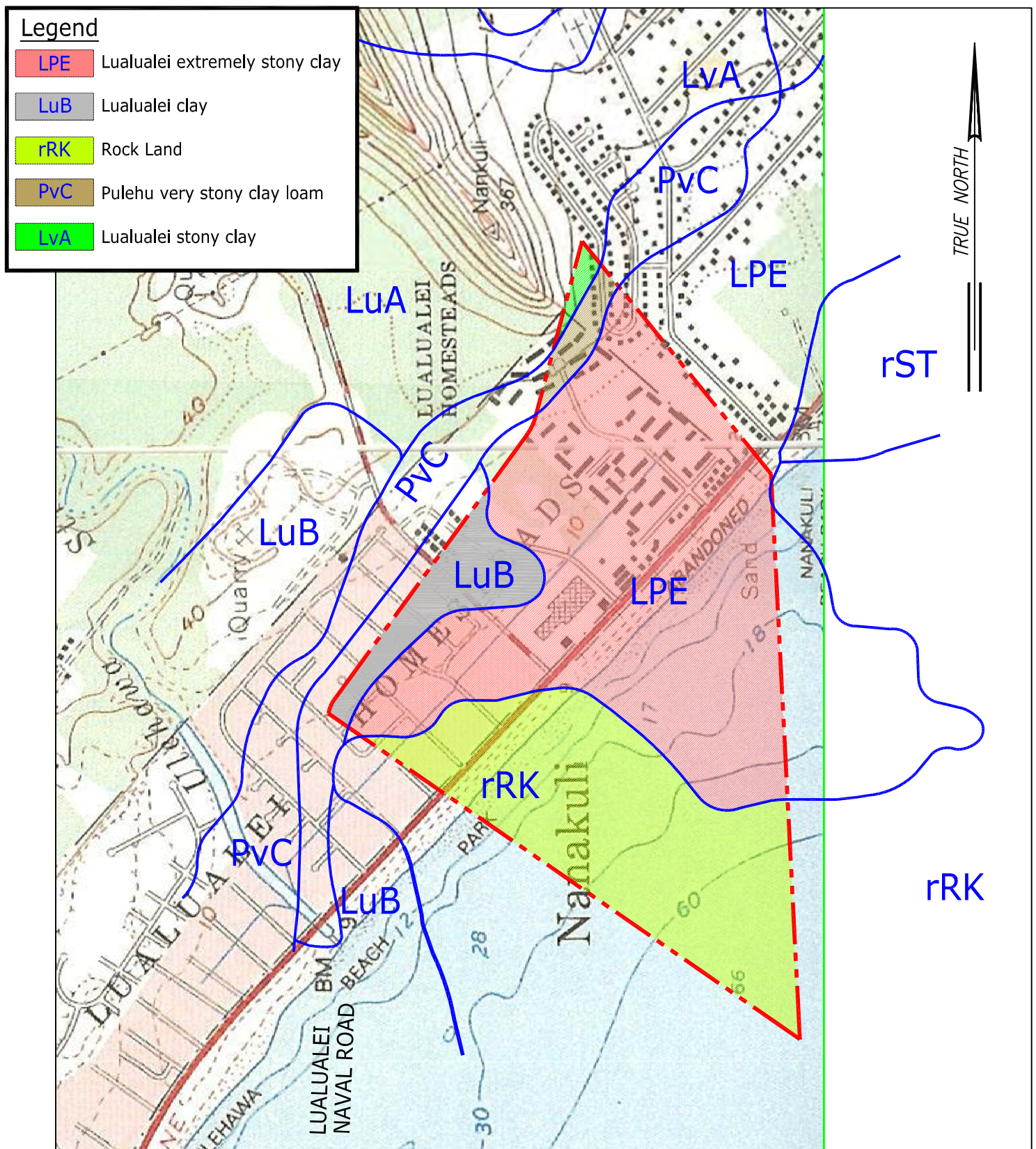
GRAPHIC SCALES 1:12000 (APPROX.)



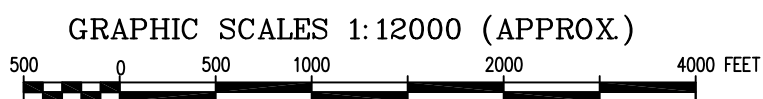
FIGURE 2

TOPOGRAPHIC MAP





Source: Soil Map, NRCS, September 19, 2006  
 The Background Digital Raster Graphics  
 was published by U.S.G.S. on August 2003.



Hida, Okamoto & Associates, Inc.  
 Consulting Engineers  
 Honolulu Hawaii

**FIGURE 3**

**SOILS MAP**



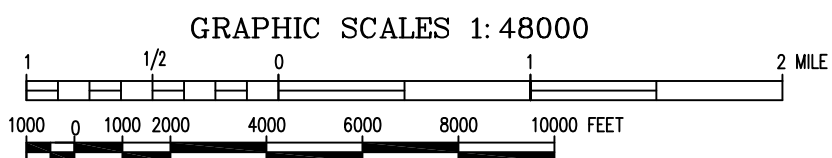
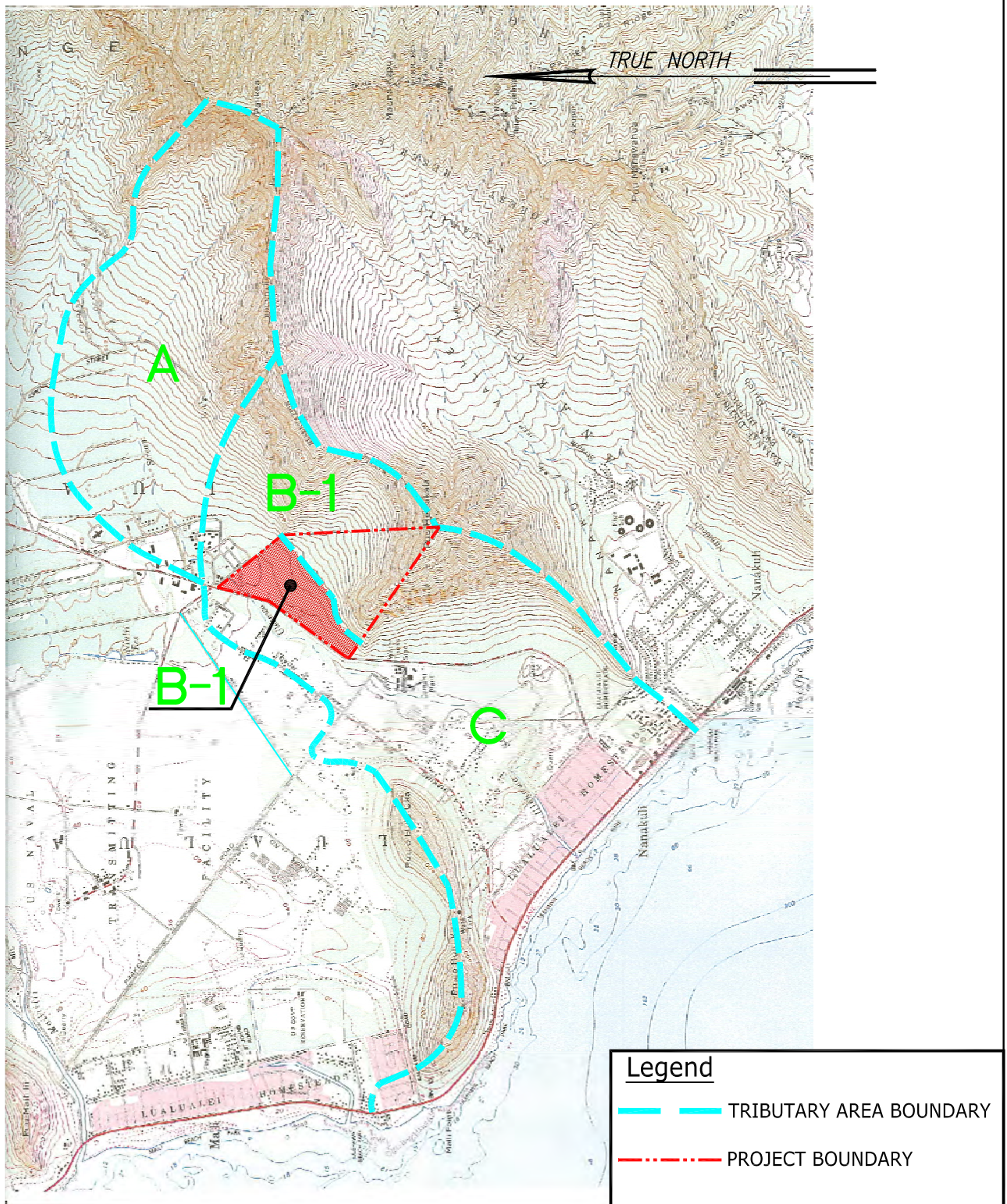
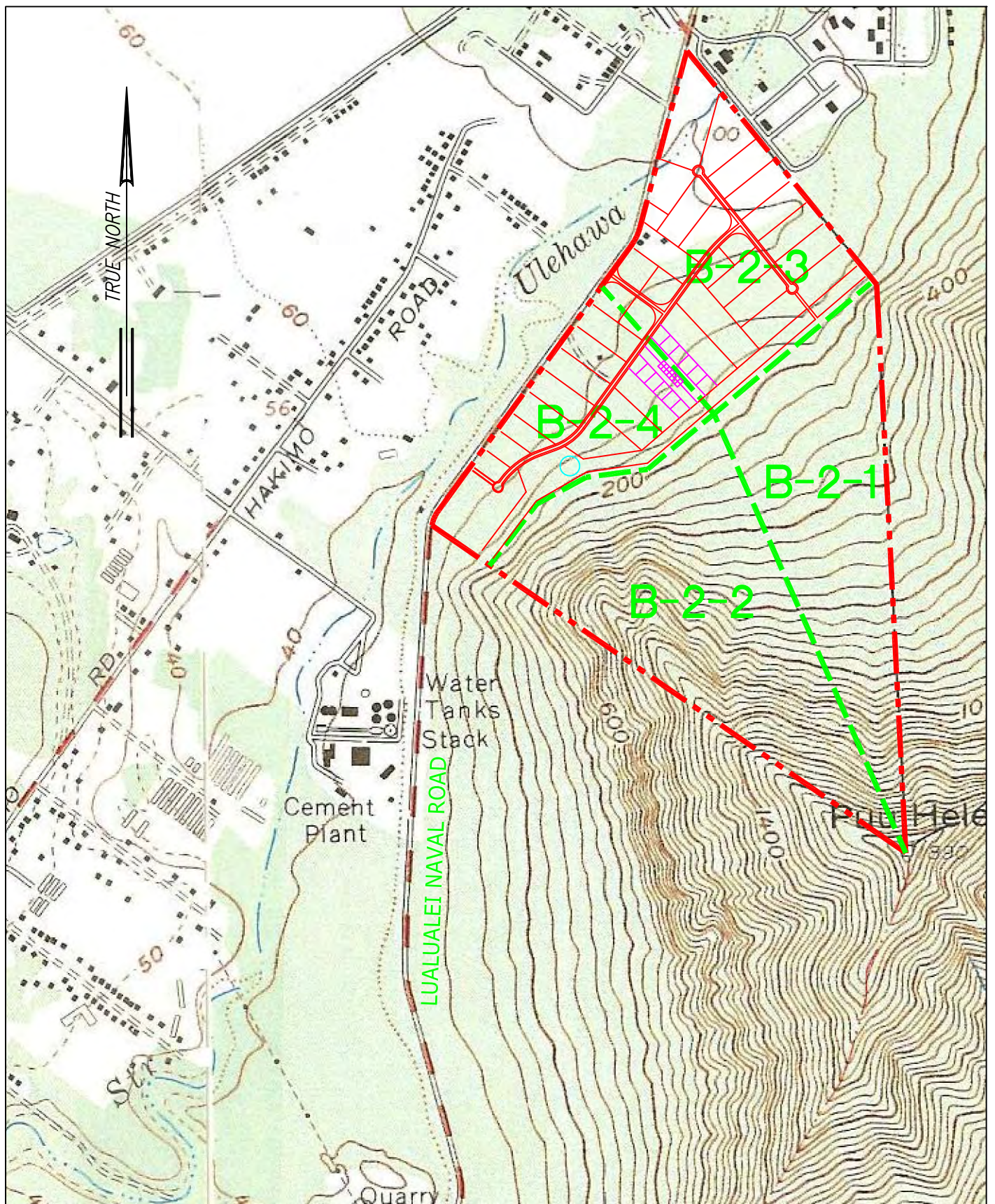


FIGURE 4  
 PRE-DEVELOPMENT  
 CATCHMENT AREAS



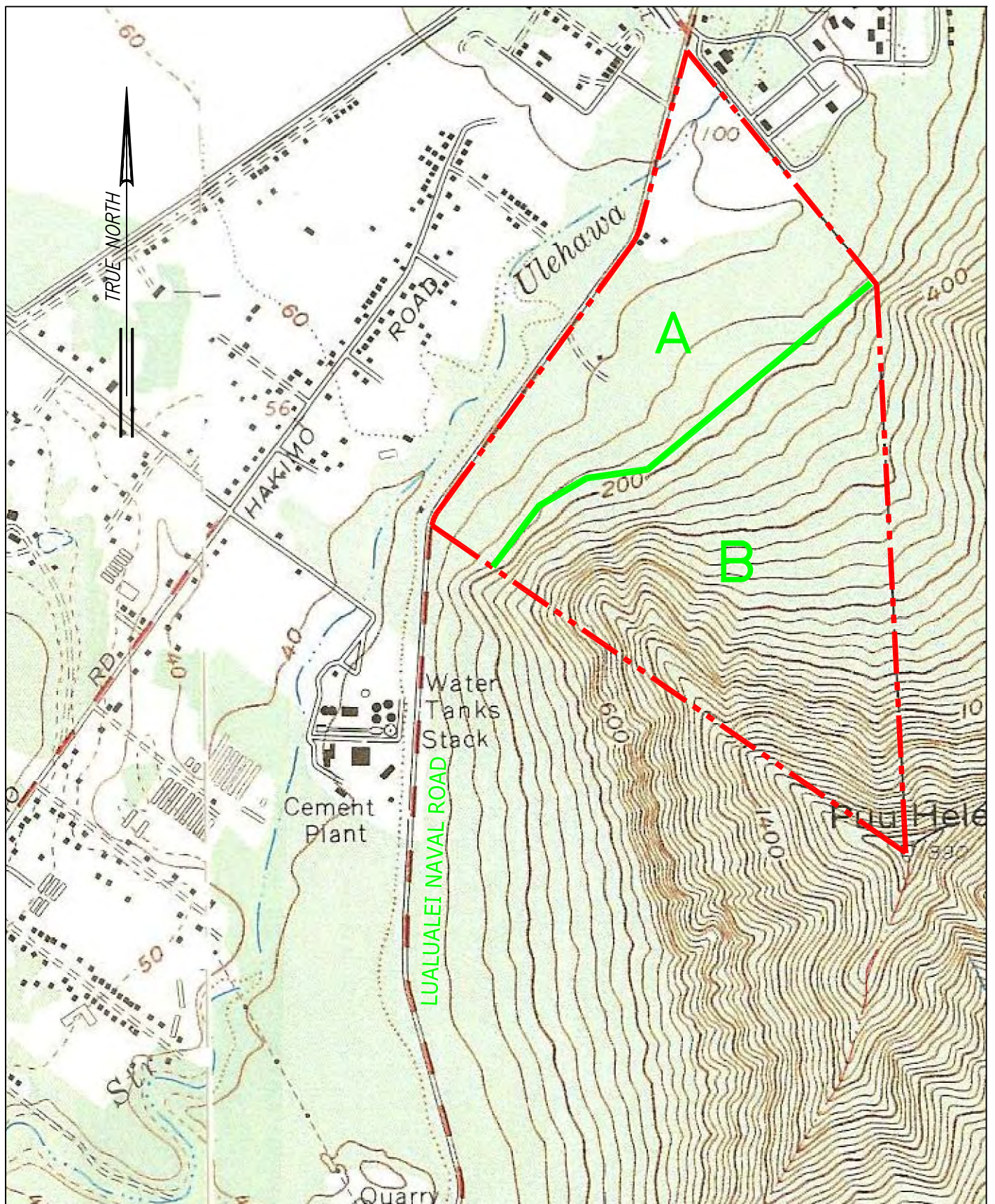


GRAPHIC SCALES 1:12000 (APPROX.)



**FIGURE 5**  
**DEVELOPMENT**  
**CATCHMENT AREAS**



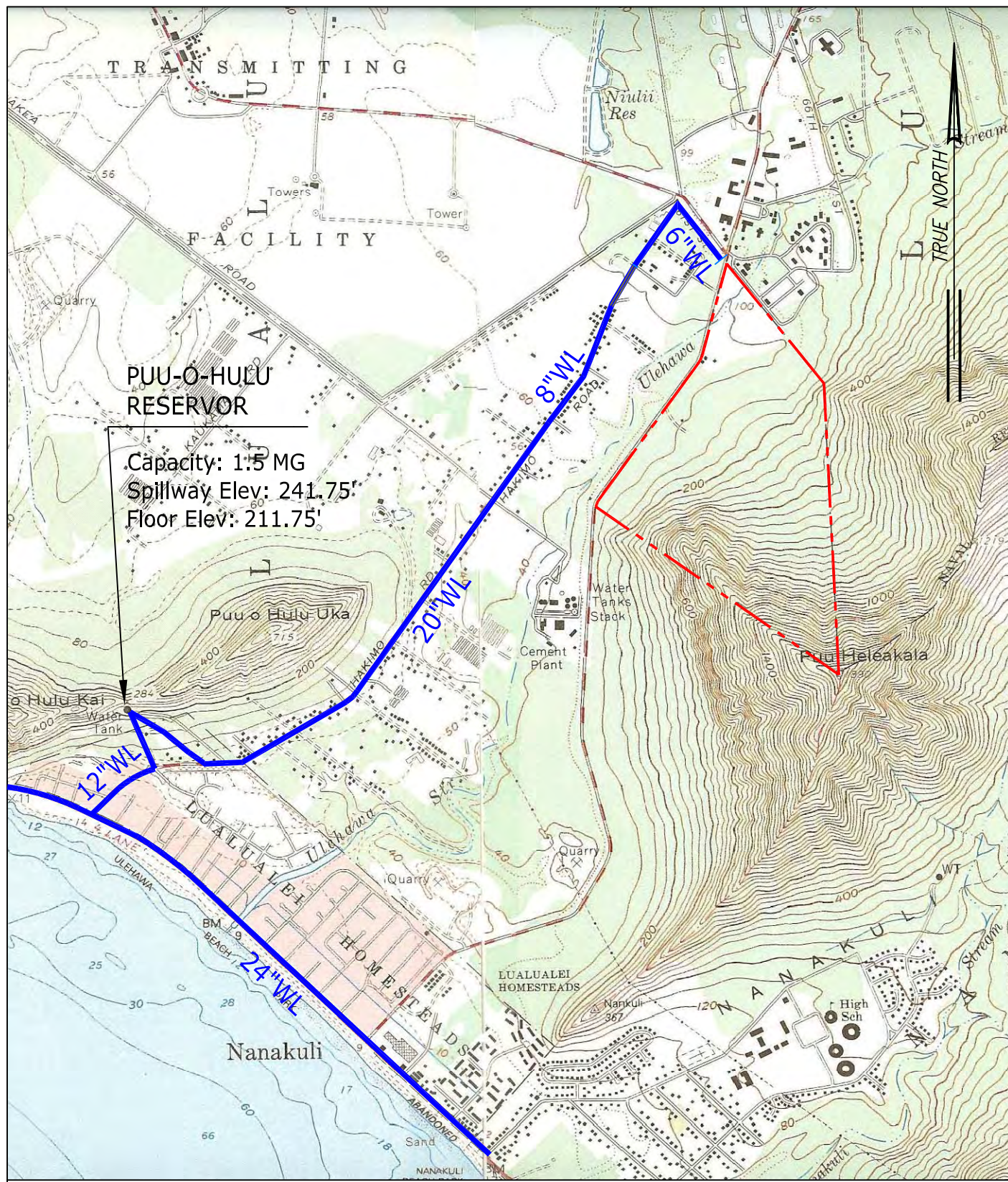


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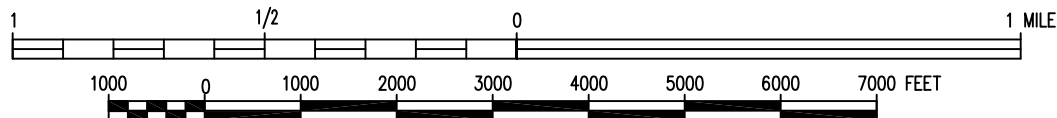


**FIGURE 6**  
SUBAREAS FOR  
CALCULATION OF  
SOIL EROSION  
POTENTIAL



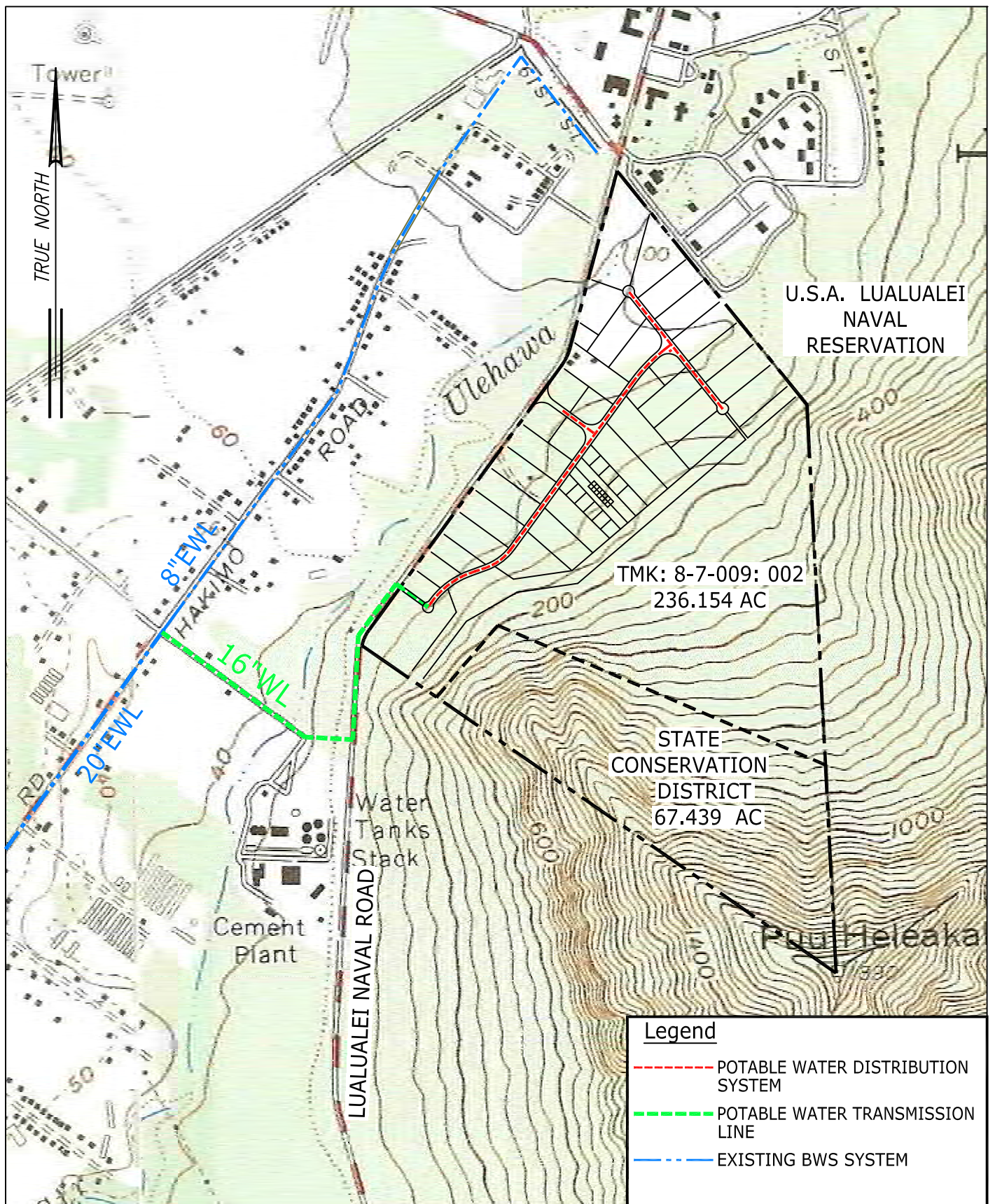


GRAPHIC SCALES 1:24000



**FIGURE 7**  
**EXISTING**  
**WATER TRANSMISSION**  
**AND STORAGE MAP**





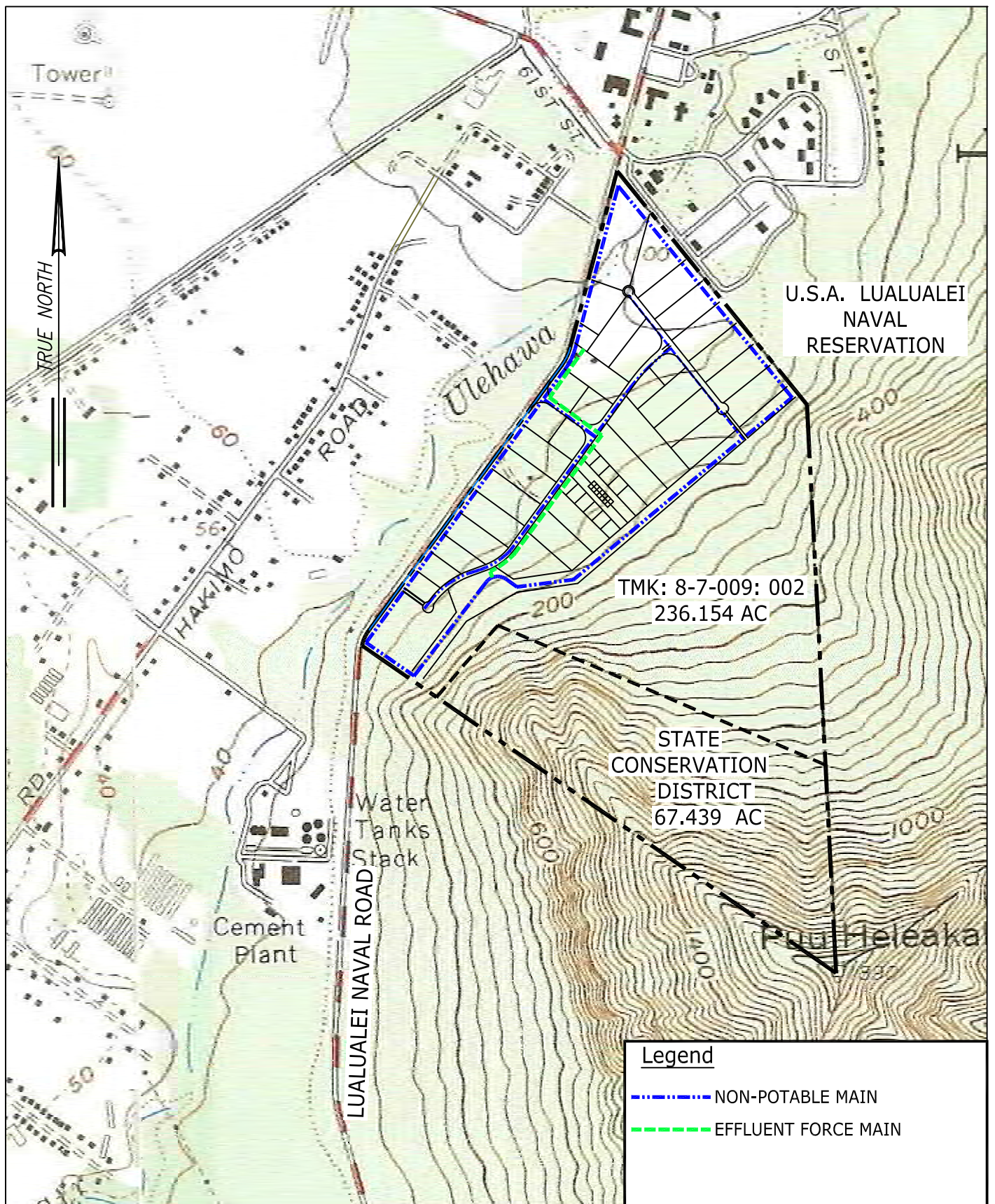
GRAPHIC SCALES 1:12000 (APPROX.)



**FIGURE 8**

**PROPOSED POTABLE WATER  
DISTRIBUTION SYSTEM**

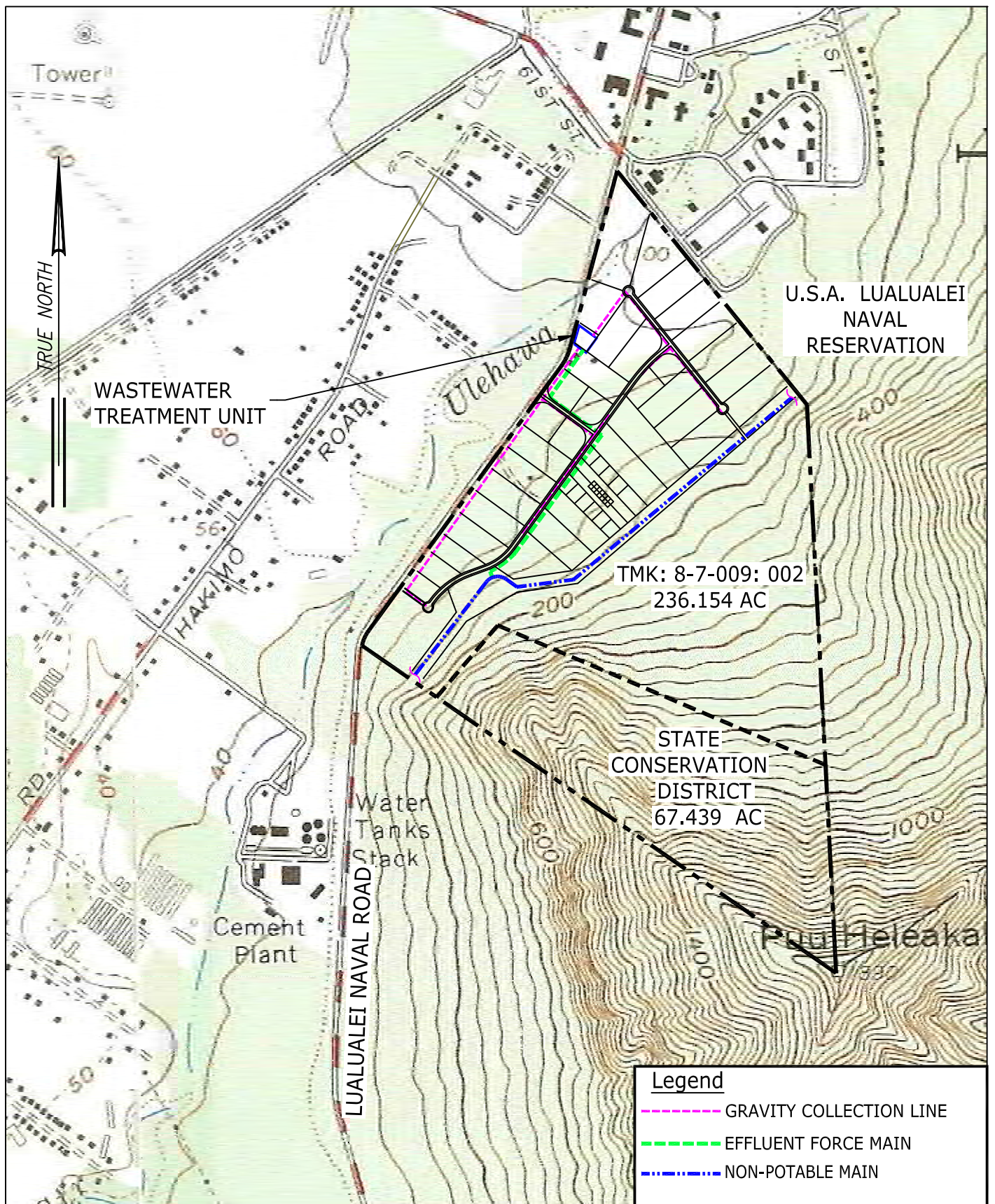




**FIGURE 9**

**PROPOSED NON-POTABLE  
WATER INFRASTRUCTURES**





GRAPHIC SCALES 1:12000 (APPROX.)



**FIGURE 10**

**PROPOSED WASTEWATER  
INFRASTRUCTURES**

## **APPENDIX B**

Market Analysis and Employment Forecast, Proposed Tropic Land  
LLC Industrial Park. Hastings, Conboy, Braig & Associates, Ltd.  
March 2008

**Market Analysis and  
Employment Forecast**

**PROPOSED TROPIC LAND LLC  
INDUSTRIAL PARK**

**Located at  
Lualualei, Waianae District,  
Island of Oahu, State of Hawaii**

**As of March 2008**



April 3, 2008

Ms. Nancy Nishikawa  
**Kimura International, Inc.**  
1600 Kapiolani Boulevard, Suite 1610  
Honolulu, Hawaii 96814

Dear Ms. Nishikawa:

We have completed a market analysis and employment forecast for a proposed industrial park development located in Lualualei Valley, Waianae District, Island of Oahu, State of Hawaii. The proposed subject development is identified herein as the Proposed Tropic Land LLC Industrial Park. The effective date of our market analysis and employment forecast for the proposed subject development is March 31, 2008.

The subject property is located along the eastern side of Lualualei Naval Access Road, inland of Farrington Highway and south of the U.S. Navy Magazine Lualualei. The proposed subject development site encompasses a land area of approximately 96 acres and is identified on State of Hawaii Tax Maps as First Division, Tax Map Key 8-7-09, Parcel 2 (Portion).

The Proposed Tropic Land LLC Industrial Park is slated to be a 35-lot subdivision with an average lot size of two acres. Anticipated uses at the proposed development will consist of light industrial activities. It is our understanding the proposed industrial park will require a State Land Use district boundary amendment to Urban District and a City and County zoning change to I-1 in order to accommodate its future development.

Our analysis and conclusions regarding the Proposed Tropic Land LLC Industrial Park are set forth in the accompanying report. Based on our research and investigation, it is our opinion that the proposed subject development represents a significant potential benefit to the local community from an economic land use and future employment perspective.

We appreciate the opportunity to have undertaken this counseling assignment.

Sincerely,

**HASTINGS, CONBOY, BRAIG  
& ASSOCIATES, LTD.**

Robert R. Braig, MAI, SRA  
Executive Vice President

/7371

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### **ADDENDA**

EXHIBIT I      -      Maps and Photographs of the Subject Property

Professional Qualifications

**I. INTRODUCTION AND EXECUTIVE SUMMARY**

**A. Introduction**

Our firm, Hastings, Conboy, Braig & Associates, Ltd., has been contracted by Kimura International, Inc. to conduct a real estate counseling analysis of the Proposed Tropic Land LLC Industrial Park development located at Lualualei, Waianae District, Island of Oahu, State of Hawaii. The subject site encompasses a land area of approximately 96 acres and is identified on State of Hawaii Tax Maps as First Division, Tax Map Key 8-7-09, Parcel 2 (Portion).

The site of the proposed development is located along the eastern side of Lualualei Naval Access Road, approximately 1.5 miles inland of Farrington Highway. As contemplated, the proposed subject development will be a 35-lot, light industrial subdivision with an average subdivision lot size of two acres. The proposed project will be developed and marketed under a condominium form of fee simple ownership.

It is our understanding the Proposed Tropic Land LLC Industrial Park will require a number of land use entitlement approvals at various levels of local government. Necessary government approvals include, but are not limited to, a Sustainable Communities Plan (SCP) amendment, a State Land Use (SLU) district boundary amendment from Agricultural to Urban District, and a City and County zoning change to I-1, Limited Industrial District.

As part of the application processes relating to these desired governmental approvals, our firm has been contracted to prepare a market analysis, land use demand forecast, and manpower/employment forecast for the Proposed Tropic Land LLC Industrial Park. The effective date of this counseling analysis is March 31, 2008.

**B. Executive Summary**

A summary of some of the more pertinent characteristics and conclusions resulting from our research, investigation and market analysis of the Proposed Tropic Land LLC Industrial Park development at Lualualei is presented as follows.

- Tropic Land LLC proposes to develop an industrial park that would occupy approximately 96 acres on TMK 8-7-9: 02, on the east side of Lualualei Naval Access Road. The industrial park would consist of approximately 35 lots, averaging two acres each. The project will be structured under a condominium form of ownership with individual lots and common ownership of internal roads and infrastructure. The anticipated opening is approximately 18 months from receipt of government approvals. The preliminary cost of the light industrial park is estimated at \$29 million.

- Among the references to industrial land use within Section 3.9 of the Waianae Sustainable Communities Plan is the following statement: “The projected growth in population may create a need for more support retail commercial and industrial acreage, although recent trends indicate a shifting of shopping habits away from local stores to the larger commercial centers in the Ewa District. Some local leaders have voiced the need for more local industrial parks.”
- Our assignment was to prepare a market demand analysis and employment forecasts associated with the Proposed Tropic Land LCC Industrial Park development. The effective date of the analysis is March 31, 2008.
- Primary emphasis for this assignment was placed on the research and collection of current socioeconomic forecast data pertaining to the State of Hawaii and the City and County of Honolulu. Data sources at the State level, as reported by the State Department of Business Economic Development and Tourism (DBEDT), include: Population and Economic Projections for the State of Hawaii to 2035; 2002 State Input-Output Study; and Report on Urban Lands in the State of Hawaii (2006). Data sources at the City and County level, as reported by the City and County Department of Planning and Permitting (DPP), include: Year 2000 Community Profiles; Socioeconomic Projections 2000 - 2030 by Development Plan Area and Subarea; and Waianae Sustainable Communities Plan (July 2000).
- According to data compiled as of Year-End 2007 by Colliers Monroe Friedlander (Colliers), the total supply of existing industrial space on the Island of Oahu is estimated at approximately 36.4 million square feet of floor area within 1,668 buildings. The indicated overall vacancy rate within Oahu’s industrial marketplace is three percent. An additional supply of approximately 750,000 square feet of industrial floor space would be the estimated requirement to effectuate a normal, equilibrium vacancy rate of five percent.
- Existing industrial development on Oahu is overwhelmingly concentrated within three designated Development Plan Areas, namely, the Primary Urban Center, Ewa, and Central Oahu. Based on the Colliers data, the combined inventory of industrial space within the remaining Development Plan Areas of East Honolulu, Koolaupoko, Koolauloa, North Shore, and Waianae totals less than 1.0 million square feet, or only 2.7 percent of the island-wide total.
- The subject property’s regional setting and relevant surrounding market area is defined as the Waianae Development Plan Area. The Waianae Development Plan Area is characterized as an outlying, rural-agricultural district for the Island of Oahu. Almost one-fourth of the total land area within this Waianae market area is categorized as agricultural. Only about five percent of the total land area is categorized as urban, with most of the urban designated land devoted to single-family residential use.

- The Department of Planning and Permitting Socioeconomic Projections for the Waianae Development Plan Area forecast a steady and moderate growth in population for the area but a contrasting, no-growth/declining scenario regarding the future outlook for job opportunities in the area. The population forecast for Waianae increases from 44,656 in 2005 to 52,285 in 2030 while the job/employment forecast for Waianae fluctuates at a modest level from 7,253 in 2005 to 7,126 in 2030.
- There is a disparity in population and job distribution associated with the Waianae area. Although the Waianae Development Plan Area accounts for almost 5.0 percent of the total population count on the Island of Oahu, Waianae has less than 1.5 percent of Oahu's total island-wide job count. This disparity is even greater with respect to jobs within the traditional industrial sectors of employment (represented by the employment categories of Transportation, Communications, Utilities; Industrial; and Construction). For industrial sector jobs, Waianae barely accounts for 1.0 percent of Oahu's island-wide total.
- The available market data indicate the existence of a geographic disconnect between a growing resident population and potential industrial labor force residing within the Waianae market area and the scarcity of any discernable new industrial development and employment opportunities within the same market area. The Proposed Tropic Land LLC Industrial Park has the potential to alleviate or mitigate some of the effects of this ongoing disconnect between labor force and job market locations.
- The Department of Planning and Permitting Socioeconomic Projections industrial sector job forecast for Waianae indicates an anticipated downward trend marked by a dramatic decline in projected construction employment. Obviously, if this forecasted decline in industrial employment were proven to be accurate there would be no compelling requirement or need for any new industrial development within the Waianae market area.
- Rather than accepting the Department of Planning and Permitting assertion of a less than one percent capture rate of Oahu's total industrial sector jobs to the Waianae market area, we have substituted a proposed range of alternative, increased capture rates of 1.5 to 2.0 percent. An industrial employment capture rate of 1.5 percent results in a forecasted industrial sector employment increase for the Waianae area of roughly 50 percent, from 1,109 jobs in 2005 to 1,682 jobs in 2030. A 2.0 percent capture rate of Oahu's island-wide total results in a forecast that approximately doubles the amount of industrial sector jobs from 1,109 in 2005 to 2,242 in 2030. An approximate mid-range capture rate of 1.7 percent results in a forecasted employment increase from 1,109 in 2005 to 1,906 in 2030.
- At the high end forecast, based on a 2.0 percent capture rate of Oahu's industrial sector jobs to the Waianae area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 100 to 115 net

acres of additional industrial land between 2010 and 2020. By comparison, the proposed subject project is anticipated to introduce 70 acres of new industrial land onto the market during this same approximate time period.

- At the mid-range forecast, based on a 1.7 percent capture rate of Oahu's industrial sector jobs to the Waianae DP Area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 65 to 80 net acres of additional industrial land between 2010 and 2020. Again, the proposed subject project is anticipated to introduce 70 acres of new industrial land onto the market during this same approximate time period.
- At the low end forecast, based on a 1.5 percent capture rate of Oahu's industrial sector jobs to the Waianae DP Area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 45 to 55 net acres of additional industrial land between 2010 and 2020. Under this scenario, the effective market absorption of the proposed subject project is anticipated to extend beyond a 15 to 20-year time horizon, and this would clearly represent an undesirable outcome.
- In our opinion, the future success or failure of the Proposed Tropic Land LLC Industrial Park is probably more directly related to the government approval process involving current land use entitlement issues than it is to potential private sector marketing issues.
- If the Proposed Tropic Land LLC Industrial Park were to be successful in obtaining the necessary land use entitlement approvals, it is our opinion that there is sufficient potential demand in the marketplace to achieve project absorption within, perhaps, a three- to five-year time frame.
- The Proposed Tropic Land LLC Industrial Park is anticipated to open approximately 18 months following the receipt of government approvals. Given this projected timetable and assuming a two- to four-month planning period prior to the start of actual construction, we estimate the construction period of the Proposed Tropic Land LLC Industrial Park to be approximately 15 months.
- During the 15-month construction period, the on-site job requirement forecast for the proposed project ranges from 100 to 125 person-years, and the off-site job requirement forecast ranges from 20 to 25 person-years. The overall short-term employment forecast for the proposed project during its construction period is equal to the sum of the on-site and off-site job requirement forecasts. Therefore, the total short-term employment forecast for the Proposed Tropic Land LLC Industrial Park is estimated at 120 to 150 person-years.
- On an assumed, stabilized operational basis, the total long-term employment forecast for the Proposed Tropic Land LLC Industrial Park is estimated at 840 to 1,260 jobs. This total long-term operational job forecast includes all forecasted direct, indirect, and induced employment effects attributable to the proposed

project. The forecast is based on an estimated range of 560 to 840 full-time, direct jobs created by the project, at operational status, in conjunction with a selected employment multiplier factor of 1.50. The employment multiplier factor accounts for potential indirect and induced job creation effects associated with the subject project.



## **II. ASSIGNMENT AND PROJECT DESCRIPTION**

### **A. Assignment**

Our assignment was to prepare a market demand analysis and employment forecasts associated with a proposed industrial park development located within Lualualei Valley in the Waianae District of the Island of Oahu. The effective date of the analysis is March 31, 2008.

The subject property has a gross land area of approximately 96 acres and is identified on State of Hawaii Tax Maps as First Division, Tax Map Key 8-7-09, Parcel 2 (Portion). The industrial park concept under consideration for the subject property is being proposed by the current property owner, Tropic Land LLC. Our client for this assignment is Kimura International, Inc., a contracted representative of Tropic Land LLC.

### **B. Scope of Work**

This counseling analysis has been prepared in conformance with the Uniform Standards of Professional Appraisal Practice (USPAP) of the Appraisal Foundation and the Code of Professional Ethics and Standards of Professional Practice of the Appraisal Institute. The use of this report is subject to the requirements relating to review by duly authorized representatives of the Appraisal Institute.

The primary objectives of this assignment involve the following two areas of analysis:

1. Prepare a Market Demand Forecast/Analysis for the Proposed Tropic Land LLC Industrial Park.
2. Provide an Employment/Manpower Forecast for the Proposed Tropic Land LLC Industrial Park.

In order to complete this assignment, we have undertaken a series of independent investigations and analyses, and have relied upon selected information and data from office files that are updated on a recurring basis. A summary of the investigations conducted and the primary data sources researched in conjunction with this analysis are presented in the following paragraphs.

Primary emphasis for this assignment was placed on the research and collection of current socioeconomic forecast data pertaining to the State of Hawaii and the City and County of Honolulu. Data sources at the State level, as reported by the State Department of Business Economic Development and Tourism (DBEDT), include: Population and Economic Projections for the State of Hawaii to 2035; 2002 State Input-Output Study; and Report on Urban Lands in the State of Hawaii (2006).

Data sources at the City and County level, as reported by the City and County Department of Planning and Permitting (DPP), include: *Year 2000 Community Profiles; Socioeconomic Projections 2000 - 2030 by Development Plan Area and Subarea; and Waianae Sustainable Communities Plan (July 2000)*. The State and County macro-economic forecast data referenced herein as the primary basis of our analysis are considered particularly relevant since this assignment, in part, is directly related to a Waianae Sustainable Communities Plan, Five-Year Review Amendment Application involving the subject property.

**C. Intended Use of the Report**

The “Intended Use” of this report is to assist the client in decision making purposes relating to the subject property. The client and intended user of this report is Kimura International, Inc., a contracted representative of the current subject property owner, Tropic Land LLC. The date of the report is April 3, 2008.

This report has been prepared for the sole and exclusive use of the client. No unrelated third party is authorized to rely upon this report without the expressed, written consent of the signers of this report. No liability is assumed, expressed or implied by Hastings, Conboy, Braig & Associates, Ltd., or the signers of this report, for unauthorized use of the report.

**D. Project Description**

The following descriptions and characterizations of the Proposed Tropic Land LLC Industrial Park are excerpted from a Waianae Sustainable Communities Plan (SCP), Five-Year Review Amendment Application submitted on behalf of the subject property.

“This SCP application involves three parcels located in the Lualualei Valley, mauka of Farrington Highway and south of U.S. Naval Magazine Lualualei. The properties are approximately 2.5 miles north of Nanakuli town and 7.5 miles from Waianae town. They are owned by Tropic Land LLC ....” [Page 1]

“Tropic Land LLC proposes to develop an industrial park that would occupy approximately 96 acres on TMK 8-7-9: 02, on the east side of Lualualei Naval Access Road (see Figure 6, Site Plan). The industrial park would consist of approximately 35 lots, averaging two acres each. The project would have a single secured entry off of Lualualei Naval Access Road and a secondary access for fire and emergency purposes. The existing linear tree farm will remain as a 30-foot landscaped setback along the Lualualei Road frontage. The north and south property lines have 15-foot setbacks. An additional strip of land, approximately 100 feet wide and mauka of the industrial lots, will be used for drainage improvements and rockfall hazard mitigation.” [Page 14]

“The project will be structured under a condominium form of ownership with individual lots and common ownership of internal roads and infrastructure. Tropic Land LLC is planning to seek an I-1 zone for the area that is planned for industrial use. The remainder of TMK 8-7-9: 02 will remain in the preservation zone.” [Page 14]

“The amendment will provide an inventory of industrial space on the Waianae Coast, which does not have a similar facility. The proposed project will be attractive to a mix of light industrial businesses and provide open yard space for storing materials, trucks, and heavy equipment.” [Page 6]

“The proposed light industrial park and baseyard is a job-producing and economy sustaining land use. The industrial park has the potential to become an employment center offering well-paid jobs that are within convenient commuting distance of Waianae Coast communities.” [Page 9]

“The anticipated opening is approximately 18 months from receipt of government approvals.” [Page 15]

“The preliminary cost of the light industrial park, based on the conceptual site plan, is estimated at \$29 million.” [Page 15]

### **III. INDUSTRIAL MARKET ANALYSES AND DEMAND FORECASTS**

This section of the report provides a presentation of our industrial market analyses and industrial land use demand forecasts for both the Island of Oahu, as a whole, and the Waianae Development Plan (DP) Area, which represents the relevant regional market area of the Proposed Tropic Land LLC Industrial Park development at Lualualei.

Our industrial market analyses include a profile of supply and demand conditions in the local marketplace and the implications of these prevailing market conditions with respect to the potential marketability of proposed, future industrial subdivision development at the subject property. Our industrial land use demand forecasts provide quantitative estimates regarding the future outlook for possible land use requirements based on anticipated economic growth.

#### **A. Industrial Market Analysis, Island of Oahu**

A general profile of the industrial market on the Island of Oahu is presented in Table III-1. The information summarized in this table reflects data compiled as of Year-End 2007 by Colliers Monroe Friedlander (Colliers). Based on this information, the total supply of existing industrial space on the Island of Oahu is estimated at approximately 36.4 million square feet of floor area within 1,668 buildings. The indicated overall vacancy rate within Oahu's industrial marketplace is three percent.

The geographic distribution of industrial space on Oahu is also allocated among 11 major sub-markets, with the four largest market areas identified as: Kalihi/Sand Island (8.47 million square feet); Airport/Mapunapuna (8.26 million square feet); Campbell Industrial Park/Kapolei Business Park (5.6 million square feet); and Bougainville/Halawa (3.23 million square feet). The seven remaining market areas have smaller inventories of industrial space ranging from as low as 467,000 square feet in Kailua to just over 2.4 million square feet in Iwilei. The subject property's Waianae market area does not merit inclusion within the tabular data published by Colliers.

Among the more notable aspects or characteristics of Oahu's industrial marketplace is the geographic concentration of its existing supply. Existing industrial development is overwhelmingly concentrated within three of Oahu's eight designated Development Plan (DP) Areas, namely, the Primary Urban Center, Ewa, and Central Oahu. Based on the Colliers data, the combined inventory of industrial space within the other five DP Areas of East Honolulu, Koolaupoko, Koolauloa, North Shore, and Waianae totals less than 1.0 million square feet, or only 2.7 percent of the island-wide total.

The Primary Urban Center is characterized as a predominantly built-out market, with potential redevelopment as a possible key component of future opportunities for industrial growth. Ewa and Central Oahu are characterized more as developing

areas where the availability of land capable of accommodating continued expansion is the primary driving force regarding future opportunities for growth in the supply of additional industrial land and buildings. Increased industrial development in Ewa and Central Oahu is also an appropriate response to the continued growth and development of substantial residential communities located within these two areas of the Island of Oahu.

Another significant feature of Oahu's industrial marketplace is its relatively low vacancy rate as it relates to pent-up demand. Pent-up demand is defined as the component or quantity of additional market demand that would need to be absorbed or otherwise introduced in the marketplace to restore normal equilibrium between supply and demand during periods of unusually low vacancy. Typically, normal equilibrium between supply and demand is reflected by an overall vacancy rate of, say, five percent. The Colliers data indicate that Oahu's overall vacancy rate for industrial space is 3.0 percent. The indicated vacancy rates within some selected market areas are calculated at less than one percent.

Oahu's vacancy rate of three percent equates to approximately 1.1 million square feet of available floor space amongst a total building inventory of 36.4 million square feet of floor space. Under these conditions, an additional supply of approximately 750,000 square feet of industrial floor space would be the implied requirement to effectuate a normal, equilibrium vacancy rate of five percent. This estimated amount of pent-up industrial demand is equivalent to roughly 50 percent, or one-half, of the total inventory of industrial floor space currently developed at the Gentry Business Park in Waipio.

**B. Industrial Market Analysis, Waianae Development Plan Area**

The subject property's regional setting and relevant market area is defined as the Waianae Development Plan (DP) Area. The Waianae DP Area extends along the leeward coast of the Island of Oahu, west of the Waianae Mountain Range, and encompasses the valleys of Nanakuli, Lualualei, Waianae, Makaha, and Makua and the residential communities of Nanakuli, Maili, Waianae, and Makaha. A portion of Farrington Highway provides the only access to and from the Waianae Development Plan Area. The subject property is located within Lualualei Valley approximately 1.5 miles east of Farrington Highway.

The Waianae market area is characterized as an outlying, rural-agricultural district for the Island of Oahu. A breakdown of existing land uses within the Waianae DP Area as of 1997, as reported by the City and County of Honolulu Department of Planning and Permitting (DPP), is presented in Table III-2. Although the information was compiled over a decade ago and, therefore, is comparatively dated, the data verify the rural-agricultural nature of the subject's market surroundings.

Almost one-fourth of the total land area within the Waianae DP Area is categorized as agricultural. Only about five percent of the total land area is categorized as urban,

with most of the urban designated land devoted to single-family residential use. According to the DPP data, almost two-thirds of the total land area in the Waianae DP Area is categorized as either Preservation or Military. This latter category of land use includes the U. S. Naval Magazine Lualualei tract located directly inland from the subject property.

The data presented in Table III-3 provide dramatic evidence of why there is an apparent lack of anticipation associated with government forecasting models dealing with future industrial land use demand within the Waianae market area. According to an urban land use inventory analysis undertaken by the DBEDT Office of Planning, the total acreage of vacant land zoned for commercial and/or industrial use within the Waianae DP Area as of 2004 was reported to be statistically equal to zero.

In essence, the data generated by the DBEDT Office of Planning indicate that opportunities for significant new industrial development within outlying, satellite areas such as Waianae are basically non-existent due to a pronounced scarcity of vacant industrial-zoned acreage. With the noted exception of the proposed subject project, we are not aware of any major new industrial land developments planned for the Waianae market area with the foreseeable future.

The existing supply of industrial land use within the Waianae DP Area remains extremely limited. As stated within Section 3.9, Commercial and Industrial Uses, of the Waianae Sustainable Communities Plan:

“Most of the District’s existing commercial and industrial uses are small in scale and are therefore included within the general designation of ‘Rural Community Development’. One significant industrially-zoned area in the vicinity of the Waianae wastewater treatment plant is shown as ‘Industrial’.”

Other notable references to industrial land use within Section 3.9 of the Waianae Sustainable Communities Plan include the following statements:

“The projected growth in population may create a need for more support retail commercial and industrial acreage, although recent trends indicate a shifting of shopping habits away from local stores to the larger commercial centers in the Ewa District. Some local leaders have voiced the need for more local industrial parks.”

“Local small businesses and light industrial operations are an important source of jobs for Waianae’s people. A healthy level of small local businesses is essential for the local economy and also lessens the volume of commuter traffic that causes severe congestion on Farrington Highway during morning peak traffic periods.”

“Encourage the establishment of light industrial businesses that provide jobs for local people, and that are generally compatible with the predominantly

residential uses of the Rural Community areas along the coast, but not in Makaha Valley.”

“Heavy industrial uses should not be permitted in the Waianae District. Such uses should be sited in the Campbell Industrial Park.”

From an existing demand perspective, it is important to realize that the Waianae DP Area accounts for roughly five percent of Oahu’s total resident population and that continued population growth is projected for the area over the next twenty years. Also, demographic and socioeconomic data from the 2000 Census indicate a significant level of industrial jobholders residing within the Waianae DP Area. Table III-4 is a presentation of selected employment characteristics reported by the 2000 Census.

An important, potential marketing implication of these statistics is the exhibited presence of a resource of available labor force with industrial job training and experience already residing within the Waianae market area. A more detailed presentation of forecasted industrial land use demand within the Waianae market area follows.

### **C. Industrial Land Use Demand Forecasts**

**Background** -- In its simplest expression, future net increases in industrial land use demand within any given geographic area are purely a function of economic growth. In essence, without continued economic expansion there would be no compelling reason or need for significant, additional development of industrial inventory or supply.

Regional economic growth can be measured by various means, using alternative standards of measurement. Typically, economic growth over time is measured in terms of periodic increases in population, employment, and/or personal income. It should be noted, however, that any measurable increases in population, employment and income are generally the resulting effects of economic growth and not the underlying cause of such growth.

The driving force behind regional economic growth and expansion is a healthy economic base, or export, industry. For the State of Hawaii, the traditional base industries or export commodities have been tourism, agriculture, and Federal government expenditures. Tourism, or the visitor industry, is widely recognized as the primary generator of economic expansion in Hawaii. The former importance of large-scale specialized agriculture, in the form of sugar cane and pineapple production, has been replaced in a reduced capacity by small-scale, diversified agricultural pursuits. Federal government expenditures, in the form of military spending and transfer payments, also continue to be an important source of exogenous income for Hawaii.



**Baseline Population and Employment Forecasts** -- The basis or foundation of our industrial land use demand forecasts corresponds to various government-sponsored/officially recognized regional population and employment projections for the State of Hawaii, City and County of Honolulu (i.e., Island of Oahu), and Waianae Development Plan (DP) Area. These baseline forecasts or measurements of future economic growth are presented in Tables III-5, III-6, and III-7.

Table III-5 summarizes population and employment forecasts for the City and County of Honolulu as published by the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT) in its Population and Economic Projections for the State of Hawaii to 2035 (DBEDT 2035 Series), dated January 2008. Brief descriptions and characterizations of the DBEDT 2035 Series projections, as excerpted from the published document are presented as follows.

“As in the 2020 projection series, the model contains five blocks: final demand, income, output, employment, and population. The final demand components were either projected by a set of econometric equations or exogenously given. The statewide projected final demands were allocated to each industry of each county using the relevant final demand vectors in the 2002 inter-county I-O [Input-Output] table. Industrial outputs of each county were then derived by multiplying the projected final demands by the total requirements matrix of the 2002 inter-county I-O table. Jobs were derived by dividing each industry’s projected output by job-to-output ratio. Once jobs were projected, labor income was estimated as a function of total jobs. Population projection was done separately using the cohort component method, but was linked with econometric module through migration.” [Page 12]

“It must be noted that, despite comprehensive data analysis and the precision of the model calculations, there is no unique solution to the projection of Hawaii’s future population and economy. If there is no change in the structure and behavior of the economy over time, analysis of the past would provide an accurate guide to the future. Unfortunately, the future trends in important factors such as fertility, mortality, migration, labor productivity, and labor force participation are inherently uncertain. The future growth of final demand and industrial structure may follow different patterns from the past. Therefore, in addition to analysis of historical economic relationships among variables many subjective judgments on future trends had to be entered to produce the current set of projections.” {Page 13]

As alluded to in these excerpts, the forecast methodology of the DBEDT 2035 Series utilizes an inter-county input-output econometric model in conjunction with an age-and-sex-specific, cohort survival/demographic module. The fundamental input-output model is The 2002 State Input-Output Study for Hawaii, published by DBEDT in June 2006. Brief descriptions and characterizations of The 2002 State

Input-Output Study for Hawaii, as excerpted from the published document are presented as follows.

“An input-output (I-O) model depicts a comprehensive and detailed set of accounts of sales and purchases of goods and services among the producing industries, final consumers (households, visitors, exports, and government), and resource owners (labor, capital, and land) during a particular time period (usually a year) for a specific economy or region. The information from the I-O model is presented in a format called the I-O table. This framework was developed by Wassily Leontief in the 1930’s, for which he was awarded the 1973 Nobel Prize in Economics.” [Page 3]

“By providing the comprehensive and detailed information on sales and purchases of goods and services among the various sectors in the economy, the I-O tables provide a useful analytical tool for economists, planners, and policy-makers in: (i) analyzing a wide range of problems related to regional and community economic development; (ii) formulating new economic and environmental policies and assessing their effects on industry output and input patterns; and (iii) assessing impacts of new economic development efforts and exogenous (external) changes on the economy (e.g., development of new exports). More specifically, the I-O tables form the factual basis for estimating output, income, employment, and other multipliers, which are frequently used in economic impact analyses. The I-O model also provides critical information for long-range economic and demographic projections, as well as for social accounting matrixes (SAM) and computable general equilibrium (CGE) modeling for public policy and alternative economic scenario simulations.” [Page 1]

Table III-6 presents a breakdown of the population and job forecasts for the Island of Oahu by designated Development Plan Areas. These allocated population and employment forecasts to the year 2030 are prepared by the City and County of Honolulu Department of Planning and Permitting (DPP) and published in tabular format as Socioeconomic Projections, 2000-2030 By Development Plan Area, dated November 2007.

The City and County’s allocated population and job count forecasts by Development Plan Area have yet to be updated to coincide with the more recent DBEDT 2035 Series projections. For example, the DBEDT 2035 Series projections indicate Oahu’s resident population forecast increasing from 902,035 in 2005 to 1,080,700 in 2030. For the same time period, the DPP Socioeconomic Projections reflect a slightly higher forecast level, indicating an increase in Oahu’s resident population from 912,913 in 2005 to 1,117,322 in 2030. For purposes of this analysis, the existing differences in the forecasts equate to less than four percent and are considered to be statistically insignificant.

The DPP Socioeconomic Projections for the Waianae Development Plan (DP) Area forecast a steady and moderate growth in population for the area but a contrasting, no-growth/declining scenario regarding the future outlook for job opportunities in the area. The population forecast for Waianae increases from 44,656 in 2005 to 52,285 in 2030 while the job/employment forecast for Waianae fluctuates at a modest level from 7,253 in 2005 to 7,126 in 2030.

Within the DPP projection model, significant job growth to the year 2030 is forecast to occur within three Development Plan Areas: Primary Urban Center, Ewa, and Central Oahu. All remaining Development Plan Areas, encompassing East Honolulu, Koolaupoko, Koolauloa, North Shore and Waianae, are projected to have relatively limited prospects for widespread increases in future job opportunities.

Table III-7 presents a more detailed breakdown of the DPP job projections to 2030 by various employment categories. Of particular note is a marked decline in forecasted construction jobs for the Waianae DP Area, from 801 in 2005 to 368 in 2030. This represents more than a 50 percent loss in jobs for the construction industry within the subject market area. The forecasted decline in construction jobs appears to reflect a perceived lack of anticipated new development within the Waianae DP Area.

**Land Use Demand Forecast Model** -- Our analysis of forecasted industrial land use demand for the Waianae DP Area to the year 2030 is presented in Tables III-8 and III-9. Table III-8 provides a comparison between the DPP Socioeconomic Projections for the Waianae DP Area and corresponding DPP projections for the City and County of Honolulu, or Island of Oahu, as a whole. Table III-9 is a presentation of our quantitative industrial land use demand forecasts for the subject property's Waianae Development Plan Area.

The data presented in Table III-8 demonstrate the disparity in population and job distribution associated with the Waianae area. Although the Waianae DP Area accounts for almost 5.0 percent of the total population count on the Island of Oahu, Waianae has less than 1.5 percent of Oahu's total island-wide job count. This disparity is even greater with respect to jobs within the traditional industrial sectors of employment (represented by the employment categories of Transportation, Communications, Utilities; Industrial; and Construction). For industrial sector jobs, the Waianae DP Area barely accounts for 1.0 percent of Oahu's forecasted island-wide total.

Our quantitative land use demand forecasts presented in Table III-9 are based, in part, on projected modifications to this prevailing disparity between population distribution and job count distribution in the subject's Waianae market area. The other major facet of our land use demand forecasts is the utilization of an employment-driven model as the basis for our quantitative results.

As shown in Table III-9, the primary baseline forecast utilized to generate land use demand implications within the context of our employment model is the “Industrial Sector Job Forecast” for the City and County of Honolulu, or Island of Oahu. The industrial sector job forecast for Oahu starts at 94,760 in 2005 and expands by almost 20 percent to 112,108 in 2030. This employment/job forecast is then converted to a corresponding industrial land use requirement based on an estimated conversion factor of 2,500 square feet of land area per employee/job. A conversion factor, or land use ratio, of 2,500 square feet per employee is approximately the mid-range equivalent to an average range of 15 to 20 employees per acre.

Industrial land use ratios can vary dramatically depending upon the specific type or form of industrial use involved. Land-intensive uses, such as those typically associated with heavy industrial activities, tend to reflect relatively higher land use ratios, or lesser numbers of employees per acre on average. Labor-intensive uses, such as those typically associated with light industrial activities, tend to reflect relatively lower land use ratios, or greater numbers of employees per acre on average. For example, land use requirement forecast models applicable to Honolulu’s higher-density, Primary Urban Center typically reflect industrial land use ratios of less than 1,000 square feet per employee.

The next step in our forecast model involves a modification to the existing DPP Socioeconomic Projections industrial job forecast for the Waianae DP Area. As presented previously in this report, the DPP industrial sector job forecast for Waianae indicates an anticipated downward trend marked by a dramatic decline in projected construction employment. Obviously, if this forecasted decline in industrial employment were proven to be accurate there would be no compelling requirement or need for any new industrial development within the Waianae market area.

It is our belief, however, that the projected decline in industrial employment for the Waianae DP Area as set forth in the DPP Socioeconomic Projections is a direct reflection of a total absence of anticipated, future industrial land use development for the Waianae area, as embodied within that specific forecasting model. From a market demand perspective, this type of underlying assumption tends to result in a somewhat self-fulfilling or self-perpetuating cycle of forecasted stagnancy. The continuous cycle can be characterized as follows: no anticipated new development in the area results in no projected increase in employment for the area which results in no projected demand for new development in the area, and so forth.

Based on this understanding, we have implemented a series of modifications to the industrial sector employment forecast applicable to the Waianae DP Area. Again, DPP projections of industrial sector employment for the Waianae area represent only 0.7 to 1.2 percent of the corresponding total of the entire City and County of Honolulu during the 2005 to 2030 forecasting period.

Rather than accepting the DPP assertion of a less than one percent capture rate of industrial sector jobs to the subject market area, we have substituted a proposed range of alternative, increased capture rates of 1.5 to 2.0 percent. A proposed capture rate/allocation of 1.5 to 2.0 percent of all future industrial sector jobs on the Island of Oahu to the Waianae DP Area is still significantly lower than Waianae's projected 4.7 percent share of Oahu's total resident population forecast to the year 2030.

An alternative industrial employment capture rate of 1.5 percent results in a forecasted industrial sector employment increase for the Waianae DP Area of roughly 50 percent, from 1,109 jobs in 2005 to 1,682 jobs in 2030. The alternative capture rate at 2.0 percent of Oahu's island-wide total results in a forecast that approximately doubles the amount of industrial sector jobs within the Waianae market area from 1,109 in 2005 to 2,242 in 2030. An approximate mid-range capture rate forecast of, say, 1.7 percent results in a forecasted employment increase of between 70 and 75 percent, from 1,109 in 2005 to 1,906 in 2030.

The final step in our forecasting model is the conversion of the modified industrial employment forecasts for the Waianae DP Area to corresponding land use demand forecasts. For this step of the analysis, the selected conversion factor, or land use ratio, is 5,000 square feet of land area per employee/job. A conversion factor/land use ratio of 5,000 square feet per employee is approximately the mid-range equivalent to an average range of 8 to 10 employees per acre. A comparatively higher industrial land use ratio (implying a comparatively lower number of employees per acre) is considered reasonable and appropriate for the subject's Waianae market area.

**Market Analysis Implications and Conclusions** -- The various modified employment projections and land use conversion ratios outlined previously are incorporated into our demand forecasting model as summarized in Table III-9. Based on this forecasting model, it is our conclusion that there is a reasonable expectation for sufficient market demand to support the potential development of the Proposed Tropic Land LLC Industrial Park at Lualualei.

At the high end forecast, based on a 2.0 percent capture rate of Oahu's industrial sector jobs to the Waianae DP Area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 100 to 115 net acres of additional industrial land between 2010 and 2020. By comparison, the proposed subject project is anticipated to introduce 70 acres of new industrial land onto the market during this same approximate time period.

At the mid-range forecast, based on a 1.7 percent capture rate of Oahu's industrial sector jobs to the Waianae DP Area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 65 to 80 net acres of additional industrial land between 2010 and 2020. Again, the proposed subject

project is anticipated to introduce 70 acres of new industrial land onto the market during this same approximate time period.

At the low end forecast, based on a 1.5 percent capture rate of Oahu's industrial sector jobs to the Waianae DP Area, industrial land use demand within the subject market area is forecast to be sufficient to absorb approximately 45 to 55 net acres of additional industrial land between 2010 and 2020. Under this scenario, the effective market absorption of the proposed subject project is anticipated to extend beyond a 15 to 20-year time horizon, and this would clearly represent an undesirable outcome.

The rationale behind the use of modified industrial sector job forecasts for the Waianae DP Area is based on a realistic expectation that a significant level of relocation demand (also referred to as transient demand) could potentially be attracted to the subject market area. This potential form of demand might well be the future result of selected industrial businesses acting upon a desire to relocate their operations to a lower-cost option located in an area offering better proximity to available labor force resources.

Pent-up business demand for industrial space on the Island of Oahu was addressed previously in this report. Based on our interpretation of the available statistical data, we believe there exists within the Waianae DP Area a somewhat parallel situation of pent-up labor force demand for additional industrial employment opportunities within the immediate Waianae Development Plan Area, itself.

Available market data indicate the existence of a geographic disconnect between a growing resident population and potential industrial labor force residing within the Waianae market area and the scarcity of any discernable new industrial development and employment opportunities within the same market area. The Proposed Tropic Land LLC Industrial Park has the potential to alleviate or mitigate some of the effects of this ongoing disconnect between labor force and job market locations.

In the final analysis, it is our opinion that the future success or failure of the Proposed Tropic Land LLC Industrial Park is probably more directly related to the government approval process involving current land use entitlement issues than it is to potential, private sector marketing issues.

If respective public sector policy boards at the local government level were to ultimately decide to maintain the constraints on lands available for industrial development within the Waianae DP Area, then the proposed subject project will have no relevance in the marketplace.

However, if the Proposed Tropic Land LLC Industrial Park were to be successful in obtaining the necessary land use entitlement approvals, it is our opinion that there is sufficient potential demand in the marketplace to achieve project absorption within, perhaps, a three- to five-year time frame.



#### **IV. EMPLOYMENT FORECASTS**

This section of the report provides a presentation of our employment forecasts for the Proposed Tropic Land LLC Industrial Park development at Lualualei. In general, employment opportunities generated by any given new development, or project, consist of jobs created during the construction period of the project followed by jobs created during the operational existence of the project. Potential job creation as associated with any given new development can also be differentiated or categorized in terms of direct employment, indirect employment, and induced employment effects.

The employment forecasts presented in this section of the report provide estimates of both the short-term and long-term potential impacts on employment associated with the Proposed Tropic Land LLC Industrial Park. Short-term, or interim, employment refers to the estimated number of jobs, or manpower requirement, of the proposed development during the specific period of time corresponding to the project's anticipated construction period. Long-term, or stabilized, employment refers to the numbers of jobs generated by the proposed development under its assumed operational status.

##### **A. Interim, Construction Employment**

Our short-term, interim employment forecast for the Proposed Tropic Land LLC Industrial Park during the project's estimated 15-month construction period is presented within Table IV-1. As shown in Table IV-1, the total short-term employment forecast associated with the proposed subject project during its anticipated construction period is estimated to range from 120 to 150 person-years. An explanation of this forecast estimate is presented within the following paragraphs.

According to the Waianae Sustainable Communities Plan (SCP), Five-Year Review Amendment Application submitted on behalf of the subject property, the Proposed Tropic Land LLC Industrial Park is anticipated to open approximately 18 months following the receipt of government approvals. The preliminary cost estimate associated with the proposed project is \$29 million. The project will consist of 35 industrial lots with an average lot size of two acres. The total land area associated with the proposed project is approximately 96 acres.

Given the projected timetable set forth in the SCP Amendment Application and assuming a two- to four-month planning period prior to the start of actual construction, we estimate the construction period of the Proposed Tropic Land LLC Industrial Park to be approximately 15 months. Also, in the absence of any alternative cost estimates, we assume the project's preliminary cost estimate of \$29 million to be reasonably accurate for purposes of this analysis.

**On-Site Employment Forecast** -- Based on the preliminary project information available at this point in time, we estimate the average daily, on-site job requirement of the subject development during the 15-month construction period at between 80

to 100 workers. This average manpower forecast is roughly equivalent to an average of one on-site worker per acre of gross land area for the project site.

During the construction period, the daily on-site job count will probably vary significantly depending upon factors such as the phasing and scheduling of construction work; the scheduling and availability of work crews and possible sub-contracted workers; lost worker time due to sick leave and/or injury; and weather conditions. In our opinion, an average labor force or manpower requirement of 80 to 100 workers per year is considered reasonable and supportable in comparison to other subdivision lot developments. A more precise or detailed breakdown of interim manpower requirements should be available once a construction contract for the proposed project is put out to bid.

The initial on-site job estimate is then converted into a corresponding person-year employment estimate. The term “person-year” refers to the equivalent of one year of full-time work for one worker. For example, two different workers with the same job description working on a part-time basis for six months each would be the mathematical equivalent to one “person-year”.

In this analysis, our estimated average on-site employment range of 80 to 100 workers is converted into a corresponding person-year forecast based on a multiplication factor equal to the length of the construction period, as expressed in numbers of years. The appropriate conversion factor for the length of time associated with the project’s 15-month construction period is 1.25 (i.e., 15 months divided by 12 months). Based on this factor, the forecasted number of on-site jobs, or manpower requirement, at the subject property during the project’s construction period is estimated to range from 100 to 125 person-years.

**Off-Site Employment Forecast** -- In addition to on-site job requirements, there is a reasonable expectation of related off-site job creation associated with the future construction of the proposed project. Off-site jobs might potentially include work relating to office and administrative matters, construction material suppliers, and transportation services. In this analysis, the extent of potential off-site job requirement is estimated at 20 percent of the on-site job requirement, or roughly equivalent to an additional 20 to 25 person-years.

**Total Construction Period Employment Forecast** -- The sum of the on-site and off-site job requirement estimates represents our short-term employment forecast for the proposed subject project during its anticipated construction period of development. Our on-site job requirement forecast ranges from 100 to 125 person-years, and our off-site job requirement forecast ranges from 20 to 25 person-years. Therefore, based on the analysis outlined within Table IV-1, the total short-term employment forecast for the Proposed Tropic Land LLC Industrial Park is estimated at 120 to 150 person-years.

**B. Stabilized Operational Employment Forecast**

Our long-term employment forecast for the Proposed Tropic Land LLC Industrial Park development under an assumed operational status at stabilized capacity is also presented within Table IV-1. As shown in Table IV-1, the total long-term employment impact associated with the proposed subject project on a stabilized operational basis is forecast to range from 840 to 1,260 jobs. An explanation of this employment forecast is presented within the following paragraphs.

Our stabilized operational employment forecast for the Proposed Tropic Land Industrial Park is equal to the sum of all direct, indirect, and induced job creation effects attributable to the project. Direct job creation is generally synonymous with primary, on-site employment generated by businesses operating or based at the proposed industrial park. Indirect job creation is associated with a secondary level of jobs generated as a result of the purchases of goods and services by businesses operating at the proposed industrial park. Induced job creation is associated with a tertiary level of jobs generated as a result of the purchases of goods and services from the personal incomes of people whose jobs are either directly or indirectly created by the operation of the proposed industrial park.

**Direct Jobs Forecast** -- The number of direct jobs created by the proposed project is forecast at 560 to 840 full-time jobs. Our direct job forecast is based on the project's estimated amount of developed industrial land multiplied by a factor expressed as the average number of employees per land area.

The project's total amount of developed industrial land is estimated at 70 acres based on the conceptual development plan of 35 subdivision lots with an average lot size of two acres. Our selected factor, or ratio, of the average number of employees per acre ranges from 8 to 12 employees per acre.

Eight jobs, or employees, per acre equates to an average land use ratio of approximately 5,500 square feet per employee. At a ratio of eight employees/jobs per acre, the forecasted number of direct jobs created by the project is 560. Twelve jobs, or employees, per acre equates to an average land use ratio of approximately 3,600 square feet per employee. At a ratio of twelve employees/jobs per acre, the forecasted number of direct jobs created by the project is 840.

It should be noted, the estimated range of forecasted direct employment is necessarily subjective in nature given the preliminary concept of the proposed development. If the Proposed Tropic Land LLC Industrial Park were to attract a proportionately higher concentration of land-intensive industrial activities, the effective ratio of the average number of employees per acre would be relatively low. Conversely, if the Proposed Tropic Land LLC Industrial Park were to attract a proportionately higher concentration of labor-intensive industrial activities, the effective ratio of the average number of employees per acre would be relatively

high. At this preliminary stage of the development process, the possible character of the future tenant mix at the proposed project remains open to wide speculation.

**Indirect and Induced Jobs Creation** -- The basis for forecasting indirect and induced employment effects associated with the proposed subject project are industry-specific employment multipliers reported within the 2002 State Input-Output Study, published by the State Department of Business Economic Development and Tourism (DBEDT) in June 2006. The following excerpt from the 2002 State Input-Output Study provides a brief description of the general nature of multiplier factors derived from the study.

“Multipliers are derived based on direct and indirect effects arising from an exogenous change in an industry’s final demand. The direct effect measures the initial effect attributable to the exogenous change, while the indirect effect measures the subsequent intra-and inter-industry purchases of inputs as a result of the initial change in output of the directly affected industry. If earnings and personal consumption expenditures (PCEs) are also included in the model as an additional endogenous sector, the resultant multipliers can measure the effects of demand changes on household spending (PCEs) that result from changes in earnings through direct and indirect effects. These additional effects are known as the induced effects.” [Page 14]

As shown in Table IV-1, the employment multiplier utilized in this analysis of the proposed subject project is 1.50. The concept of this selected multiplier mimics that of the Type II multipliers reported within the 2002 State Input-Output Study. Type II multipliers take into account the combined impact of both indirect effects and induced effects. The following industry-specific, Type II multipliers are reported in Table 2.4 of the 2002 State Input-Output Study: Mining and Construction - 2.44; Other Manufacturing - 2.36; Transportation - 2.55; Wholesale Trade - 1.96.

**Total Operational Employment Forecast** -- We have selected a comparatively lower employment multiplier factor of 1.5 based on a belief that a significant proportion of potential businesses operating at the subject project might well be pre-existing entities that will have relocated to the subject site from other areas of the Island of Oahu. The forecasted range of direct jobs created by the subject project on an assumed stabilized operational basis is 560 to 840 jobs. Therefore, based on an employment multiplier of 1.5, the total long-term employment forecast for the Proposed Tropic Land LLC Industrial Park is estimated at 840 to 1,260 jobs, including forecasted direct, indirect, and induced employment effects.

**V. LIMITING CONDITIONS AND ASSUMPTIONS**

The following conditions and assumptions embodied in this report constitute the framework of our analysis and conclusions.

- This appraisal is based upon the condition of the national economy and the purchasing power of the dollar as of the date of the appraisal report.
- This report expresses the opinion of the signers as of the date of the report; in no way has it been contingent upon the reporting of specified values or findings.
- The appraisers have extensive experience in the valuation of proposed subdivision development properties and are considered competent to undertake and complete this appraisal assignment. A summary of the appraisers' qualifications is included in the Addenda of this report.
- It is assumed that the subject property is free and clear of any and all encumbrances other than those referred to herein, and no responsibility is assumed for matters of a legal nature. This report is not to be construed as rendering any opinion of title, which is assumed to be good and marketable. Responsible ownership and competent management of the subject property is also assumed, unless otherwise stated within the report.
- It is assumed that any existing or proposed uses of the subject property's land and improvements will occur within the legal boundaries or property lines of the subject property and that no encroachment or trespass exists, now or in the future, unless otherwise stated within the report.
- It is assumed that any and all required licenses, certificates of occupancy and/or other legislative or administrative authorizations relating to any existing or proposed uses of the subject property upon which our value conclusion is based will be obtained readily from the appropriate local, state, or federal government agencies, private institutions, or other organizational entities that exercise jurisdiction over these types of licensing and administrative matters.
- Any maps or plot plans reproduced and included in this report are intended only for the purpose of showing spatial relationships. These maps do not necessarily represent measured surveys or measured maps, and the appraiser is not responsible for the possible existence of any topographic or surveying errors within such maps. No engineering tests were furnished, and, therefore, no liability is assumed for the soil conditions, bearing capacity of the subsoil or building engineering matters relating to the subject property.
- Information provided by informed local sources such as governmental agencies, financial institutions, realtors, buyers, sellers and others, was interpreted in the manner in which it was supplied and, whenever possible or practical, was checked and verified by secondary means. However, no responsibility is assumed for any possible misinformation contained in these sources of information.

- The presence of hazardous wastes or toxic materials such as underground storage tanks, asbestos, urea-formaldehyde foam insulation or other potentially harmful substances may have an adverse affect on the value of a given property. The value conclusions reported herein are predicated on the assumption that there is no such hazardous material on or in the subject property that would result in this type of loss in value. No responsibility is assumed for any potentially adverse environmental conditions or for the lack of any expertise or engineering knowledge required to discover such conditions.
- The appraisers are not required to give testimony or appear in court because of having made this appraisal unless arrangements for the appearance and the fee for such appearance have been agreed upon by the person or corporation requiring such testimony.
- The appraisers' prior written consent and approval must be obtained in the event that the appraisal report should be conveyed by anyone to the public through advertising, public relations, news, sales, or other media.
- The appraisers will not disclose the contents of the appraisal report except as provided for in the Uniform Standards of Professional Appraisal Practice.



**VI. CERTIFICATION**

The undersigned hereby certifies that, to the best of their knowledge and belief:

- The statements of fact contained in this report are true and correct.
- The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are our personal, impartial and unbiased professional analyses, opinions, and conclusions.
- We have no present or prospective interest in the property that is the subject of this report, and have no personal interest with respect to the parties involved.
- We have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
- Our engagement in this assignment was not contingent upon developing or reporting predetermined results.
- Our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, which include the Uniform Standards of Professional Appraisal Practice (USPAP).
- Robert R. Braig, MAI, SRA and Ricky P. Minn have conducted a personal inspection of the property that is the subject of this report.
- No one provided significant real property appraisal assistance to the person signing this certification.
- As of the date of this report Robert R. Braig, MAI, SRA has completed the requirements of the continuing education program of the Appraisal Institute.
- The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.

April 3, 2008

Robert R. Braig, MAI, SRA  
State Certified General Appraiser CGA-149  
Certificate Expires: December 31, 2009

/7371

Ricky P. Minn

**Table III-1****YEAR-END 2007 OAHU INDUSTRIAL MARKET STATISTICS**

<b>Area/Location</b>	<b>Number of Buildings</b>	<b>Building Area (Sq. Ft.)</b>	<b>Available Space (Sq. Ft.)</b>	<b>YTD Absorption (Sq. Ft.)</b>	<b>Vacancy Rate</b>
Kalihi/Sand Island	668	8,471,116	332,249	(147,899)	3.92%
Kapalama Military Reserve	19	1,250,000	-	-	0.00%
Iwilei	92	2,433,603	21,389	77,883	0.88%
Airport/Mapunapuna	209	8,261,305	67,427	(41,360)	0.82%
Bougainville/Halawa	104	3,231,187	166,645	(24,024)	5.16%
Pearl City/Pearl City Industrial/Aiea	70	2,276,137	56,380	(24,554)	2.48%
Waipahu/Milltown	113	2,355,845	86,501	(2,078)	3.67%
Gentry Business Park	64	1,523,125	9,395	(6,041)	0.62%
Campbell Industrial Park/Kapolei Business Park	251	5,605,778	335,318	(87,120)	5.98%
Kailua	37	467,164	3,200	(3,200)	0.68%
Kaneohe	41	512,187	16,452	(10,804)	3.21%
<b>TOTALS</b>	<b>1,668</b>	<b>36,387,447</b>	<b>1,094,956</b>	<b>(269,197)</b>	<b>3.01%</b>

Source: Colliers Monroe Friedlander, 2007.

**Table III-2****EXISTING LAND USE MAP CATEGORIES FOR THE  
WAIANAE DEVELOPMENT PLAN AREA AS OF 1997**

<b>Land Use Categories</b>	<b>Acreage</b>	<b>Commercial/ % of Total</b>	<b>Vacant Acres 1996</b>
Single-Family Residential	1,991	5.23%	652
Low-Density Apartment	5	0.01%	-
Medium-Density Apartment	70	0.18%	-
Commercial	85	0.22%	13
Industrial	49	0.13%	15
Resort	92	0.24%	26
Agriculture	8,777	23.04%	5,318
Public & Quasi-Public	531	1.39%	-
Parks & Recreation	492	1.29%	-
Golf Courses	582	1.53%	242
Preservation	12,148	31.89%	-
Military	13,036	34.23%	-
Undesignated	231	0.61%	-
<b>TOTALS</b>	<b>38,089</b>	<b>100.00%</b>	
Source: Department of Planning and Permitting (DPP), Waianae Sustainable Communities Plan, July 2000.			

**Table III-3****TOTAL ACREAGE OF VACANT LAND BY COUNTY ZONING AND GEOGRAPHIC PLANNING AREA AS OF 2004**

	<b>Residential</b>	<b>Commercial/ Industrial</b>	<b>Agricultural</b>	<b>Mixed Use</b>	<b>Resort</b>	<b>Conservation</b>	<b>Other</b>
<b>City and County of Honolulu/ Island of Oahu</b>	<b>3,591</b>	<b>1,280</b>	<b>3,734</b>	<b>345</b>	<b>312</b>	<b>3,399</b>	<b>6,718</b>
Primary Urban Center	279	280	26	31	-	126	1,038
Ewa	1,506	689	2,150	314	101	865	5,447
Central Oahu	1,109	311	677	-	-	766	210
East Honolulu	98	-	-	-	-	351	-
Koolaupoko	187	-	214	-	-	647	23
Koolauloa	37	-	82	-	167	378	-
North Shore	13	-	194	-	-	53	-
Waianae	362	-	391	-	44	213	-

Source: State Office of Planning, DBEDT, Report On Urban Lands In The State Of Hawaii, Part I: Supply Of Urban Lands, May 2006.

Table III-4

**SELECTED ECONOMIC CHARACTERISTICS: 2004**  
**NEIGHBORHOOD AREA 24: WAIANAE COAST**

	<b>Number</b>	<b>Percent</b>
<b><u>EMPLOYMENT STATUS</u></b>		
<b>Population 16 Years and Over</b>	<b>29,444</b>	<b>100.0</b>
In Labor Force	17,353	58.9
Civilian Labor Force	17,137	58.2
Employed	14,580	49.5
Unemployed	2,557	8.7
(Percent of Civilian Labor Force)	(14.9)	
Armed Forces	216	0.7
Not in Labor Force	12,091	41.1
<b><u>COMMUTING TO WORK</u></b>		
<b>Workers 16 Years and Over</b>	<b>14,314</b>	<b>100.0</b>
Car, Truck, or Van -- Drove Alone	8,321	58.1
Car, Truck, or Van -- Carpooled	3,663	25.6
Public Transportation (Including Taxicab)	1,276	8.9
Walked	438	3.1
Other Means	313	2.2
Worked at Home	303	2.1
Mean Travel Time to Work, In Minutes	41.9	
<b><u>EMPLOYED CIVILIAN POPULATION</u></b>		
<b>16 YEARS AND OVER:</b>	<b>14,580</b>	<b>100.0</b>
<b><u>OCCUPATION</u></b>		
Management, Professional, and Related Occupations	3,183	21.8
Service Occupations	3,205	22.0
Sales and Office Occupations	3,898	26.7
Farming, Fishing, and Forestry Occupations	221	1.5
Construction, Extraction, and Maintenance Occupations	1,893	13.0
Production, Transportation, and Material Moving Occupations	2,180	15.0
<b><u>INDUSTRY</u></b>		
Agriculture, Forestry, Fishing and Hunting, and Mining	404	2.8
Construction	1,250	8.6
Manufacturing	654	4.5
Wholesale Trade	633	4.3
Retail Trade	1,921	13.2
Transportation and Warehousing, and Utilities	1,293	8.9
Information	196	1.3
Finance, Insurance, Real Estate, and Rental and Leasing	778	5.3
Professional, Scientific, Management, Administrative, and Waste Management Services	1,327	9.1
Educational, Health and Social Services	2,587	17.7
Arts, Entertainment, Recreation, Accommodation and Food Service	1,797	12.3
Other Services (Except Public Administration)	685	4.7
Public Administration	1,055	7.2

Source: DPP, Year 2000 Community Profiles (2000 U.S. Census Data).

Table III-5

**FORECASTED RESIDENT POPULATION AND JOBS BY SECTOR  
FOR THE CITY AND COUNTY OF HONOLULU TO THE YEAR 2035**

	2005	2010	2015	2020	2025	2030	2035
<b><u>Resident Population</u></b>							
Civilians	808,384	835,260	873,630	910,290	945,960	980,620	1,013,250
Military & Dependents	93,651	96,860	100,080	100,080	100,080	100,080	100,080
<b>Total Population, Civilian + Military</b>	<b>902,035</b>	<b>932,120</b>	<b>973,710</b>	<b>1,010,370</b>	<b>1,046,040</b>	<b>1,080,700</b>	<b>1,113,330</b>
	2006	2010	2015	2020	2025	2030	2035
<b><u>Jobs By Sector, Including Self-Employed (1)</u></b>							
Agriculture	5,280	5,380	5,520	5,570	5,600	5,610	5,570
Mining & Construction	31,840	31,850	33,880	33,780	34,570	35,410	36,570
Food Processing	4,490	4,580	4,710	4,770	4,820	4,830	4,830
Other Manufacturing	9,370	9,500	9,780	9,890	10,010	10,060	10,090
Transportation	24,580	25,750	27,470	28,990	30,510	31,990	33,450
Information	10,360	10,740	11,290	11,680	12,090	12,450	12,810
Utilities	1,820	1,890	2,000	2,070	2,160	2,240	2,310
Wholesale Trade	17,910	18,590	19,700	20,480	21,370	22,250	23,130
Retail Trade	62,290	64,380	67,430	69,350	71,380	73,230	74,860
Finance & Insurance	22,040	22,910	24,170	25,080	26,000	26,860	27,640
Real Estate & Rentals	28,900	30,080	31,680	32,790	33,880	34,850	35,670
Professional Services	34,510	37,050	40,920	44,700	49,170	54,070	59,670
Business Services	50,090	53,950	59,710	65,320	71,660	78,640	86,340
Educational Services	14,570	15,470	16,750	17,890	19,120	20,400	21,730
Health Services	53,840	57,390	62,370	66,840	71,740	76,890	82,260
Arts & Entertainment	12,800	13,600	14,720	15,740	16,810	17,910	19,030
Hotels	14,480	14,880	15,380	15,770	16,010	16,130	16,140
Eating & Drinking	41,140	42,920	45,370	47,350	49,340	51,250	53,090
Other Services	35,540	37,840	41,120	44,040	47,230	50,570	54,040
Government	101,840	105,200	109,740	113,490	117,320	121,060	124,620
<b>Total Jobs, Wage &amp; Salary + Self-Employed (2)</b>	<b>577,640</b>	<b>603,910</b>	<b>643,670</b>	<b>675,560</b>	<b>710,790</b>	<b>746,660</b>	<b>783,830</b>

(1) Jobs By Sector rounded to the nearest 10.

(2) Total Jobs may not add due to rounding.

Source: Department of Business Economic Development and Tourism (DBEDT), Population and Economic Projections for the State of Hawaii to 2035.

**Table III-6**

**FORECASTED POPULATION AND JOBS BY DEVELOPMENT PLAN (DP) AREA  
FOR THE CITY AND COUNTY OF HONOLULU TO THE YEAR 2030**

	2005	2010	2015	2020	2025	2030
<b><u>POPULATION FORECAST:</u></b>						
<b>City and County of Honolulu</b>	<b>912,913</b>	<b>952,661</b>	<b>995,562</b>	<b>1,037,252</b>	<b>1,078,058</b>	<b>1,117,322</b>
Primary Urban Center	423,621	440,981	452,048	463,335	475,700	487,148
Ewa	84,015	97,111	116,183	137,125	156,302	177,026
Central Oahu	159,018	163,153	170,643	179,833	188,719	195,617
East Honolulu	49,748	52,387	53,436	52,642	51,952	51,304
Koolaupoko	118,763	119,856	121,292	119,567	118,062	116,676
Koolauloa	14,697	15,014	15,422	15,824	16,188	16,516
North Shore	18,395	18,987	19,547	20,035	20,450	20,750
Waianae	44,656	45,172	46,991	48,891	50,685	52,285
<b><u>EMPLOYMENT/JOB FORECAST:</u></b>						
<b>City and County of Honolulu</b>	<b>522,851</b>	<b>545,229</b>	<b>566,862</b>	<b>588,030</b>	<b>610,113</b>	<b>632,711</b>
Primary Urban Center	379,355	391,512	398,747	407,927	417,758	426,591
Ewa	27,542	36,863	48,168	56,209	64,201	73,370
Central Oahu	55,838	55,296	59,090	62,599	66,341	70,031
East Honolulu	6,931	6,907	6,622	6,650	6,676	6,795
Koolaupoko	36,140	36,764	36,792	36,923	37,172	37,498
Koolauloa	5,883	6,480	6,294	6,500	6,684	6,945
North Shore	3,909	4,201	4,208	4,235	4,261	4,355
Waianae	7,253	7,206	6,941	6,987	7,020	7,126

Source: Department of Planning and Permitting (DPP), Socioeconomic Projections, 2000-2030 By Development Plan Area.



**Table III-7**

**FORECASTED JOBS BY EMPLOYMENT CATEGORY TO THE YEAR 2030  
FOR THE CITY AND COUNTY OF HONOLULU AND WAIANAE DP AREA**

	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b><u>City and County of Honolulu</u></b>						
Armed Forces	40,368	40,368	40,370	40,370	40,370	40,370
Public Administration	36,703	37,606	38,601	39,392	40,304	41,282
Hotel	16,795	17,399	17,900	18,500	18,998	19,500
Agriculture	4,627	4,769	4,854	4,945	5,110	5,255
Transportation, Communication, Utilities	39,531	41,599	43,591	45,711	47,816	49,997
Industrial	30,143	31,094	32,052	32,873	33,715	34,636
Construction	25,086	26,187	26,281	26,464	26,975	27,475
Finance, Insurance, Real Estate	33,965	35,611	37,311	38,910	40,603	42,299
Services	201,186	211,296	221,665	231,745	242,163	252,844
Retail	94,447	99,300	104,237	109,120	114,059	119,053
<b>Total Jobs, C &amp; C of Honolulu</b>	<b>522,851</b>	<b>545,229</b>	<b>566,862</b>	<b>588,030</b>	<b>610,113</b>	<b>632,711</b>
<b><u>Waianae Development Plan (DP) Area</u></b>						
Armed Forces	47	47	47	47	47	47
Public Administration	401	401	401	405	414	421
Hotel	26	109	109	109	109	110
Agriculture	534	553	569	581	607	620
Transportation, Communication, Utilities	193	196	208	221	224	234
Industrial	115	115	115	115	115	115
Construction	801	649	356	373	368	443
Finance, Insurance, Real Estate	245	245	245	245	245	245
Services	3,586	3,586	3,586	3,586	3,586	3,586
Retail	1,305	1,305	1,305	1,305	1,305	1,305
<b>Total Jobs, Waianae DP Area</b>	<b>7,253</b>	<b>7,206</b>	<b>6,941</b>	<b>6,987</b>	<b>7,020</b>	<b>7,126</b>

Source: Department of Planning and Permitting (DPP), Socioeconomic Projections, 2000-2030 By Development Plan Area.

Table III-8

**COMPARISON OF POPULATION AND EMPLOYMENT FORECASTS FOR THE  
CITY AND COUNTY OF HONOLULU & WAIANAE DEVELOPMENT PLAN AREA**

Year	2005	2010	2015	2020	2025	2030
<b><u>Resident Population Forecast</u></b>						
<b>City and County of Honolulu (Island of Oahu)</b>	912,913	952,661	995,562	1,037,252	1,078,058	1,117,322
Percent of City & County/Island Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<b>Waianae Development Plan Area</b>	44,656	45,172	46,991	48,891	50,685	52,285
Percent of City & County/Island Total	4.9%	4.7%	4.7%	4.7%	4.7%	4.7%
<b><u>Employment/Job Forecast (Total Jobs)</u></b>						
<b>City and County of Honolulu (Island of Oahu)</b>						
Total Jobs	522,851	545,229	566,862	588,030	610,113	632,711
Percent of City & County/Island Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<b>Waianae Development Plan Area</b>						
Total Jobs	7,253	7,206	6,941	6,987	7,020	7,126
Percent of City & County/Island Total	1.4%	1.3%	1.2%	1.2%	1.2%	1.1%
<b><u>Employment/Job Forecast of Industrial Sector Jobs(1)</u></b>						
<b>City and County of Honolulu (Island of Oahu)</b>						
Industrial Sector Jobs(1)	94,760	98,880	101,924	105,048	108,506	112,108
Percent of City & County/Island Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<b>Waianae Development Plan Area</b>						
Industrial Sector Jobs(1)	1,109	960	679	709	707	792
Percent of City & County/Island Total	1.2%	1.0%	0.7%	0.7%	0.7%	0.7%

(1) Industrial Sector Jobs include all jobs within the following DPP employment categories: Transportation, Communications, Utilities; Industrial; and Construction.

Source: Department of Planning and Permitting (DPP), Socioeconomic Projections, 2000-2030 By Development Plan Area.

Table III-9

**INDUSTRIAL LAND USE DEMAND FORECASTS, 2005-2030**  
**Proposed Tropic Land LLC Industrial Park**  
**Lualualei, Waianae, Island of Oahu**

Year	2005	2010	2015	2020	2025	2030
<b><u>Industrial Land Use Demand Forecast -- Employment Model</u></b>						
<b>City and County of Honolulu (Island of Oahu)</b>						
Industrial Sector Job Forecast	94,760	98,880	101,924	105,048	108,506	112,108
Land Use Conversion Factor (Land Area Per Employee/Job)	2,500 SF/Job	2,500 SF/Job	2,500 SF/Job	2,500 SF/Job	2,500 SF/Job	2,500 SF/Job
Industrial Land Use Demand (Acres)	5,438	5,675	5,850	6,029	6,227	6,434
Cumulative Additional Land Use Demand (Acres)	-	236	411	590	789	996
<b>Waianae Development Plan Area</b>						
Modified Industrial Job Forecast @ 2.0% of Island of Oahu	1,109	1,978	2,038	2,101	2,170	2,242
Land Use Conversion Factor (Land Area Per Employee/Job)	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job
Industrial Land Use Demand (Acres)	127	227	234	241	249	257
<b><i>Cumulative Additional Land Use Demand (Acres) HIGH END</i></b>	<b>-</b>	<b>100</b>	<b>107</b>	<b>114</b>	<b>122</b>	<b>130</b>
<b>Waianae Development Plan Area</b>						
Modified Industrial Job Forecast @ 1.7% of Island of Oahu	1,109	1,681	1,733	1,786	1,845	1,906
Land Use Conversion Factor (Land Area Per Employee/Job)	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job
Industrial Land Use Demand (Acres)	127	193	199	205	212	219
<b><i>Cumulative Additional Land Use Demand (Acres) MID-RANGE</i></b>	<b>-</b>	<b>66</b>	<b>72</b>	<b>78</b>	<b>85</b>	<b>92</b>
<b>Waianae Development Plan Area</b>						
Modified Industrial Job Forecast @ 1.5% of Island of Oahu	1,109	1,483	1,529	1,576	1,628	1,682
Land Use Conversion Factor (Land Area Per Employee/Job)	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job	5,000 SF/Job
Industrial Land Use Demand (Acres)	127	170	176	181	187	193
<b><i>Cumulative Additional Land Use Demand (Acres) LOW END</i></b>	<b>-</b>	<b>43</b>	<b>49</b>	<b>54</b>	<b>60</b>	<b>66</b>

Source: Hastings, Conboy, Braig & Associates, Ltd., March 2008.

Table IV-1

**SHORT-TERM AND LONG-TERM EMPLOYMENT FORECASTS**  
**Proposed Tropic Land LLC Industrial Park**  
**Lualualei, Waianae, Island of Oahu**

<b>Short-Term, Interim Forecast (15-Month Construction Period):</b>	<b>Low</b>		<b>High</b>	
Average Number of On-Site Jobs/Workers	80	to	100	Persons
Multiplied by Length of Construction Period, In Years	<u>x 1.25</u>		<u>x 1.25</u>	
Equals Number of Person-Years	100.0	to	125.0	Person-Years
<b>On-Site Job Requirement, In Person-Years</b>	<b>100.0</b>	<b>to</b>	<b>125.0</b>	<b>Person-Years</b>
<b>Plus Off-Site Job Requirement @ 20%</b>	<b><u>20.0</u></b>	<b>to</b>	<b><u>25.0</u></b>	<b>Person-Years</b>
<b>Total Short-Term Employment Forecast</b>	<b>120.0</b>	<b>to</b>	<b>150.0</b>	<b>Person-Years</b>
<b>Long-Term, Stabilized Operational Forecast:</b>	<b>Low</b>		<b>High</b>	
Amount of Developed Industrial Land, In Acres	70		70	Acres
Multiplied by Number of Employees/Jobs Per Acre	<u>x 8</u>	to	<u>x 12</u>	Jobs Per Acre
Equals Number of Direct Jobs Created (On-Site)	560	to	840	Jobs
<b>Direct Jobs Created (On-Site)</b>	<b>560</b>	<b>to</b>	<b>840</b>	<b>Jobs</b>
<b>Employment Multiplier (Indirect and Induced Job Creation)</b>	<b><u>x 1.50</u></b>		<b><u>x 1.50</u></b>	
<b>Total Long-Term Employment Forecast</b>	<b>840</b>	<b>to</b>	<b>1,260</b>	<b>Jobs</b>

Source: Hastings, Conboy, Braig & Associates, Ltd., March 2008.

## **APPENDIX C**

Agricultural Feasibility Report, TMK 8-7-009: 002, Nanakuli, Oahu,  
Hawaii. John J. McHugh, Jr. Ph.D., May 2008

**Agricultural Feasibility Report**  
**TMK 8-7-009-002**  
**Nanakuli, Oahu, Hawaii**

**Prepared for**

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**May 2, 2008**

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## INTRODUCTION

This Agricultural Feasibility Report relates to TMK 8-7-009-002 located in Nanakuli on the island of Oahu, hereafter referred to as the “Property”. The purpose of this report is to demonstrate that the property is unsuitable for agricultural uses. The Property consists of a total of 236.154 acres and is bounded by land zoned to a combination of preservation and agriculture. The Property has not been actively used for many years and is overgrown with non-native trees, shrubs, and grasses.

## PROPERTY DESCRIPTION

The Property is located in West Oahu, to the east of Farrington Highway in Nanakuli with frontage along Lualualei Naval Road (**ATTACHMENT A**). This Property is identified as TMK 8-7-009-002 and consists of a total of 236.154 acres.

### 1. Land Use Classification

The Property is within an area zoned P-2 General Preservation by the City and County of Honolulu and includes land also zoned P-1 Restricted Preservation.

### 2. Existing Uses and Site Conditions

The Property is undeveloped and not currently being used for agriculture. It is overgrown with non-native trees, shrubs, and grasses. There are no improvements on the Property. Much of the Property is heavily sloped with a gradient rise of over 70% in some sections. The lowest sections of the Property contain slopes of greater than 10%. Rainfall in the area is less than 20 inches annually which makes it difficult to graze animals without the use of expensive irrigation water.

### 3. Soil Analysis (**ATTACHMENT B**)

Half of the Property is Lualualei extremely stony clay soil (LPE) which is characterized by slopes of 3 to 35%. In most places the soil is moderately sloping to steep. Erosion hazard is moderate to severe. The natural vegetation consists of kiawe, haole koa, guinea grass, bristly foxtail, and swollen fingergrass. The LPE soil has a Capability Classification of VIIIs which has very severe limitations rendering it unsuitable for cultivation because of unfavorable texture as well as being extremely stony or rocky.

Approximately 30% of the Property is considered to be Rock Land (rRK) with slopes of 5 to 70%. This soil type contains areas where exposed rock covers 25 to 90% of the surface. Rock outcrops and very shallow soils are the main characteristics. The land is nearly level to very steep. Natural vegetation at the elevation of the Property consists of kiawe, Japanese tea, koa haole, and guinea grass. A total of 80% of the Property is unusable for any type of agriculture because of the presence of the two dominant soil types.

The remainder of the soil is composed of 15% Lualualei clay (LuB) which has a slope of 2 to 6%, Lualualei clay of 0% slope (LuA) which makes up 2% of the

overall soil component, and Pulehu very stony clay loam (PvC), with slopes of 0 to 12%, comprises the remaining 3% of the total soil on the Property.

LuA and LuB soils, if not irrigated, have a Capability Classification of VIs which has extreme limitations that make them generally unsuited to cultivation and have a stony or rocky texture. If irrigated, the Capability Classification improves to IIIs for the LuA soil and IIle for the LuB. Class III soils can have severe limitations that reduce the choice of crop plants. IIIs soils are challenged because of stoniness and/or unfavorable texture, resulting in poor water holding capacity, while IIle soils are subject to severe erosion if cultivated and not protected. PvC soils have a Capability Classification of IVs which has very severe limitations that also can reduce the choice of crop plants, require very careful management, and are stony, shallow with unfavorable texture, and have low water holding capacity coupled with severe shrink/swell characteristics. Irrigation does not improve the Capability Classification of PvC soil.

Because of the high percentage of rocks, stony ground, poor soil texture, low water holding capacity, severe shrink/swell properties, steep slope, and severe erosion hazard agricultural options for the Property are extremely limited.

#### **4. Slope Conditions (ATTACHMENT C)**

The side of the Property that abuts Lualualei Naval Rd is about 60 to 80 feet above sea level. From that location the land rises slowly at first to 90 feet and then abruptly exceeds a 10% rise in gradient. The highest point on the property is approximately 1,870 feet above sea level in the southern corner of the lot.

#### **LAND CLASSIFICATION AND CROP PRODUCTIVITY RATINGS BY THE LAND STUDY BUREAU, UNIVERSITY OF HAWAII (ATTACHMENTS D)**

The Property has an overall agricultural productivity rating of E, as determined by the University of Hawaii Land Study Bureau, on 80% of the area. In general, the soils in their native state have serious limitations relative to agricultural productivity. Because much of the parcel is stony, agricultural options for the Property, without amendment or modification, are considered to be minimal. That portion of the Property with an overall agricultural productivity rating of B is accorded that rating if it is irrigated. The limitations of that particular piece, without irrigation, have been addressed in the preceding section.

#### **LAND AS RATED UNDER THE ALISH SYSTEM (ATTACHMENT E & F)**

Maps detailing Agricultural Lands of Importance to the State of Hawaii (ALISH) were first created in 1977 and was a joint effort between the USDA – Soil Conservation Source (now know as the Natural Resource Conservation Services – NRCS) and the College of Tropical Agriculture and Human Resources (CTAHR) at the University of Hawaii. Land was broken down into 4 categories: 0 = Unclassified, 1 = Prime

Agricultural Lands, 2 = Unique Lands, 3 = Other Lands  
([http://www.hawaii.gov/dbedt/gis/data/alish\\_n83.txt](http://www.hawaii.gov/dbedt/gis/data/alish_n83.txt) ).

The ALISH classification system was devised to identify lands which were agriculturally important with the intention of providing a break down of type of agricultural lands based on soil characteristics, establishing a process for classifying the lands, and ultimately identifying those lands which met specific criteria for their respective classes. Those lands that were not considered for designation of agricultural status were: developed urban land; natural or artificial bodies of water over 10 acres in size; forest reserves; public use lands such as parks; lands with slopes in excess of 35%; and military installations. The classification of any land to important agricultural status does not constitute a specific land use for that designation. The main objective for the process was to identify those lands for planning purposes.

A designation of Prime Agricultural Lands (PAL) is associated for those areas that are best suited for the production of food, feed, forage, and fiber. Soil quality, moisture (or availability of water), and length of growing season needed to obtain high yields were considered in PAL determination. Specific criteria used to evaluate land for PAL use include: soils with a good moisture holding capacity and good drainage; land with accessible water supply for irrigation purposes where the quality of the water is also appropriate for crop production; a very narrow range in variation of soil temperature between the warmest and coldest times of the year (less than 9°F) and with a minimum temperature of 47°F; soil chemistry, as expressed by pH, between 4.5 and 8.4 within 40 inches of the soil surface; soil with a water table far enough below the surface that it would not encroach on the crop root zone; soil that does not have a high sodium or salt content within a 40 inch root zone; soils that are not subject to frequent and regular flooding (less often than one every 2 years); soils without a serious erosion hazard; soil with a water permeability rate of at least 0.06 inches per hour; less than 10% of the soil surface layer consists of rock or stone fragments greater than 3 inches; soils must be stable (not subject to sliding).

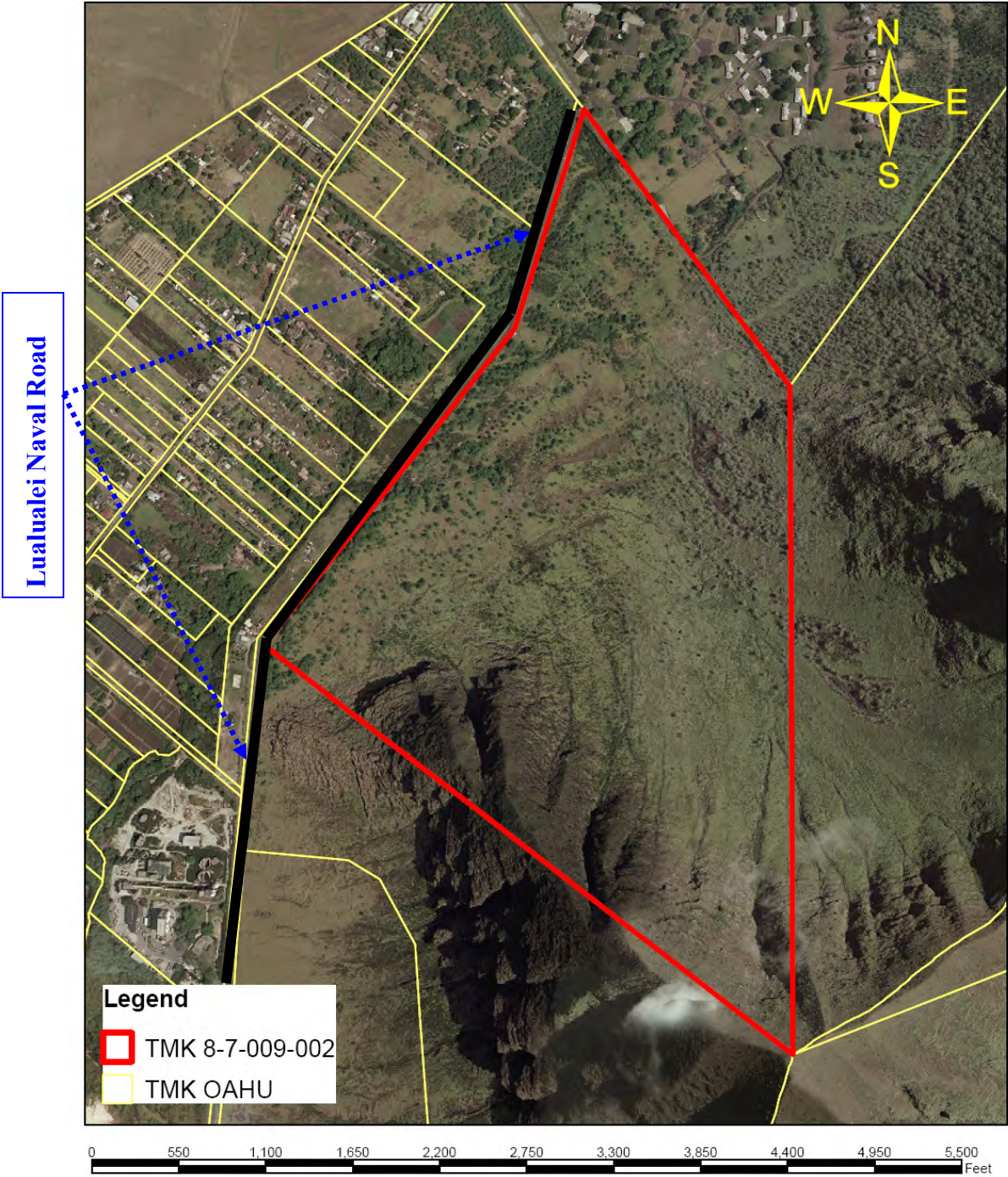
The Unique Agricultural Land (UAL) designation applies to those lands other than PAL which are used for production of specific high value crops such as coffee, taro, rice, and watercress. UAL lands have a special combination of soil quality, growing season, sunlight, elevation, moisture supply, temperature, and nearness to market place such that the year round production of specific commodities can remain unabated. Other Important Agricultural Land (OIAL) is land other than PAL and UAL on which agricultural crops can be farmed but they may be subjected to frequent flooding, drought, excessive rainy season moisture, or has slopes in excess of 35°. Inadequate moisture supply could include OIAL lands which might otherwise be considered to be PAL. However, these lands could be brought into productive agricultural use if an irrigation source is available. Generally OIAL may require additional inputs and management intensity beyond those required for farming PAL. Some of those additional inputs may include additional fertilizer, erosion control measures, improved drainage, flood protection and produce fair to good crops if managed properly.

The LuA, LuB, and PVC soils combine to form that portion of the property (approximately 17%) that is considered to be Other Ag Lands under the ALISH system (**ATTACHMENT F**). These soils have serious agricultural limitations as described under the Soil Analysis portion of this report. Their use for agriculture is further limited by the availability of affordable irrigation water. Water availability for new agricultural land on the leeward coast of Oahu is extremely limited and expensive (currently at \$2.46/1,000 gallons for the first 13,000 gallons and \$1.05/1,000 gallons for any amount over 13,000 gallons) and thus is not considered to be economically viable for agriculture because of the availability of large tracts of agricultural land located in Kunia (4,000 acres+), Waialua, and Wahiawa where agricultural water rates range from \$0.41 to \$0.55/1,000 gallons and land is plentiful.

## **CONCLUSION**

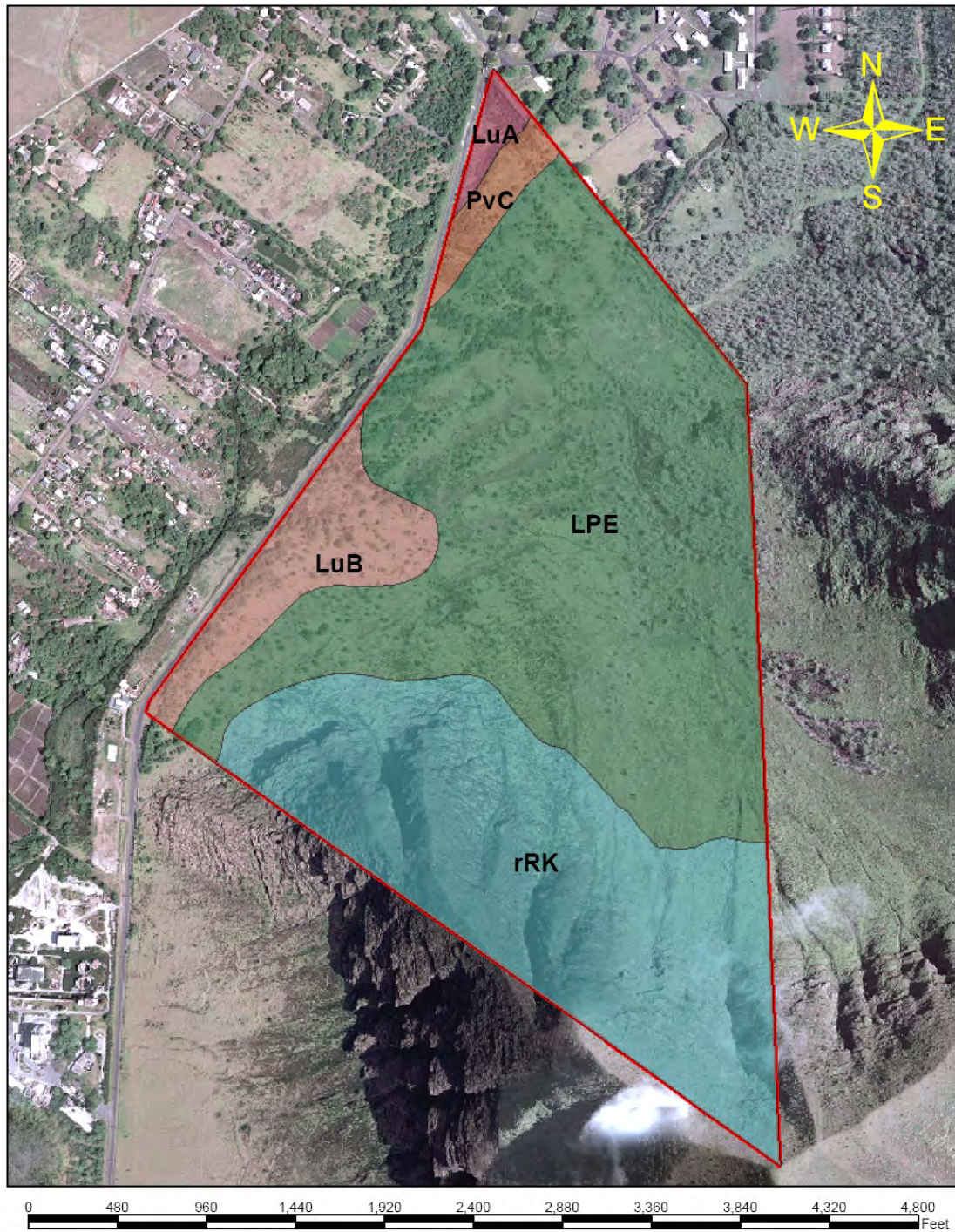
The overall poor condition of the soil combined with topography and the lack of affordable irrigation water makes this Property poorly suited for agricultural operations. To bring the more agriculturally suitable 17% of the Property into agricultural use would require water resources which are not readily available to new agricultural operations on the leeward coast of Oahu. For the approximately 40 acres of farmable land the water requirement, in the hot and dry climate of Nanakuli, would be 5,400 gallons per acre a day using drip irrigation technology. This amounts to a water demand for crops grown on those acres of 216,000 gallons per day. This type of water consumption would be difficult to provide which further renders the property unsuitable to agricultural production. The combination of poor soil conditions and high water requirement would make it unlikely that any prospective farming operators would consider this property for active agriculture. Currently much more favorable options are available including several thousand acres of James Campbell Company land in Kunia recently sold to various agricultural businesses, Dole land in Wahiawa and Waialua, and the Galbraith Estate property in Wahiawa which have more affordable irrigation water options than are present on the leeward coast of Oahu.

**ATTACHMENT A – Property Location**



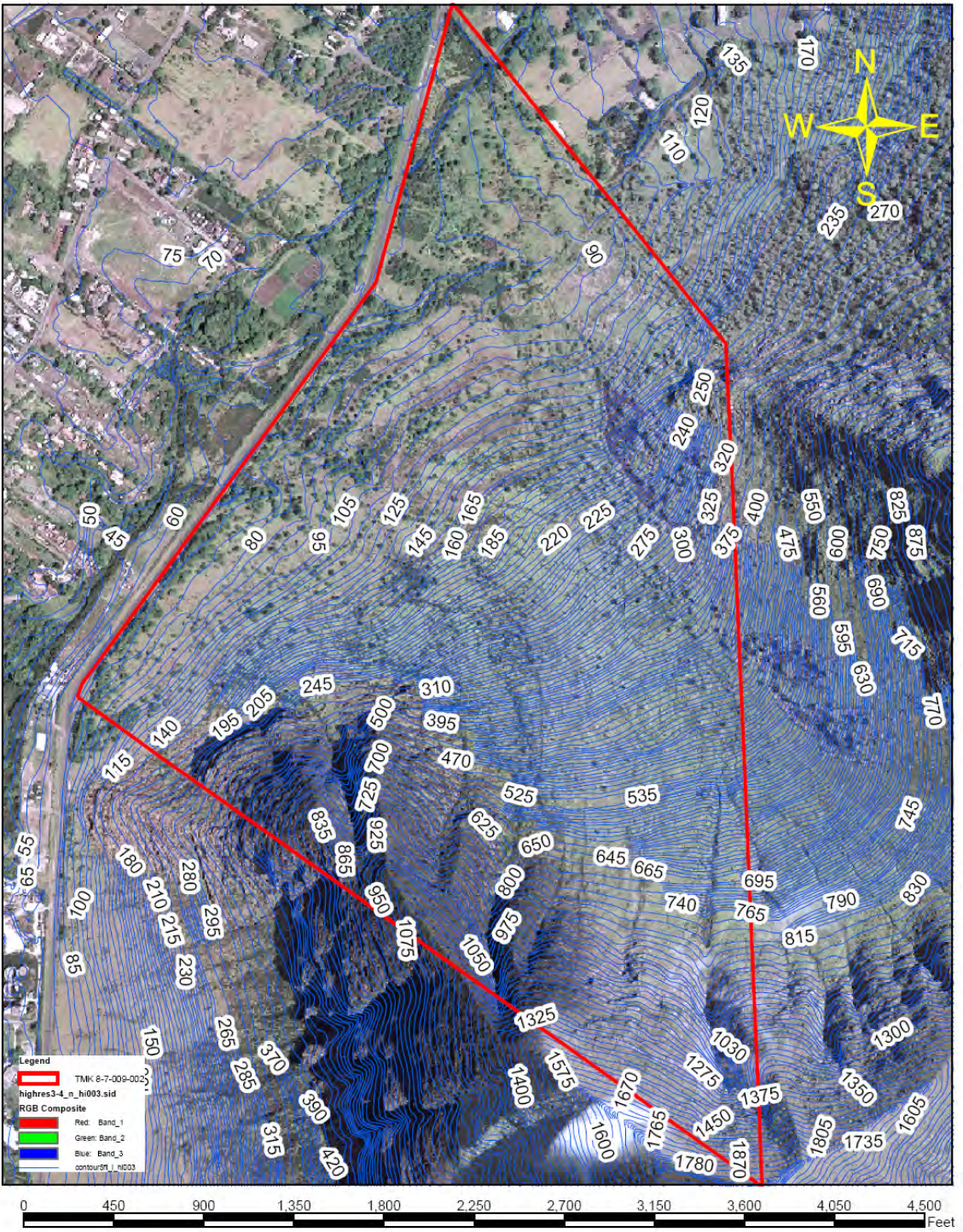


**ATTACHMENT B – Soil Map**



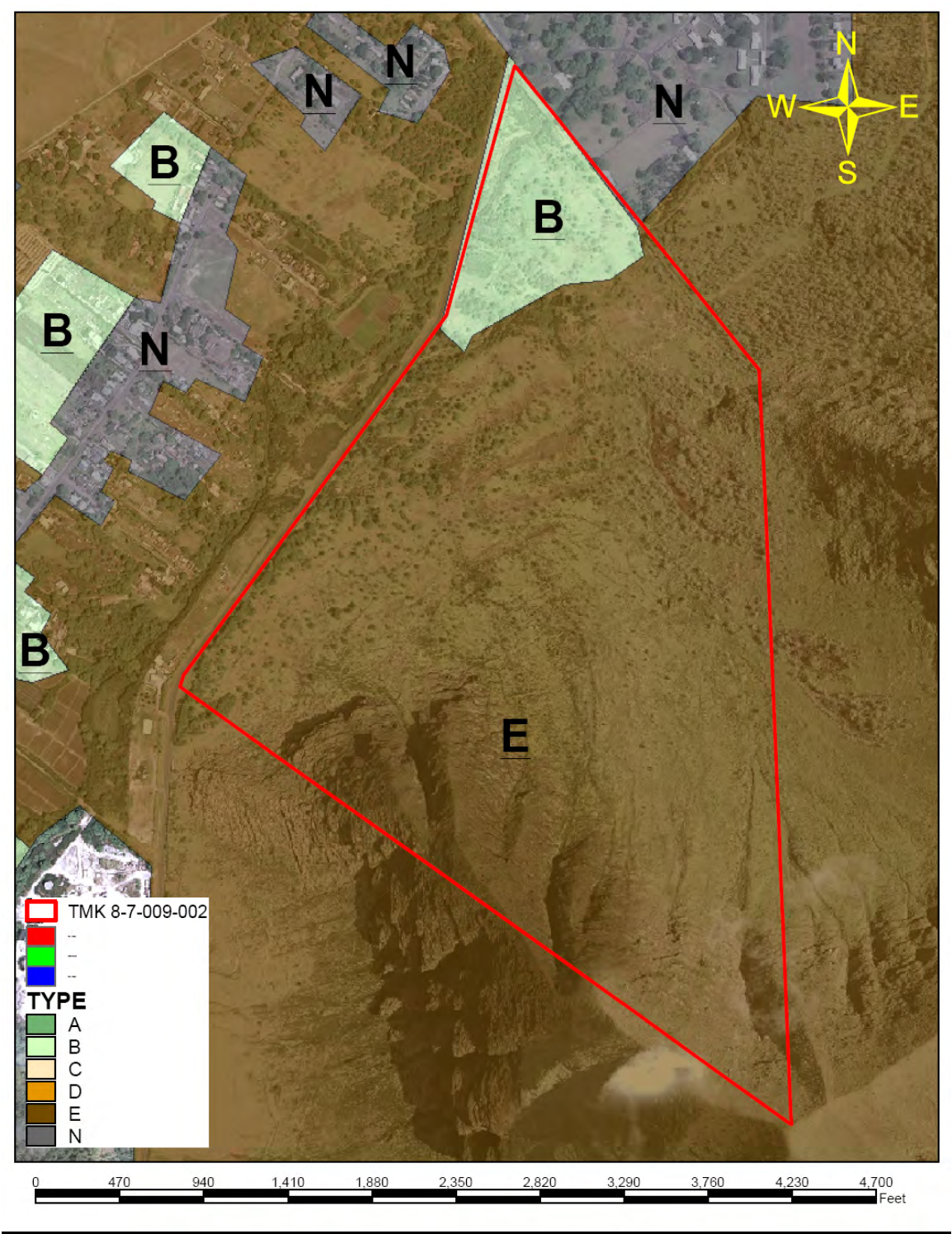


**ATTACHMENT C – Topographical Map (5 ft. contour)**

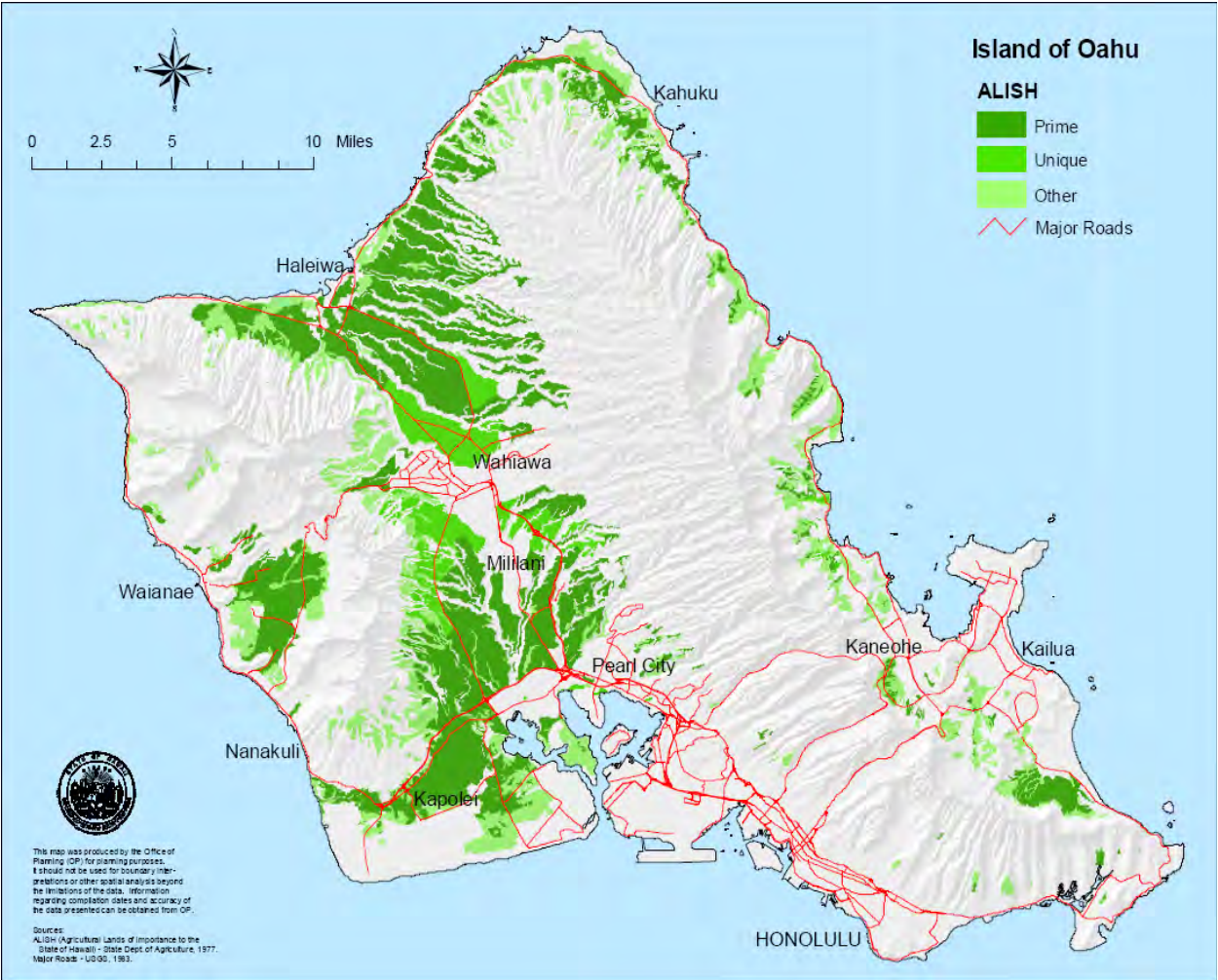




**ATTACHMENT D – Land Study Bureau Productivity Rating for Subject Property**

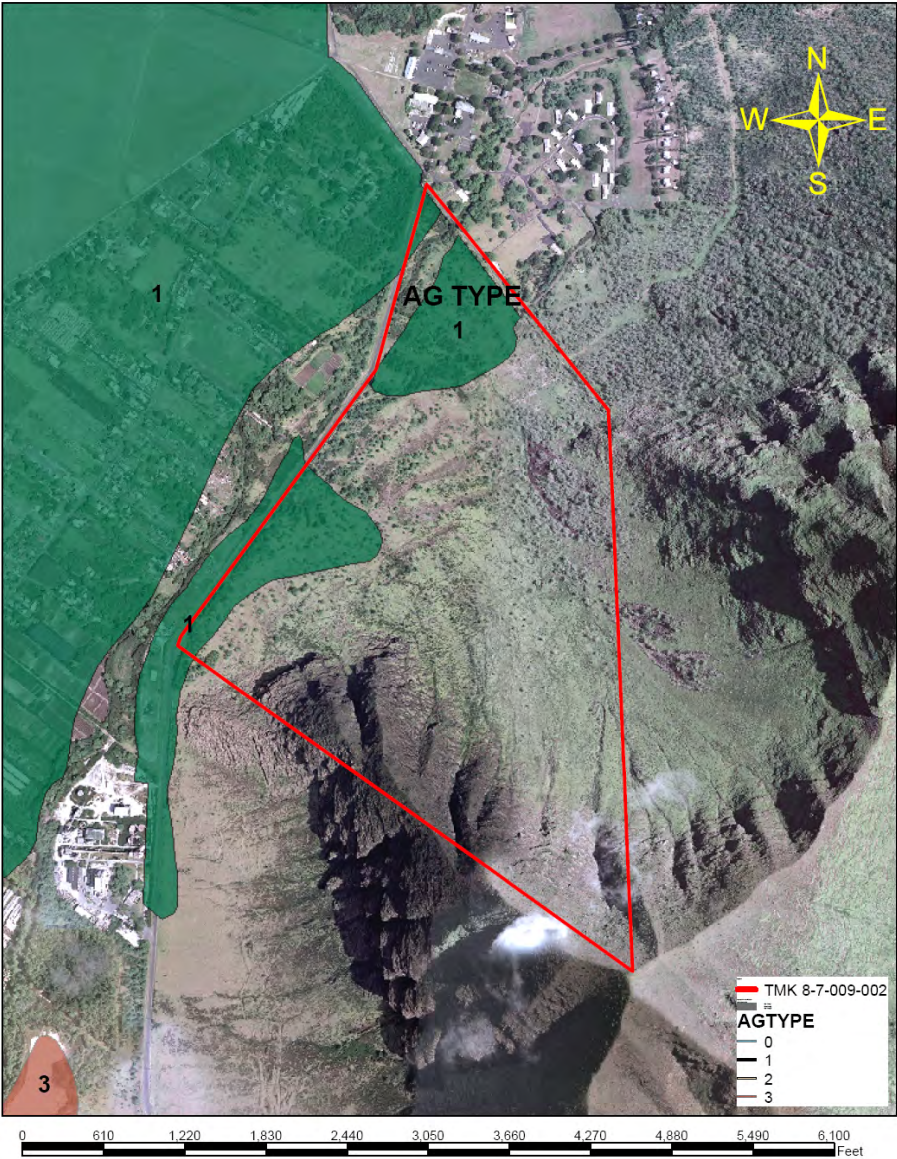


**ATTACHMENT E – ALISH Classification for the Island of Oahu**





**ATTACHMENT F – ALISH Classification for Subject Property**



## **APPENDIX D**

Biological Surveys Conducted on the Tropic-Land LLC, Nānākuli  
Light Industrial Park Site, Waiʻanae District, Oʻahu, Hawaiʻi. Reginald  
E. David and Eric Guinther, June 2008

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**Biological Surveys Conducted on the  
Tropic-Land LLC, Nānākuli Light Industrial  
Park Site, Wai‘anae District, O‘ahu, Hawai‘i.**

---

***DRAFT***

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## **Introduction**

Tropic-Land LLC is proposing to develop a light industrial park on approximately 96-acres of a 236.154-acre parcel of land identified as TMK: 8-7-009:002. The currently undeveloped property is located in Nānākuli, Wai‘anae District, Island of O‘ahu (Figure 1). This report documents the methodologies used and the results of the botanical, avian and mammalian surveys that were conducted on the site as part of the environmental disclosure process,

The primary purpose of the surveys was to determine if there were any botanical, avian or mammalian species currently listed, or proposed for listing under either federal or State of Hawai‘i endangered species statutes within or adjacent to the study area. We were also asked to evaluate the potential impacts that the development of the project might pose to any sensitive or protected native botanical, avian or mammalian species, and to propose appropriate minimization and or mitigative measures that could be implemented to reduce or eliminate any such impacts. The federal and State of Hawai‘i listed species status follows species identified in the following referenced documents, (Division of Land and Natural Resources (DLNR) 1998, Federal Register 2005, U. S. Fish & Wildlife Service (USFWS) 2005, 2008). Fieldwork was conducted on the site on June 25, 2008.

The avian phylogenetic order and nomenclature used in this report follows *The American Ornithologists’ Union Checklist of North American Birds 7<sup>th</sup> Edition* (American Ornithologists’ Union 1998), and the 42<sup>nd</sup> through the 48<sup>th</sup> supplements to *Check-list of North American Birds* (American Ornithologists’ Union 2000; Banks et al. 2002, 2003, 2004, 2005, 2006, 2007). Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986). Plant names follow *Hawai‘i’s Ferns and Fern Allies* (Palmer 2003) for ferns, *Manual of the Flowering Plants of Hawai‘i* (Wagner et al., 1990, 1999) for native and naturalized flowering plants, and *A Tropical Garden Flora* (Staples and Herbst, 2005) for crop and ornamental plants. Place names follow *Place Names of Hawaii* (Pukui et al., 1974).

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text on Page 17.

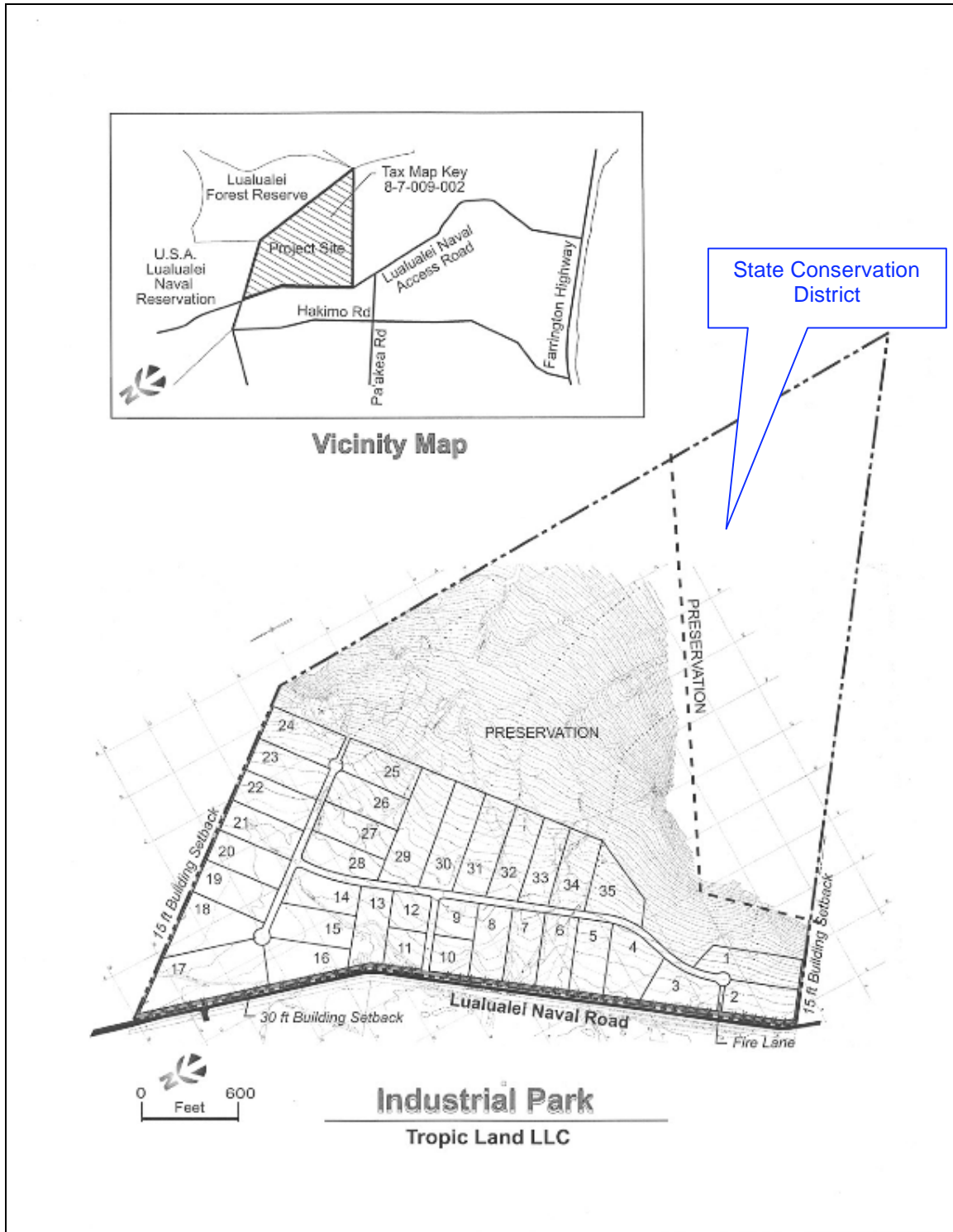
## **General Site and Project Description**

The site is bound to the west by the existing Lualualei Naval Road, to the north and east by the U.S. Naval Magazine Lualualei, and to the south by Pu‘uheleakalā ridge, and undeveloped land (Figure 1). The terrain slopes from the southeast to the northwest, from a maximum elevation of approximately 566 meters (1859 feet) above mean sea level, at the summit of Pu‘uheleakalā, down to 28 meters (92 feet) above mean sea level at the northwest corner the site, at the intersection of Lualualei Naval Road and 61<sup>st</sup> street (Figure 1).

As previously mentioned Tropic-Land LLC is proposing to develop approximately 96-acres of a 236.154-acre parcel of land. The bulk of the site is too steep to allow development, as can be seen in Figure 1 and 2, development will occur on 96-acres of the site, essentially all lands that



Figure 1



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fall below the 200 foot (61 meter) elevational contour (Figure 1). Additionally, 67.439-acres of land on the northern face of Pu‘uheleakalā is within the State of Hawai‘i Conservation District and thus will not be developed (Figure 1).

The environment present at the project site is highly disturbed, with abundant signs of fires, bulldozed firebreaks/roads and the like. The vegetation is dominated by buffel grass and Guinea grass (*Cenchrus ciliaris* and *Urochloa maxima*), kiawe (*Prosopis pallida*) trees forming a savanna in the upper parts of the parcel (Figure 2) and a somewhat open forest in the lower parts. Both *koa haole* (*Leucaena leucocephala*) and the much smaller virgate mimosa (*Desmanthus pernambucanus*) shrubs are common to abundant across the mostly grassy landscape. Additionally there are numerous alien weedy species present, especially along the various scrapes and unimproved roads within the site. The vegetation is typical of disturbed, xeric areas on the leeward slopes of the island.



**Figure 2. Typical aspect of the Tropic Land site with modest, grass-covered slopes and scattered kiawe trees. Pu‘u Kaua towers over Lualualei Valley in the background.**

### ***Botanical Survey Methods***

The botanical survey was undertaken on June 25, 2008 following a wandering transect that traversed all parts of the subject parcel up to about the 200-foot (60-m) elevation. The survey was

conducted early in the dry season and therefore a few plants typical of this site, especially annuals, might have completed their life cycle and been missed or gone dormant. The dominant herbaceous plants (buffel and Guinea grass) were still showing some green leaves, but had completed flowering and fruiting.

### **Botanical Survey Results**

The results of the botanical survey are provided as a table of the flora of the site (Table 1). In this case, the table includes both plant species identified on June 25, 2008 with relative abundances, and species previously reported from the property by Char (1990). In the case of the latter survey, no abundance estimates were made. Species listed in the table without an abundance value were observed by Char and not seen in the more recent survey.

**Table 1 - Listing of plants (flora) for the Tropic Land, Light Industrial Park Site**

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Relative Abundance</i>	<i>Notes</i>
<b>FLOWERING PLANTS</b>				
<b>DICOTYLEDONES</b>				
<b>ACANTHACEAE</b>				
<i>Asystasia gangetica</i> (L.) T. Anderson	Chinese violet	Nat.	U1	(2)
<b>AIZOACEAE</b>				
<i>Trianthema portulacastrum</i> L.	---	Nat.	U2	(1)
<b>AMARANTHACEAE</b>				
<i>Achyranthes aspera</i> L.	---	Nat.	---	(2)
<i>Alternanthera pungens</i> Kunth	khaki weed	Nat.	R	(1,2)
<i>Amaranthus spinosus</i> L.	spiny amaranth	Nat.	O	(1,2)
<i>Amaranthus viridis</i> L.	slender amaranth	Nat.	R	(1)
<b>ASTERACEAE (COMPOSITAE)</b>				
<i>Ageratim conyzoides</i> L.	<i>maile hohono</i>	Nat.	---	(2)
<i>Bidens pilosa</i> L.	beggar's tick	Nat.	---	(2)
<i>Conyza bonariensis</i> (L.) Cronq.	hairy horseweed	Nat.	U	(2) †
<i>Eclipta prostrata</i> (L.) L.	---	Nat.	R3	
<i>Emilia fosbergii</i> Nicolson	<i>pualele</i>	Nat.	R	(2)
<i>Pluchia carolinensis</i> (Jacq.) G. Don	sourbush	Nat.	R1	(2)
<i>Sonchus oleraceus</i> L.	sow thistle	Nat.	R	(2)
<i>Tridax procumbens</i> L.	coat buttons	Nat.	U2	(2)
<i>Verbesina encelioides</i> (Cav.) Benth.	golden crownbeard	Nat.	---	(2)
<i>Xanthium strumarium</i> var. <i>canadense</i> (Mill.) Torr. ex A. Gray	cocklebur	Nat.	---	(2)
<b>BIGNONIACEAE</b>				
<i>Spathodea campanulata</i> P. Beauv.	African tulip tree	Orn.	R2	
<b>BORAGINACEAE</b>				
<i>Heliotropium procumbens</i> Mill.	---	Nat.	R2	
<b>BUDDLEIACEAE</b>				
<i>Buddleia asiatica</i> Lour.	dog tail	Nat.	---	(2)

**Table 1 Continued.**

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Relative Abundance</i>	<i>Notes</i>
<b>CACTACEAE</b>				
<i>Opuntia ficus-indica</i> (L.) Mill.	prickly pear	Nat.	---	(2)
<b>CHENOPODIACEAE</b>				
<i>Atriplex semibaccata</i> R. Br.	Australian saltbush	Nat.	R2	
<i>Chenopodium murale</i> L.	'aheahea	Nat.	---	(2)
<b>CONVOLVULACEAE</b>				
<i>Ipomoea indica</i> (J. Burm.) Merr.	koali 'awa	<b>Ind.</b>	---	(2)
<i>Ipomoea obscura</i> (L.) Ker-Gawl.	field bindweed	Nat.	U	(2)
<i>Ipomoea triloba</i> L.	little bell	Nat.	U	
<i>Jacquemontia ovalifolia</i> (Choisy) H. Hallier	pā'ū-o-Hi 'iaka	<b>Ind.</b>	U2	(2)
<i>Merremia aegyptica</i> (L.) Urb.	hairy merremia	Nat.	---	(2)
<b>CUCURBITACEAE</b>				
<i>Cucumis dipsaceus</i> Ehrenb. ex Spach	teasel goard	Nat.	R	
<b>EUPHORBIACEAE</b>				
<i>Chamaesyce hirta</i> (L.) Millsp.	garden spurge	Nat.	R	(2)
<i>Chamaesyce hypericifolia</i> (L.) Millsp.	graceful spurge	Nat.	U2	(2)
<i>Euphorbia lactea</i> Haworth	mottled-candlestick	Orn.	R	
<i>Ricinus communis</i> L.	castor bean	Nat.	U	(2)
<b>FABACEAE</b>				
<i>Acacia farnesiana</i> (L.) Willd.	klu	Nat.	O	(2)
<i>Crotalaria incana</i> L.	fuzzy rattlepod	Nat.	O	(2)
<i>Desmanthus pernambucanus</i> (L.) Thellung	virgate mimosa	Nat.	A	(2)
<i>Erythrina sandwicensis</i> Degener	wili wili	<b>End</b>	---	(2)
<i>Leucaena leucocephala</i> (Lam.) deWit	koa haole	Nat.	C	(2)
<i>Indigofera hendecaphylla</i> Jacq.	creeping indigo	Nat.	R2	
<i>Indigofera suffruticosa</i> Mill.	indigo	Nat.	U	(2)
<i>Macroptilium lathyroides</i> (L.) Urb.	cow pea	Nat.	U	(2)
<i>Pithecelobium dulce</i> (Roxb.) Benth.	'opiuma	Nat.	R	
<i>Prosopis pallida</i> (Humb. & Bonpl. ex Willd.) Kunth	kiawe	Nat.	A	(2)
<i>Samanea saman</i> (Jacq.) Merr.	monkeypod	Nat.	R	(2)
<b>LAMIACEAE</b>				
<i>Hyptis pectinata</i> (L.) Poit.	comb hyptis	Nat.	O3	(2)
<i>Leonotis nepetifolia</i> (L.) R. Br.	lion's ear	Nat.	A	(2)
<i>Ocimum gratissimum</i> L.	wild basil	Nat.	R	(2)
<b>MALVACEAE</b>				
<i>Abutilon grandifolium</i> (Willd.) Sweet	hairy abutilon	Nat.	---	(2)
<i>Abutilon incanum</i> (Link) Sweet	hoary abutilon	<b>Ind.</b>	---	(2)

**Table 1 Continued.**

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Relative Abundance</i>	<i>Notes</i>
<i>Malvastrum coromandelianum</i> (L.) Garck	false mallow	Nat.	O	(1,2)
<i>Malva parviflora</i> L.	cheeseweed	Nat.	R	(1)
<i>Sida ciliaris</i> L.	---	Nat.	U	(1)
<i>Sida fallax</i> Walp.	'ilima	<b>Ind.</b>	O3	(2)
<i>Sida rhombifolia</i> L.	Cuba jute	Nat.	---	(2)
<i>Sida spinosa</i> L.	prickly sida	Nat.	U2	(2)
<b>MORACEAE</b>				
<i>Ficus microcarpa</i> L.	Chinese banyan	Nat.	R	(2)
<b>NYCTAGINACEAE</b>				
<i>Boerhavia coccinea</i> Mill.	false alena	Nat.	---	(2)
<b>PASSIFLORACEAE</b>				
<i>Passiflora foetida</i> L.	love-in-a-mist	Nat.	---	(2)
<b>PORTULACACEAE</b>				
<i>Portulaca oleracea</i> L.	pigweed	Nat.	R	
<b>SOLANACEAE</b>				
<i>Nicandra physalodes</i> (L.) Gaertn.	apple-of-Peru	Nat.	R	(2)
<i>Solanum americanum</i> Mill.	pōpolo	<b>Ind.</b>	---	(2)
<i>Solanum lycopersicum</i> var. <i>cerasiforme</i> (Dunal) Spooner, G. Anderson, & Jansen	wild cherry tomato	Nat.	U	(2)
<b>STERCULIACEAE</b>				
<i>Waltheria indica</i> L.	'uhaloa	<b>Ind.</b>	U	(2)
<b>VERBENACEAE</b>				
<i>Lantana camara</i> L.	lantana	Nat.	---	(2)
<b>MONOCOTYLEDONES</b>				
<b>COMMELINACEAE</b>				
<i>Commelina benghalensis</i> L.	hairy honohono	Nat.	---	(2)
<b>POACEAE</b>				
<i>Bothriochloa pertusa</i> (L.) A Camus	pitted beardgrass	Nat.	---	(2)
<i>Cenchrus ciliaris</i> L.	buffelgrass	Nat.	AA	(2)
<i>Cenchrus echinatus</i> L.	sand bur	Nat.	R	
<i>Chloris barbata</i> (L.) Sw.	swollen fingergrass	Nat.	O3	(2)
<i>Chloris radiata</i> (L.) Sw.	radiate fingergrass	Nat.	---	(2)
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	Nat.	---	(2)
<i>Digitaria insularis</i> (L.) Mez. ex Ekman	sourgrass	Nat.	---	(2)
<i>Eleusine indica</i> (L.) Gaertn.	wiregrass	Nat.	R	(1,2)
<i>Melinis minutiflora</i> P. Beauv.	molasses grass	Nat.	R	

**Table 1 Continued.**

<i>Species listed by family</i>	<i>Common name</i>	<i>Status</i>	<i>Relative Abundance</i>	<i>Notes</i>
<i>Melinus repens</i> (Willd.) Zizka	Natal redtop	Nat.	---	(2)
<i>Setaria verticillata</i> (L.) P. Beauv.	bristly foxtail	Nat.	U	(2)
<i>Urochloa maxima</i> (Jacq.) Webster	Guinea grass	Nat.	AA	(2)

### Legend to Table 1

STATUS = distributional status for the Haaiian Islands:	
ind. =	indigenous; native to Hawaii, but not unique to the Hawaiian Islands.
nat. =	naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.
ABUNDANCE = occurrence ratings for plants by area:	
R - Rare	seen in only one or perhaps two locations.
U - Uncommon	seen at most in several locations
O - Occasional	seen with some regularity
C - Common	observed numerous times during the survey
A - Abundant	found in large numbers; may be locally dominant.
AA - Very abundant	abundant and dominant; defining vegetation type.
Numbers following an occurrence rating indicate clusters within the survey area. The ratings above provide an estimate of the likelihood of encountering a species within the specified survey area; numbers modify this where abundance, where encountered, tends to be greater than the occurrence rating:	
1 -	several plants present
2 -	many plants present
3 -	locally abundant
NOTES:	
(1) -	Generally associated with unimproved roads and other recently disturbed sites.
(2) -	Previously reported by Char () from the property. .
(3) -	Plant lacking key diagnostic characteristics (flower, fruit).
† -	Seen only as dead plant matter.

A total of 52 species were observed during the survey on June 25. All but 2 species are introduced (not native), putting the percentage of native species at 4%. A total of 76 species have identified from the site when combing the results from Char (1990) with the most recent survey data.

### *Avian Survey Methods*

Eight avian count stations were evenly spaced across the approximately 100-acre proposed development area. Each station was counted once. Field observations were made with the aid of Leitz 10 X 42 binoculars and by listening for vocalizations. Counts were concentrated in the early morning hours, the time of day that bird activity is typically at its peak. Time not spent counting was used to search the site and the surrounding area for species and habitats not detected during count sessions. We took particular care to cover areas upslope of the proposed development area to ensure that no additional habitats or species were present on the owners property upslope of the proposed disturbance area.

### *Avian Survey Results*

A total of 227 individual birds of 17 species, representing 12 separate families, were recorded during station counts (Table 2). All of the 17 species detected are considered to be alien to the



Hawaiian Islands (Table 2). No avian species currently protected, or proposed for protection under either the Federal or State of Hawai'i endangered species programs were detected during the course of this survey (DLNR 1998, Federal Register 2005, USFWS 2005, 2008).

Avian diversity and densities were in keeping with the location and the depaureate and xeric habitat present on the site. Four species, House Sparrow (*Passer domesticus*), Spotted Dove (*Streptopelia chinensis*), Common Waxbill (*Estrilda astrild*) and Zebra Dove (*Geopelia striata*), accounted for slightly more than 54% of the total number of all birds recorded during station counts. The most commonly recorded species was House Sparrow, which accounted for slightly less than 17% of the total number of individual birds recorded. An average of 28 birds were detected per station count.

<b>Table 2 - Avian Species Detected on the Tropic-Land Light Industrial Park Site</b>			
<i>Common Name</i>	<i>Scientific Name</i>	<i>ST</i>	<i>RA</i>
GALLIFORMES			
PHASIANIDAE - Pheasants & Partridges			
Phasianinae - Pheasants & Allies			
Erckel's Francolin	<i>Francolinus erckelii</i>	A	1.38
COLUMBIFORMES			
COLUMBIDAE - Pigeons & Doves			
Rock Pigeon	<i>Columba livia</i>	A	0.13
Spotted Dove	<i>Streptopelia chinensis</i>	A	4.13
Zebra Dove	<i>Geopelia striata</i>	A	2.88
STRIGIFORMES			
TYTONIDAE - Barn Owls			
Barn Owl	<i>Tyto alba</i>	A	0.13
PASSERIFORMES			
PYCNONOTIDAE - Bulbuls			
Red-vented Bulbul	<i>Pycnonotus cafer</i>	A	1.63
ZOSTEROPIDAE - White-eyes			
Japanese White-eye	<i>Zosterops japonicus</i>	A	1.38
MIMIDAE - Mockingbirds & Thrashers			
Northern Mockingbird	<i>Mimus polyglottos</i>	A	1.13
STURNIDAE - Starlings			
Common Myna	<i>Acridotheres tristis</i>	A	0.63
EMBERIZIDAE - Emberizids			
Red-crested Cardinal	<i>Paroaria coronata</i>	A	0.25
CARDINALIDAE - Cardinals Saltators & Allies			
Northern Cardinal	<i>Cardinalis cardinalis</i>	A	1.50
FRINGILLIDAE - Fringilline and Carduline Finches & Allies			
Carduelinae - Carduline Finches			
House Finch	<i>Carpodacus mexicanus</i>	A	1.63
PASSERIDAE - Old World Sparrows			
House Sparrow	<i>Passer domesticus</i>	A	4.75
ESTRILDIDAE - Estrildid Finches			

*Table 2 Continued.*

<i>Common Name</i>	<i>Scientific Name</i>	<i>ST</i>	<i>RA</i>
Estrildinae - Estrildine Finches			
Common Waxbill	<i>Estrilda astrild</i>	A	3.63
Nutmeg Mannikin	<i>Lonchura punctulata</i>	A	2.75
Chestnut Munia	<i>Lonchura atricapilla</i>	A	0.25
Java Sparrow	<i>Padda oryzivora</i>	A	0.25

Key to Table 1.

<b>ST</b>	Status
<b>A</b>	Alien species – introduced to Hawai‘i by humans
<b>RA</b>	Relative Abundance: Number of birds detected divided by the number of count stations (8)

### ***Mammalian Survey Methods***

With the exception of the endemic, endangered Hawaiian hoary bat, or ‘ōpe‘ape‘a, as it is known locally, all terrestrial mammals currently found on the island of O‘ahu are alien species. Most are ubiquitous; no trapping program was proposed or undertaken to quantify the use of the study site by alien mammalian species. The survey of mammals was limited to visual and auditory detection, coupled with observation of scat, tracks, and other animal sign. A running tally was kept of all vertebrate species observed and heard within the project sites.

### ***Mammalian Survey Results***

Three mammalian species; domestic dog (*Canis f. familiaris*), small Indian mongoose (*Herpestes a. auropunctatus*), and cat (*Felis catus*), were detected within the study site. There were several pit bulls chained up around the trucks, heavy equipment and sheds immediately *mauka* of the entrance gate. Additionally, one pit bull was running loose on the property. One small Indian mongoose was seen on the west end of the site, and scat, tracks, and sign of both dog and cat was encountered in several locations within the project site.

### ***Discussion***

#### ***Botanical Resources***

A majority of the property to be developed as an industrial park supports a Kiawe-Buffel Grass Association (Char, 1990), although significant areas support Guinea grass as a dominant or co-dominant with buffel grass. From a floristic standpoint, the site below the preservation and conservation zone lacks habitat for valuable native plants. This area has seen various uses and activities over the years (rock quarrying, rangeland, agricultural cropping) and a portion is presently used as a trucking base yard. The property has been subjected to one or more wildfires; Char (1990) reporting the site as partly burned during her survey.

It is unclear from Char’s (Char & Assoc., 1990) description of the site and her survey method as to just how much of the parcel was surveyed in August 1990. The reports notes that land slopes become steep (12 to 30%) above the 200-foot contour and then “rise abruptly and steeply” in the

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rear portions of the project site leading to Pu‘uheleakalā ridge. The statement is made that “[n]o golf course construction is planned for these steeply sloping areas,” a generalization that implies the 1990 botanical survey may not have included areas above an unspecified steepness. One significance here is that steeper areas tend to be very rocky with a sparse growth of buffel grass, and therefore are less likely to support devastating wildfires that remove native plants from the environment. In addition, of course, is the fact that direct impacts of the proposed Tropic Land project, would not occur above about 200 feet elevation because the industrial lots will not extend to the slopes above about the 200 foot elevation contour.

Char (1990) developed a longer plant species list (76 species vs. 52 species) than that resulting from the present survey, although the latter included 15 species not reported in 1990. The 24 plants listed as present in 1990 and not observed in 2008 are mostly common weedy species that certainly should be expected on or near the project area. Possibly had our survey extended further upslope or included parcels along Ulehawa Stream as was the case in 1990, many of these species would have been encountered. Seasonal conditions appear not to be a factor, since Char conducted her survey during the typically dry month of August. Char notes that her survey was more intense “[w]here Ulehawa Stream crosses the property” to rule out the presence of the endangered fern, *Marsillea villosa*, known from the nearby Naval Radio Transmitting Facility (Botanical Consultants, 1984; Traverse Group, 1987). Parcels to the west of Lualualei Naval Road were not included in the present survey area.



***Figure 3. Unnamed ridge rising over 1800 ft (550 m) to the east above the project site. Note that the steep slopes are still green.***

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Char noted the native *wiliwili* tree (*Erythrina sandwicensis*) as present in the dry stream bed near the road to an old quarry. The tree was not seen in 2008, either because it is no longer there, was growing above the upper elevation limit of our survey (although a quarry and well site as described was part of our survey area), or missed against the backdrop of the kiawe trees in the gulch—*wiliwili* are deciduous in the dry season and a single tree could be overlooked if absent all of its leaves. Although an endemic species, the *wiliwili* is not listed as threatened or endangered. All of the native plants encountered on the property in 1990 and 2008 are common species in the Hawaiian Islands.

Although no part of the project area is included in the federally designated plant critical habitat Unit 15 encompasses adjacent Pu‘uheleakalā and the ridgeline above the project area extending to the northeast (Figure 3) (Federal Register, 2003). Unit 15 extends all along the Wai‘anae ridge here to the upper end of Lualualei Valley. In the project area, the boundary of this unit descends to around the 500-ft (152-m) elevation on the ridges to the northeast and southwest, rising to the 1000-ft (305-m) contour in the valley behind the proposed industrial park. Within the property boundaries, the area of critical habitat is entirely within the State Conservation District as depicted in Figure 1.

The portion of Unit 15 (Pu‘uheleakalā) closest to the project includes critical habitat for an endangered species of ‘akoko (*Chamaesyce kuwaleana*; see page 33) and *Lipochaeta lobata* var. *leptophylla* at the top of the ridgeline to the east. The following descriptions from Guinther (2007, p. 33-34) summarize information on these and other listed plant species in the area:

*Chamaesyce kuwaleana* is a species of ‘akoko listed as endangered (Federal Register, 1991). Critical habitat for this species has been designated in seven units. Unit 15 encompasses 454 ac (184 ha) of Pu‘u Heleakalā and is thought to presently harbor 300 individual plants (Federal Register, 2003). ... The plant is a small shrub between 0.2 and 0.9 m (8 to 35 in) high, known only from “arid volcanic cliffs, 250 m [820 ft high], Wai‘anae Mountains, and also known from one specimen from Mokumanu, Kāne‘ohe, O‘ahu” (Wagner, Herbst, and Sohmer, 1990).

*Schiedea ligustrina* is indicated as having been reported from near the peak (northeast slope) of Pu‘u Heleakalā....

*Nehe* (*Lipochaeta lobata*) is presently considered to be found in the wild as two distinguishable varieties (Wagner, Herbst, and Sohmer, 1990). *Lipochaeta lobata* var. *leptophylla* is a listed variety (Federal Register, 1991); The few remaining plants of *L. l.* var. *leptophylla* are located above Lualualei Valley but the known elevation range of this variety is well above the [proposed industrial park site].... The lowland or coastal variety, *L. l.* var. *lobata* is not listed and not presently regarded for listing consideration.



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*Marsilea villosa* or ‘ili‘ihi is a small aquatic or semi-aquatic fern resembling a clover (Fig. [4]). The fern requires periodic flooding and drying of the ground to complete its short life cycle, and thus is confined to shallow basins subjected to brief periods of flooding during the wet season.

The following description is from the Recovery Plan for the *Marsilea villosa* as given by USFWS (undated):

“This fern requires periodic flooding for spore release and fertilization, then a decrease in water levels for the young plants to establish. It typically occurs in shallow depressions in clay soil, or lithified sand dunes overlaid with alluvial clay. All reported populations occur at or below 500 feet (150 meters) elevation. While *M. villosa* can withstand minimal shading, it appears most vigorous growing in open areas.”



Figure 4. The fern, *Marsilea villosa* or ‘ili‘ihilauākea, is an endangered species, here growing among grasses at Naval Transmitting Facility property at Lualualei.

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Char (Char & Assoc., 1990) made a special effort to ascertain whether *‘ili‘ihilauākea* was present on the former proposed golf course site, particularly on parcels located across Lualualei Naval Road from the proposed industrial subdivision site that we recently surveyed. She was unable to locate this plant and we did not find either the fern or suitable habitat for this fern.

### ***Avian Resources***

The findings of the avian survey are consistent with the findings of a previous study conducted on the subject property (Berger 1990), and with at least three other avian surveys conducted in 2004, 2005 and 2007 on lands immediately adjacent to this site (David 2007), and with at least two other avian studies conducted in the general project vicinity in the recent past (David 2002, 2003). Given the highly disturbed nature of the site and the almost completely alien dominated vegetation present, it is not surprising that all avian species detected were commonly occurring lowland alien species.

The species list generated during the course of this survey is almost identical to that generated during course of the surveys conducted on the property to the immediate south of this site in 2004, 2005 and 2007 which is presented in David (2007).

Although not detected during the course of this survey, the 1990 survey of the site, or the 2004, 2005 and 2007 surveys of the adjacent property, it is likely that the Hawaiian endemic subspecies of the Short-eared Owl (*Asio flammeus sandwichensis*), or *pue‘o* as it is known locally, forages within the project site upon occasion (Berger 1990, David 2007). The O‘ahu population of this species is listed as endangered under State of Hawai‘i endangered species statutes, it is not so listed under the federal endangered species act.

The habitat on site changes on such a regular basis due to anthropogenic alteration and fire that the site likely does not contain suitable nesting habitat for this species very often, if ever. From a *pueo*’s perspective there is nothing unique about the habitat present on the project site. There are large areas of better foraging and nesting habitat within the Lualualei Branch of the Pearl Harbor Naval Ammunition Depot, located in close proximity to this site (David 2002, 2003). Clearing of the project site may temporarily disturb foraging *pueo*, though such activity is unlikely to result in an adverse impact to this species.

### ***Mammalian Resources***

The findings of the mammalian survey are consistent with the findings of a previous study conducted on the subject property (Berger 1990), and with at least three other mammalian surveys conducted in 2004, 2005 and 2007 on lands immediately adjacent to this site (David 2007), and with at least two other mammalian studies conducted in the general project vicinity in the recent past (David 2002, 2003).

Although no rodents were detected during the course of this survey, it is likely that the four established alien *muridae* found on O‘ahu, roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), European house mouse (*Mus musculus domesticus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use various resources found within the project area. All of these

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introduced rodents are deleterious to native ecosystems and the native faunal species that are dependant on them.

### ***Potential Impacts to Critical Habitat***

Any human presence is likely to enhance the prospects for fires, and during the dry season, fires arising from activities on this property could be very detrimental to endangered species growing on the high ridgelines forming the surrounding small valley. The following discussion concerning the nearby west-facing slope of Pu‘uheleakalā (from Guinther, 2007, p. 7-8) summarizes the problem:

“The vegetation of the site is mostly grassland. The dry conditions and occasional fires tend to favor exotic grasses over native grasses, shrubs, and trees. Scrutiny of the satellite image... reveals a complex of fire roads cut into the steeper slopes to control the spread of fires that can occur with unfortunate regularity on leeward O‘ahu between about May and September of most years. Buffel grass dominates, and becomes self-preserving by increasing the intensity of fires that occur, itself capable of regrowing from basal stems when rains return (Hughes, Vitousek, and Tunison, 1991; Tix, undated, Latz, 1991). Native Hawaiian plants are not adapted to fire, and are gradually eliminated from areas subjected to repeated fires (Mueller-Dombois, 1981).”

### ***Conclusions***

From a native botanical, avian and mammalian perspective we found nothing precluding the clearing and development of the subject property. It is not expected that the modification of the habitat present on this site will result in any deleterious impacts to native botanical, avian or mammalian species.

### ***Recommendations***

The potential for starting a fire that would then spread upslope should be addressed as an issue for the construction contractor and for tenants of the industrial park. In general, this means developing fire breaks at the start of grading and having the ability on-site during construction to quickly address a fire if started.

We recommend that following build-out of the light industrial subdivision that a firebreak be maintained between the subdivision and the undeveloped grassy slopes in the back of the valley and/or that a green belt along the upland border of the development.



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***Glossary:***

Alien – Introduced to Hawai‘i by humans.

Endemic – Native and unique to the Hawaiian Islands.

Indigenous – Native to the Hawaiian Islands, but also found elsewhere naturally.

*mauka* – Upslope, towards the mountains.

*‘ōpe‘ape‘a* – Hawaiian hoary bat.

*pueo* – Hawaiian endemic sub-species of the Short-eared Owl.

Sign – Biological term referring tracks, scat, rubbing, odor, marks, nests, and other signs created by animals by which their presence may be detected

Threatened - Listed and protected under the ESA as a threatened species.

Xeric – Extremely dry conditions or habitat.

DLNR – Hawaii State Department of Land & Natural resources.

ESA – Federal Endangered Species Act of 1973, as amended.

USFWS – United States Fish & Wildlife Service.

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## **APPENDIX E**

Draft Traffic Impact Analysis Report for the Proposed Nanakuli Industrial Park. Traffic Management Consultant, September 2008

**DRAFT TRAFFIC IMPACT ANALYSIS REPORT**  
**FOR THE PROPOSED**  
**NANAKULI INDUSTRIAL PARK**  
**TAX MAP KEY: 8-7-9:02**

**I. Introduction**

**A. Project Description**

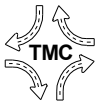
Tropic Land, LLC proposes to develop an industrial park in Nanakuli, Oahu. The 96-acre site is identified as Tax Map Key: 8-7-9:02. The industrial park would consist of approximately 33 lots, totaling 75 net acres. Figure 1 depicts the vicinity map and the site plan. Site access is proposed on the east side of Lualualei Naval Access Road via a stop-controlled T-intersection. The Year 2020 is used as the study's planning horizon for the purpose of the traffic impact analysis.

**B. Purpose and Scope of the Study**

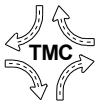
The purpose of this study is to analyze the traffic impacts resulting from the development of the proposed Nanakuli Industrial Park. This report presents the findings and recommendations of the study. The scope of this study includes:

1. Description of the proposed project.
2. Evaluation of existing roadways and traffic conditions.
3. Development of trip generation characteristics of the proposed project.
4. Analysis of the 2020 traffic conditions without the proposed project.
5. Identification and analysis of traffic impacts resulting from the development of the full build-out of the proposed project.
6. Recommendations of improvements, as necessary, that would mitigate the traffic impacts identified in this study.





**Figure 1. Site Plan and Location Map**



## C. Methodologies

### 1. Capacity Analysis Methodology

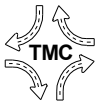
The highway capacity analysis, performed for this study, is based upon procedures presented in the Highway Capacity Manual (HCM), published by the Transportation Research Board, 2000. HCM defines Level of Service (LOS) as "a quality measure describing operational conditions within a traffic stream". Several factors may be included in determining LOS, such as: speed, travel time, freedom to maneuver, traffic interruptions, driver comfort, and convenience. LOS's "A", "B", and "C" are considered satisfactory Levels of Service. LOS "D" is generally considered a "desirable minimum" operating level of service. LOS "E" is an undesirable condition, and LOS "F" is an unacceptable condition. Intersection LOS is primarily based upon average delay, which is measured in seconds per vehicle (sec/veh). Table 1 summarizes the LOS criteria.

Table 1. Level of Service Criteria (HCM)		
LOS	Signalized Intersections	Unsignalized Intersections
	Control Delay (sec/veh)	Control Delay (sec/veh)
A	$\leq 10$	$\leq 10$
B	$> 10 - 20$	$> 10 - 15$
C	$> 20 - 35$	$> 15 - 25$
D	$> 35 - 55$	$> 25 - 35$
E	$> 55 - 80$	$> 35 - 50$
F	$> 80$	$> 50$

"Volume-to-capacity" (v/c) ratio is a measure indicating the relative traffic demand to the roadway's capacity. HCM defines capacity as "the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic flow, and traffic control conditions." A v/c ratio of 0.50 indicates that the traffic demand is utilizing 50 percent of the roadway's capacity. A v/c ratio in excess of 1.00 indicates that the traffic demand exceeds the carrying capacity of the highway facility. Worksheets for the capacity analysis, performed throughout this report, are compiled in the Appendix.

### 2. Trip Generation Methodology

The trip generation methodology is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in Trip Generation, 7th Edition. ITE trip rates are developed by correlating the total vehicle trip generation data with various activity/land use characteristics, such as the vehicle trips per hour (vph) per acre.



## **II. Existing Conditions**

### **A. Roadways**

Farrington Highway is the primary arterial highway on the Leeward coast of Oahu, which carries over 48,000 vehicles per day, total for both directions. Farrington Highway is a four-lane highway, which is oriented generally in the north-south directions. Farrington Highway is signalized at Lualualei Naval Access Road. An exclusive left turn lane is not provided on southbound Farrington Highway at this intersection. The posted speed on Farrington Highway is 35 miles per hour (mph).

Lualualei Naval Access Road is a two-lane, two-way roadway, which provides access to the U. S. Navy Naval Radio Transmitter Facility in Lualualei. The posted speed on Lualualei Naval Access Road varies between 25 mph and 45 mph.

### **B. Existing Peak Hour Traffic Volumes and Operating Conditions**

#### **1. Field Investigation and Data Collection**

Manual traffic count surveys were conducted at the intersection of Farrington Highway and Lualualei Naval Access Road on May 1-2, 2008, during the peak periods of traffic – from 5:30 AM to 8:00 AM and from 2:30 PM to 5:00 PM. Additional surveys were conducted on Lualualei Naval Access Road at an existing base yard on the project site on July 21-22, 2008. The peak period traffic data are presented in Appendix A.

#### **2. Existing AM Peak Hour Traffic**

The AM peak hour of traffic on Farrington Highway varies between 5:00 AM and 7:00 AM. The AM peak hour selected for this analysis is from 5:45 AM to 6:55 AM, based upon the observed AM peak hour of traffic on Lualualei Naval Access Road. Farrington Highway carried about 2,800 vehicles per hour (vph), total for both directions. Lualualei Naval Access Road carried a total of 430 vph at Farrington Highway, during the existing AM peak hour of traffic. At the project site, the traffic volume on Lualualei Naval Access Road decreased to about 120 vph.

The intersection of Farrington Highway and Lualualei Naval Access Road operated at an overall Level of Service "D" with a v/c ratio of 1.12, during the existing AM peak hour. Southbound Farrington Highway operated at LOS "E". The left-turn movement from Lualualei Naval Access Road on Farrington Highway operated at LOS "F". Figure 2 depicts the existing AM peak hour traffic volumes.

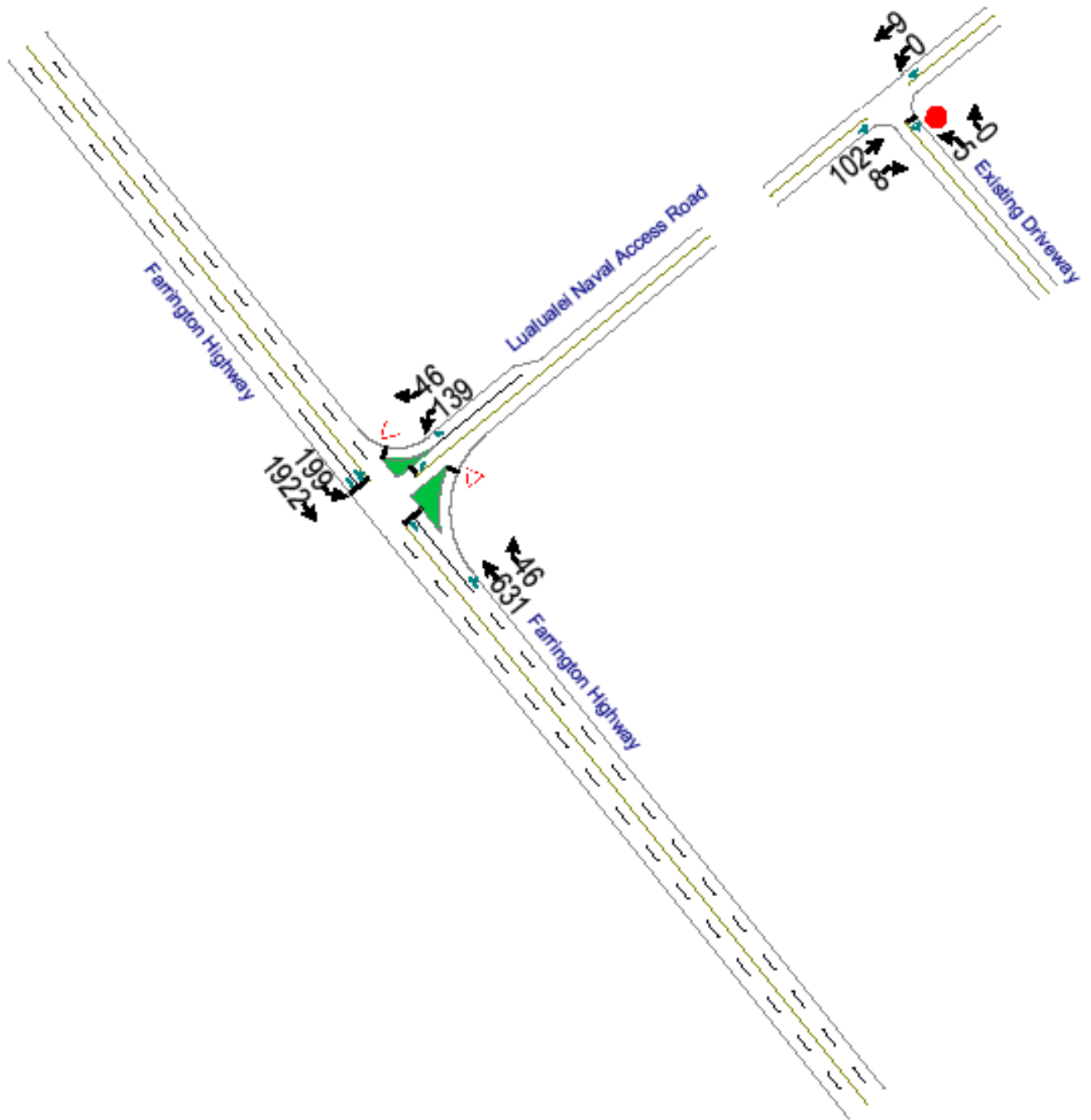
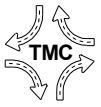


Figure 2. Existing AM Peak Hour Traffic (VPH)



### 3. Existing PM Peak Hour Traffic

The PM peak hour of traffic generally occurred between 3:15 PM and 4:15 PM. Farrington Highway carried about 3,500 vph, total for both directions. Lualualei Naval Access Road carried a total of over 500 vph, during the existing PM peak hour of traffic. At the project site, the traffic volume on Lualualei Naval Access Road decreased to about 100 vph.

During the existing PM peak hour of traffic, the shared through/left-turn lane on southbound Farrington Highway at Lualualei Naval Access Road operated as a de facto left-turn lane, according the HCM analysis, i.e., the delay on the left-turn movement resulted in the left through/left-turn lane being used as an exclusive left-turn lane. The intersection of Farrington Highway and Lualualei Naval Access Road operated at an overall LOS "C" with a v/c ratio of 0.94. The left-turn movement from Lualualei Naval Access Road on Farrington Highway operated at LOS "D". The existing PM peak hour traffic volumes are depicted on Figure 3.

## III. Future Traffic Conditions

### A. Background Growth in Traffic

The Oahu Transportation Regional Plan 2030 (ORTP), was prepared for the Oahu Metropolitan Planning Organization (OMPO) in April 2006, and amended in May 2007. The Year 2030 socio-economic forecasts indicated about a one-half percent annual increase in population and employment on the Waianae coast. Based upon the ORTP socio-economic forecast, an annual growth of 0.55 percent was applied uniformly to the existing peak hour traffic to estimate the Year 2020 peak hour traffic demands without the proposed project.

### B. Year 2020 AM Peak Hour Traffic Analysis Without Project

During the AM peak hour of traffic without the proposed project, traffic demands at the intersection of Farrington Highway and Lualualei Naval Access Road are expected to exceed the carrying capacity of the existing intersection, operating at an overall LOS "F" with a v/c ratio of 1.23. The southbound approach of Farrington Highway and the left-turn movement from Lualualei Naval Access Road are expected to operate at LOS "F". Figure 4 depicts the AM peak hour traffic without the proposed project.

### C. Year 2020 PM Peak Hour Traffic Analysis Without Project

The PM peak hour of traffic demand without the proposed project is expected exceed the existing carrying capacity of the intersection of Farrington Highway and Lualualei Naval Access Road, operating at LOS "D" with a v/c ratio of 1.01. Southbound Farrington Highway and the left-turn movement from Lualualei Naval Access Road are expected to operate at LOS "D". The PM peak hour traffic without the proposed project is depicted on Figure 5.

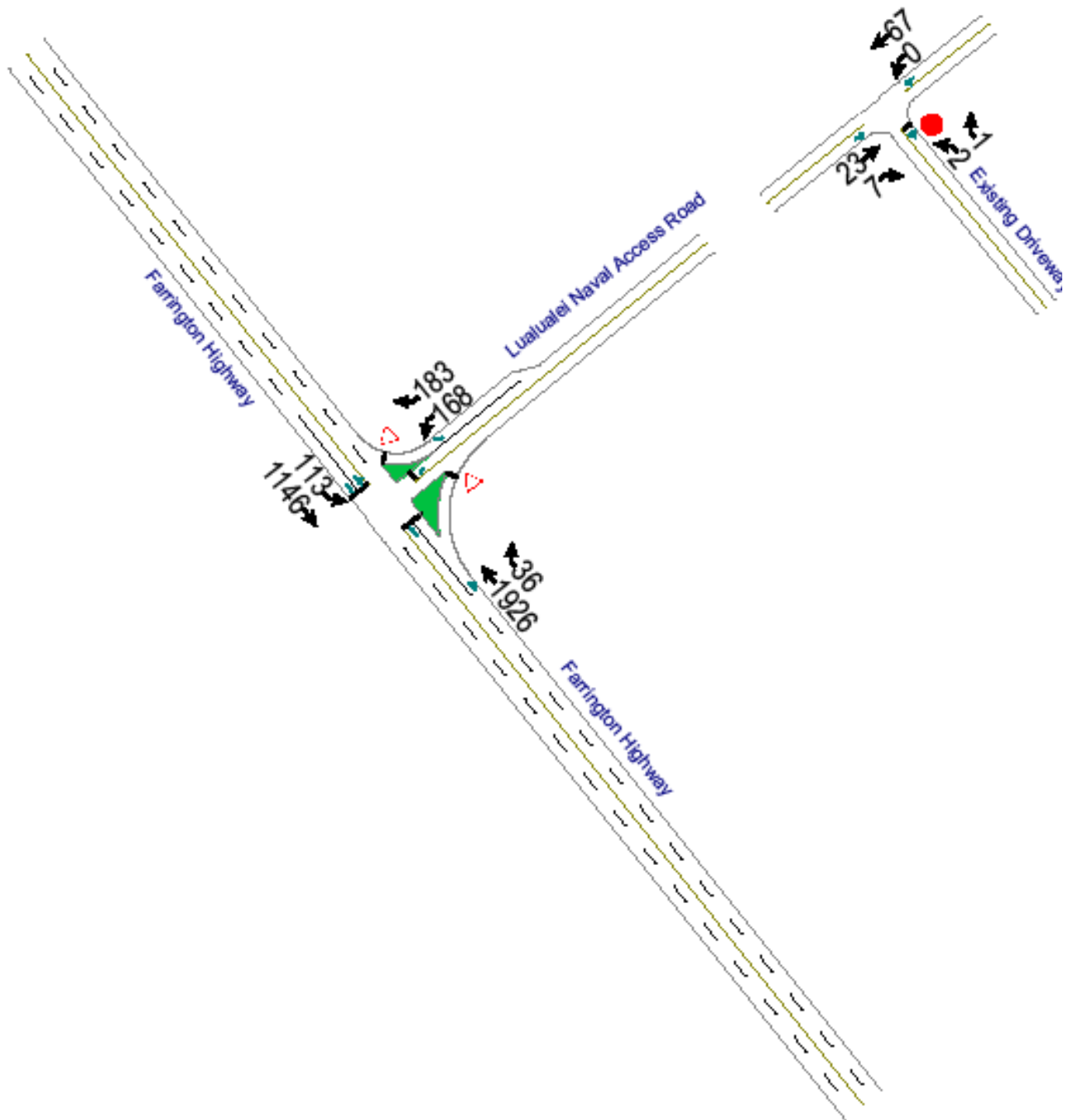
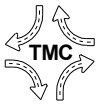


Figure 3. Existing PM Peak Hour Traffic (VPH)

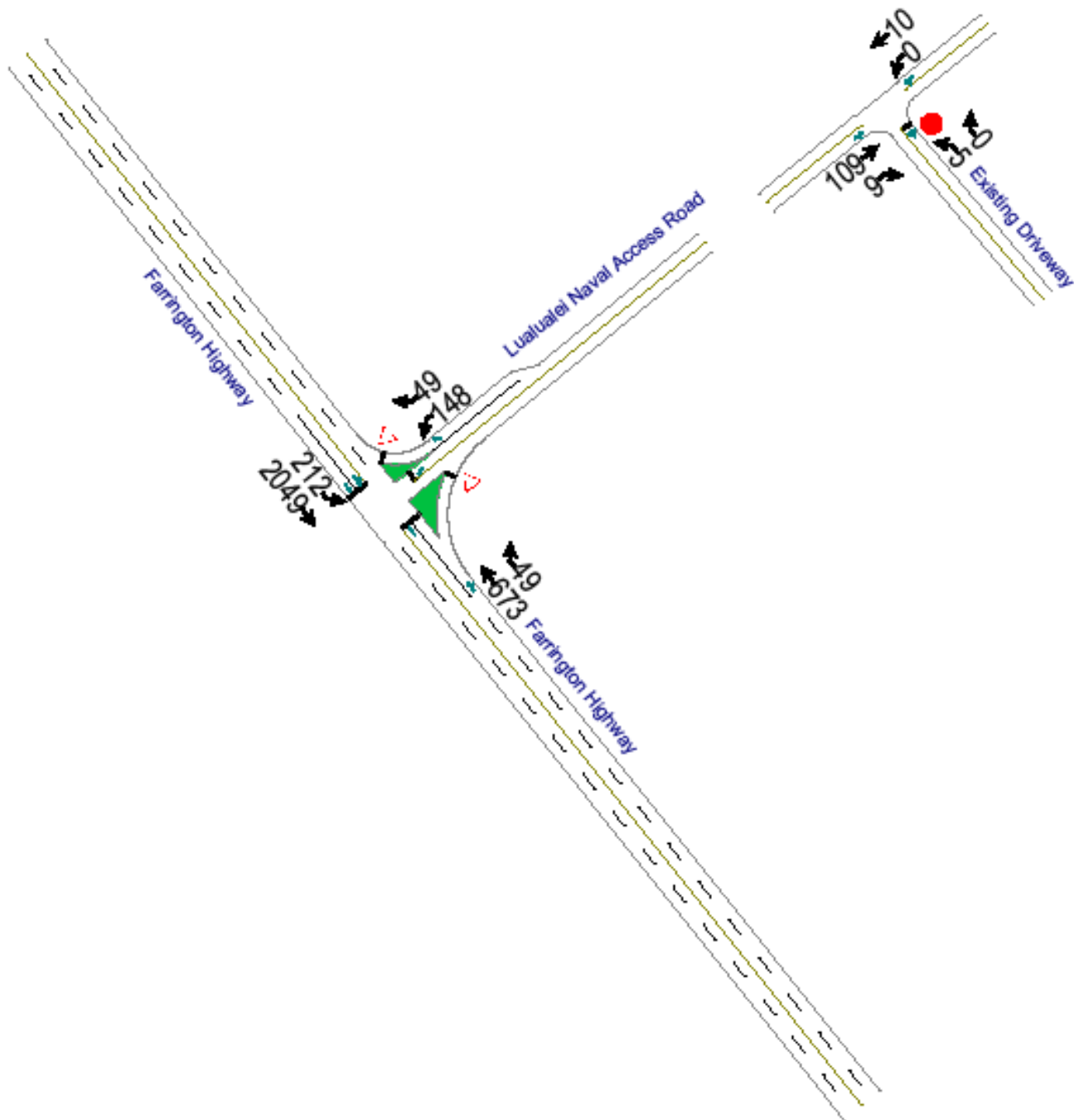
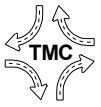


Figure 4. AM Peak Hour Traffic (VPH) Without Project



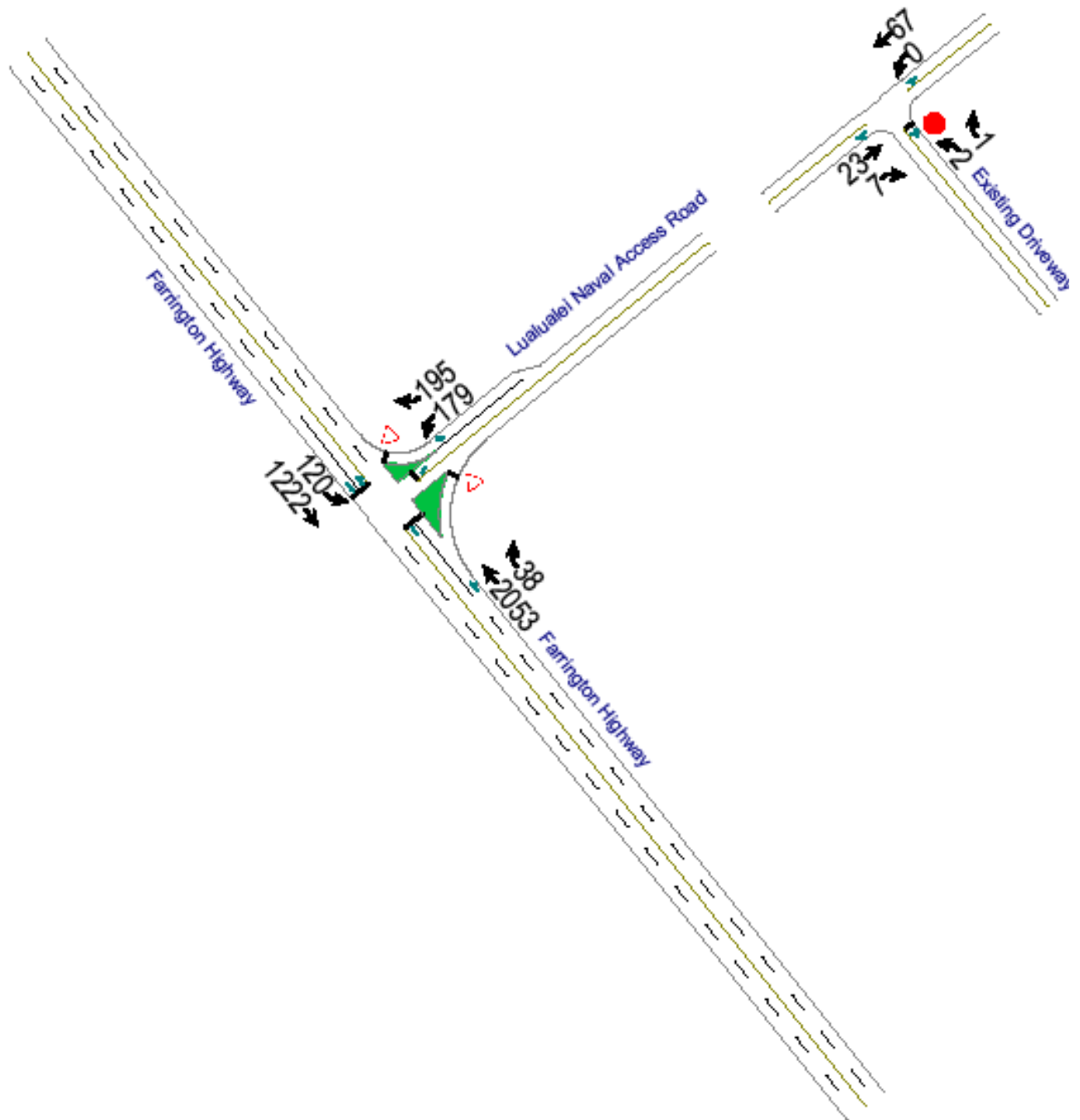
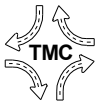
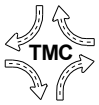


Figure 5. PM Peak Hour Traffic (VPH) Without Project



#### IV. Traffic Impact Analysis

##### A. Project Generated Traffic

###### 1. Trip Generation Characteristics

During the AM peak hour of traffic, the proposed project is expected to generate a total of 522 vph – 433 vph entering the site and 98 vph exiting the site. The proposed project is expected to generate a total of 518 vph – 109 vph entering the site and 409 vph exiting the site, during the PM peak hour of traffic.

###### 2. Trip Distribution

The trip distribution is based upon the projected growth in the Ewa and Waianae regions. By the Year 2020, the population of the Ewa region is expected to exceed the Waianae region by a ratio of 3 to 1. Similarly, the employment in the Ewa region is expected to be 6.7 times that of the Waianae coast. Table 2 summarizes the traffic assignment splits during the peak hours of traffic.

Table 2. Traffic Assignment			
Peak Hour	Direction	Northbound	Southbound
AM	Enter	75%	25%
	Exit	15%	85%
PM	Enter	85%	15%
	Exit	75%	25%

Figures 6 and 7 depict the AM and PM peak hour project-generated traffic assignments for the proposed project, respectively.

##### B. AM Peak Hour Traffic Impact Analysis With Project

Farrington Highway and Lualualei Naval Access Road is expected to operate at an overall LOS “F” and a v/c ratio of 1.86, during the AM peak hour of traffic with the proposed project. Southbound Farrington Highway and Lualualei Naval Access Road approaches are expected to operate at LOS “F”. Figure 8 depicts the AM peak hour traffic with the proposed project.

##### C. PM Peak Hour Traffic Impact Analysis With Project

During the PM peak hour of traffic with the proposed project, the intersection of Farrington Highway Lualualei Naval Access Road is expected to operate at LOS “F” with a v/c ratio of 1.39. Both Farrington Highway approaches and Lualualei Naval Access Road are expected to operate at LOS “F”. The PM peak hour traffic with the proposed project is depicted on Figure 9.

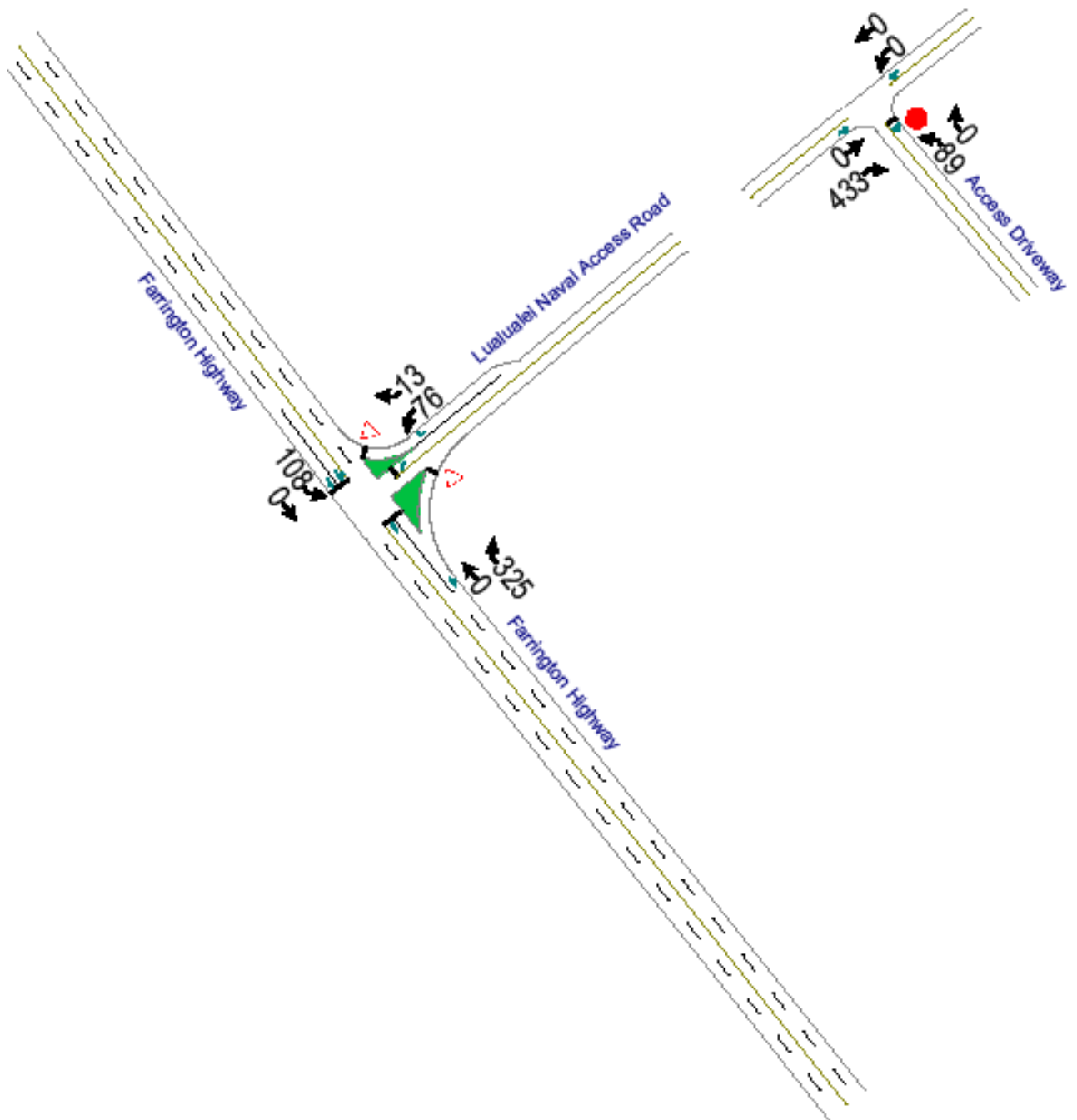
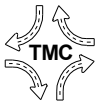
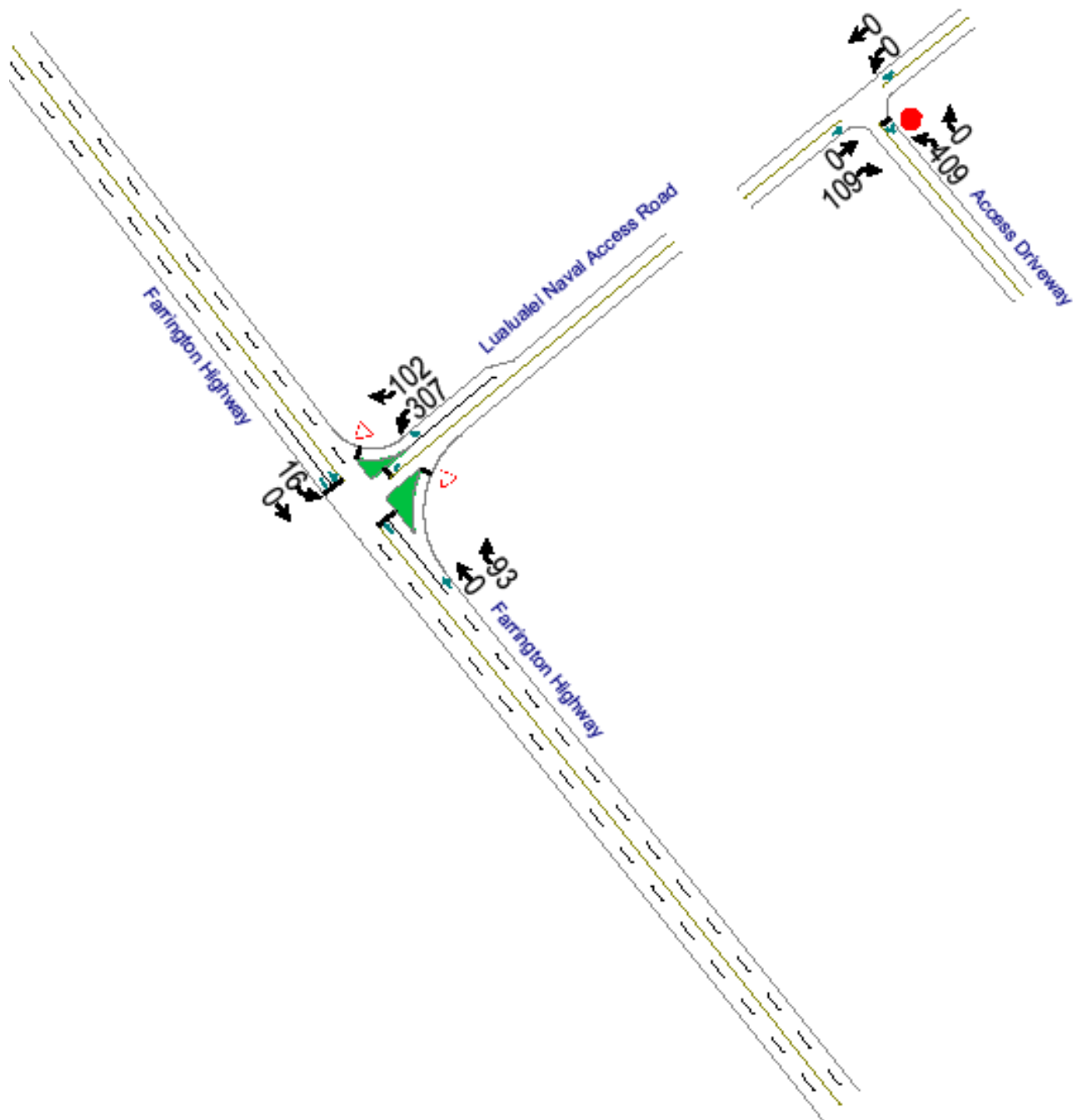
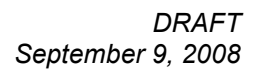


Figure 6. AM Peak Hour Traffic (VPH) Assignment



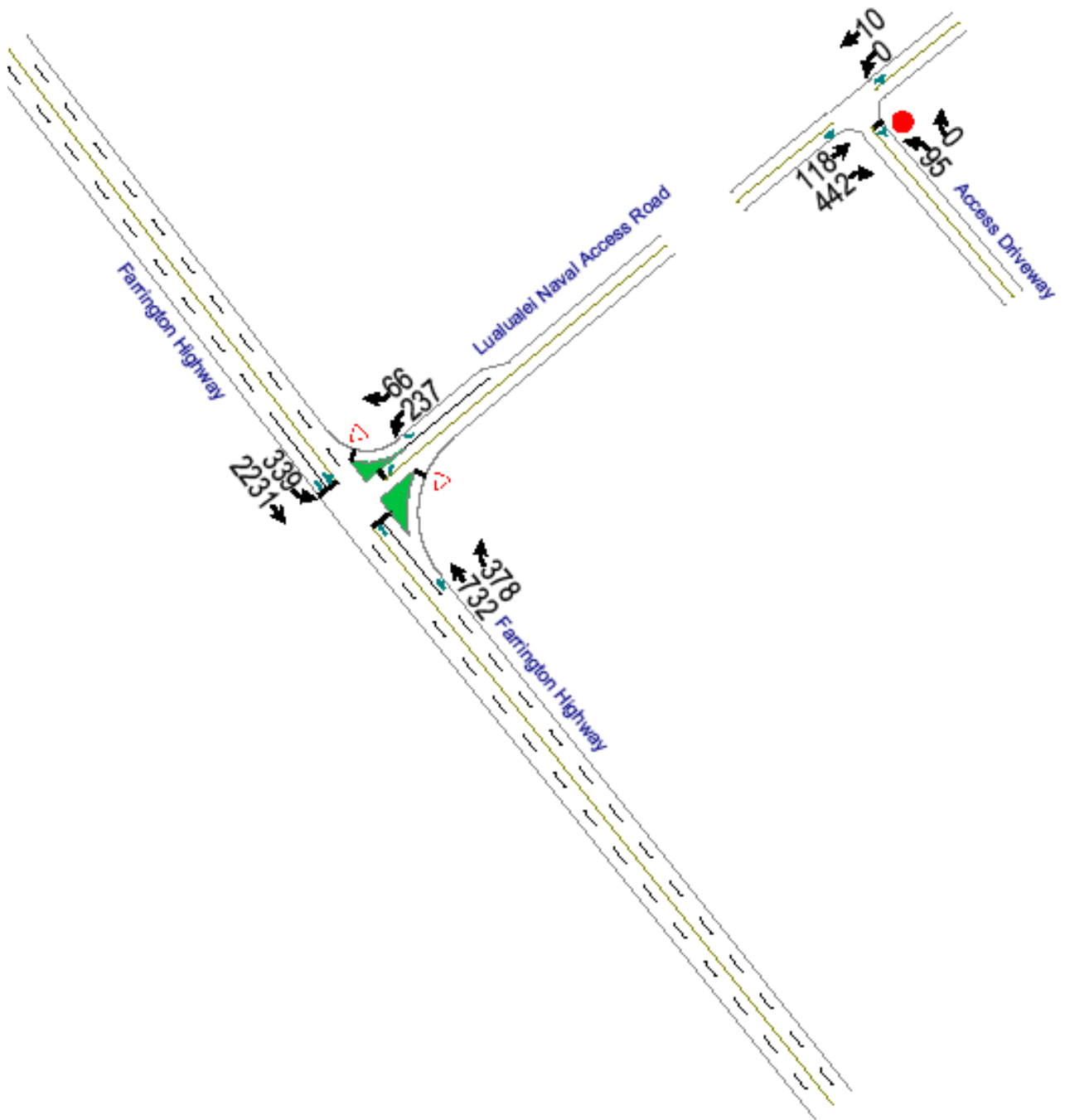
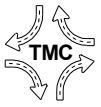


Figure 8. AM Peak Hour Traffic (VPH) With Project

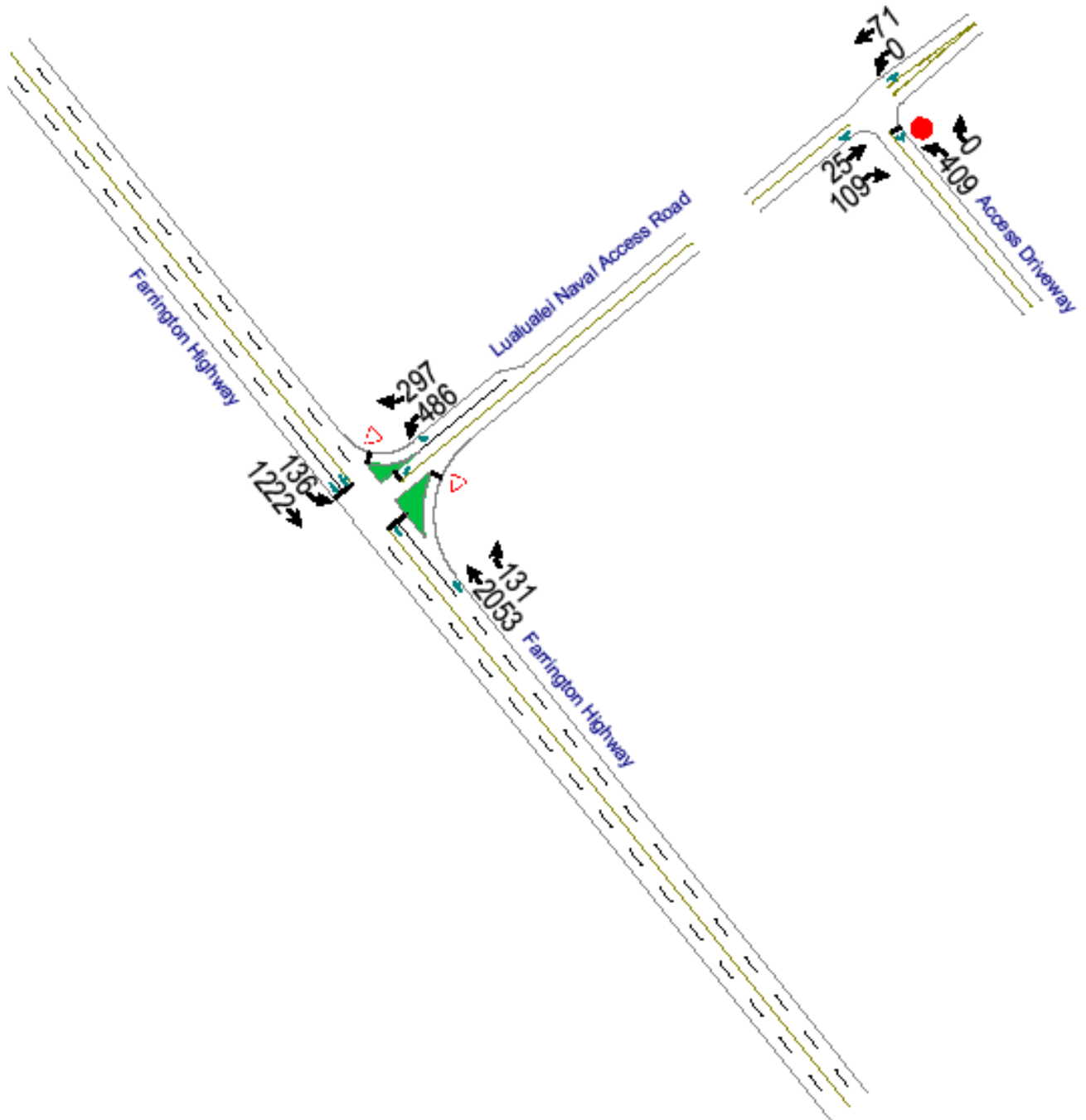
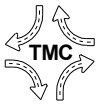
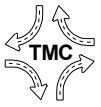


Figure 9. PM Peak Hour Traffic (VPH) With Project



## **V. Recommendations and Conclusions**

### **A. Recommendations**

The following traffic improvements, depicted on Figure 10, are recommended to mitigate the traffic impacts resulting from the proposed project:

1. Widen southbound Farrington Highway to provide an exclusive left-turn lane (350 feet in length).
2. Widen Lualualei Naval Access Road to provide double left-turn lanes (350 feet in length) and an exclusive right-turn lane.

### **B. Conclusions**

Traffic improvements, recommended herein, are expected to mitigate the traffic impacts resulting from the development of the proposed Nanakuli Industrial Park. Table 3 summarizes the traffic impact analysis of the project.



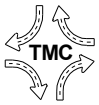


Table 3. Capacity Analysis - Farrington Highway and Lualualei Naval Access Road									
Scenario		MOE	SBT	SBL	NBT	NBR	WBL	WBR	Int.
Existing AM Peak Hour Traffic		LOS	E		A		F	B	D
		v/c	1.12		0.37		0.79	0.23	1.12
		Delay	76.0		3.4		94.6	18.7	52.8
Existing PM Peak Hour Traffic		LOS	C	C	C		D	C	C
		v/c	0.67	0.95	0.92		0.73	0.59	0.95
		Delay	29.7	27.3	23.9		50.4	24.5	26.7
AM Peak Hour Traffic Without Project		LOS	F		A		F	B	F
		v/c	1.23		0.40		0.82	0.24	1.23
		Delay	125.6		3.6		98.3	18.3	84.0
PM Peak Hour Traffic Without Project		LOS	D	D	C		D	C	C
		v/c	0.81	1.01	0.95		0.76	0.66	1.01
		Delay	48.2	41.1	28.1		53.5	31.3	34.7
AM Peak Hour Traffic With Project	Without Improvements	LOS	F		A		F	C	F
		v/c	1.86		0.63		1.06	0.27	1.86
		Delay	408.1		6.3		136.8	21.9	237.3
	With Improvements	LOS	E	A	C		E	A	C
		v/c	0.88	0.71	0.84		0.61	0.10	0.88
		Delay	73.0	7.2	26.1		59.6	6.4	22.0
PM Peak Hour Traffic With Project	Without Improvements	LOS	F	F	F		F	D	F
		v/c	1.39	1.14	1.09		1.16	0.64	1.39
		Delay	245.7	100.4	82.4		136.6	43.1	97.2
	With Improvements	LOS	E	A	D		E	D	D
		v/c	0.82	0.52	1.00		0.95	0.70	1.00
		Delay	60.4	7.9	43.4		75.9	46.6	38.0

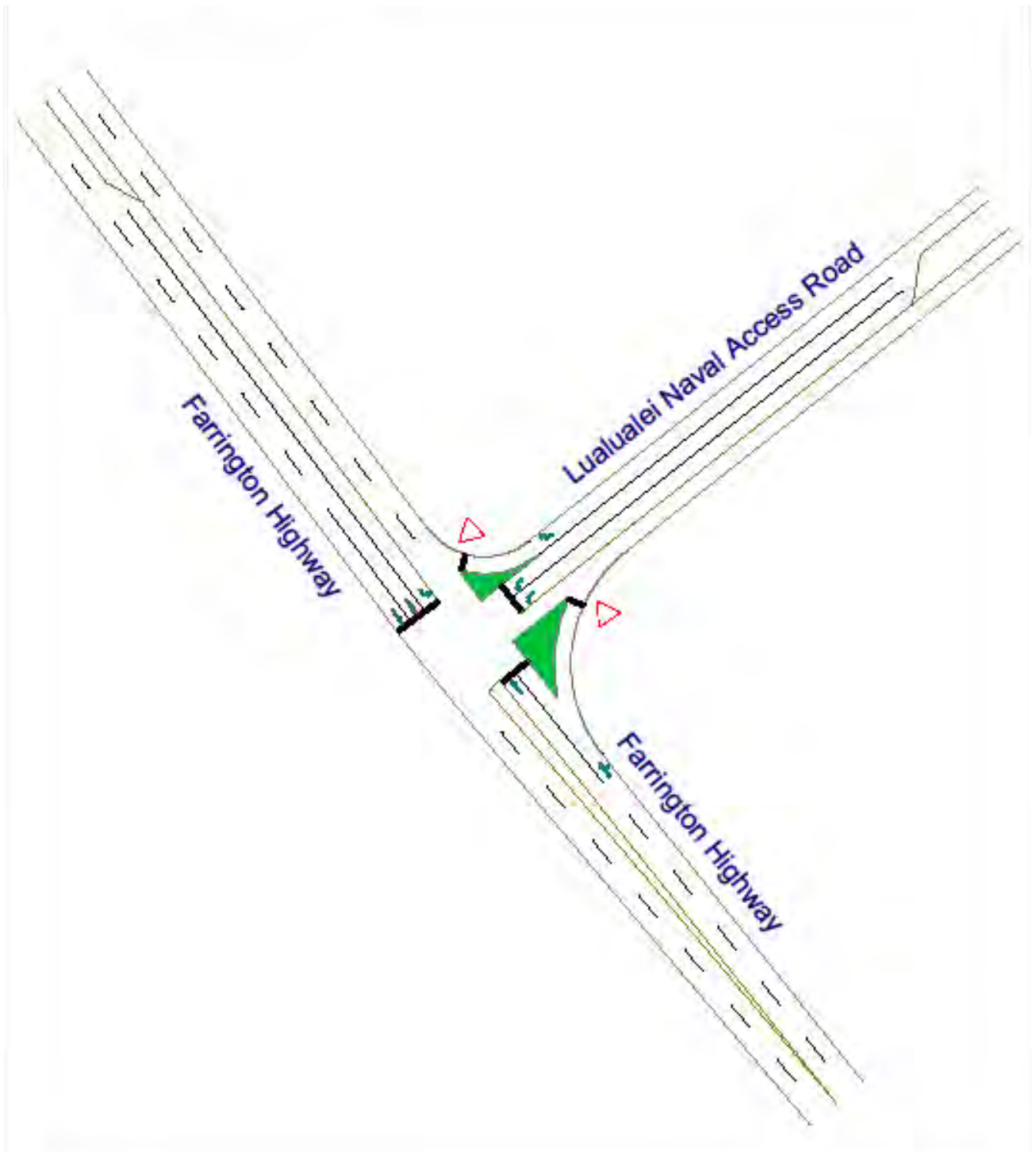
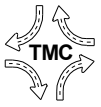


Figure 10. Intersection Improvements

## **APPENDIX F**

An Archaeological Inventory Survey for the Proposed Lualualei Golf Course, Lualualei, Wai‘anae, O‘ahu. Hallet H. Hammatt, Ph.D., Jennifer J. Robins, and Mark Stride, January 1991

**An Archaeological Inventory Survey  
for the Proposed Lualualei Golf Course  
Lualualei, Wai'anae, O'ahu**

DRAFT

*By*

Hallett H. Hammatt, Ph.D.

Jennifer J. Robins, B.A.

Mark Stride

**Prepared for  
Hida, Okamoto and Associates**

*by*

*Cultural Surveys Hawaii*

January 1991

### Abstract

Cultural Surveys Hawaii was requested by Hida, Okamoto and Associates to undertake an archaeological inventory survey for the approximately 170-acre proposed Lualualei Golf Course Development Project (TMK 8-7-9:portion 2; 8-7-10 parcels 6 and 10; and 8-7-19, portion 1) located in the ahupua'a of Lualualei, Island of O'ahu.

The survey and limited testing were conducted during four field days in the month of November 1990. As a result of the fieldwork eight sites were located within the project area including two traditional Hawaiian sites and six historic sites related to ranching and military activities. The historic sites include a cattle wall, a furnace, wells, a house lot, and cement foundation structure. The two traditional Hawaiian sites include one habitation complex and one wall remnant.

Limited subsurface testing for cultural deposits was conducted at the habitation complex - site 50-80-08-4366 - within a suspected hearth feature; no midden or artifacts were recovered. According to the Lualualei Golf Course development plan, site 50-80-08-4366 lies outside of the impact area and thus should be spared any disturbance. However, in the event that the impact zone is extended into the site area, we would recommend that it be preserved since it represents the only unequivocal, traditional Hawaiian habitation site in the project area.

Of the remaining seven sites identified within the project area, none are considered significant for future research.

### Acknowledgments

We wish to thank Mr. Harvey Hida of Hida, Okamoto and Associates for supplying the general information and maps for this project. Recognition and thanks is given to Messrs. Chris Bailey, Don Hugo, and Aron Suzuki who, along with the authors comprised the field crew. We would also like to thank Ms. Carol Kawachi of the State Historic Preservation Office for supplying information necessary for this report, Dr. Vicki Creed of Windword Processing for typing this report, and Mr. Dennis Tom for drafting the site maps. We especially thank Mr. Rodney Chiogioji and Mr. David Shideler for editing this report.

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## I. Introduction

At the request of Hida, Okamoto and Associates, Cultural Surveys Hawaii conducted an archaeological inventory survey of the proposed Lualualei Golf Course (170 acres) in the ahupua'a of Lualualei, Island of O'ahu (TMK 8-7-9:portion 2; 8-7-10 parcels 6 and 10; and 8-7-19: portion 1)(Figures 1-5).

The objective of this survey was to locate, inventory and evaluate the significance of the cultural resources in the project area and provide recommendations for treatment of these resources.

Fieldwork was conducted over a period of four days during the month of November 1990, by a crew of four persons. Limited subsurface testing was conducted at site 50-80-08-4366 to determine if cultural deposits are present.

The project area is located along the northeastern perimeter of Lualualei Valley and along the base of Pu'u Heleakala Ridge which partially separates Lualualei Valley from Nanakuli Valley.

As a result of the survey, eight sites were identified within the project area (Figure 6). Two of these sites (50-80-08-4366 and -4367) are interpreted as traditional Hawaiian sites, while the remaining six are clearly attributable to historic activities related to ranching and military presence.

### A. Scope and Methods

This project consisted of reconnaissance, description and mapping of archaeological sites within the project area.

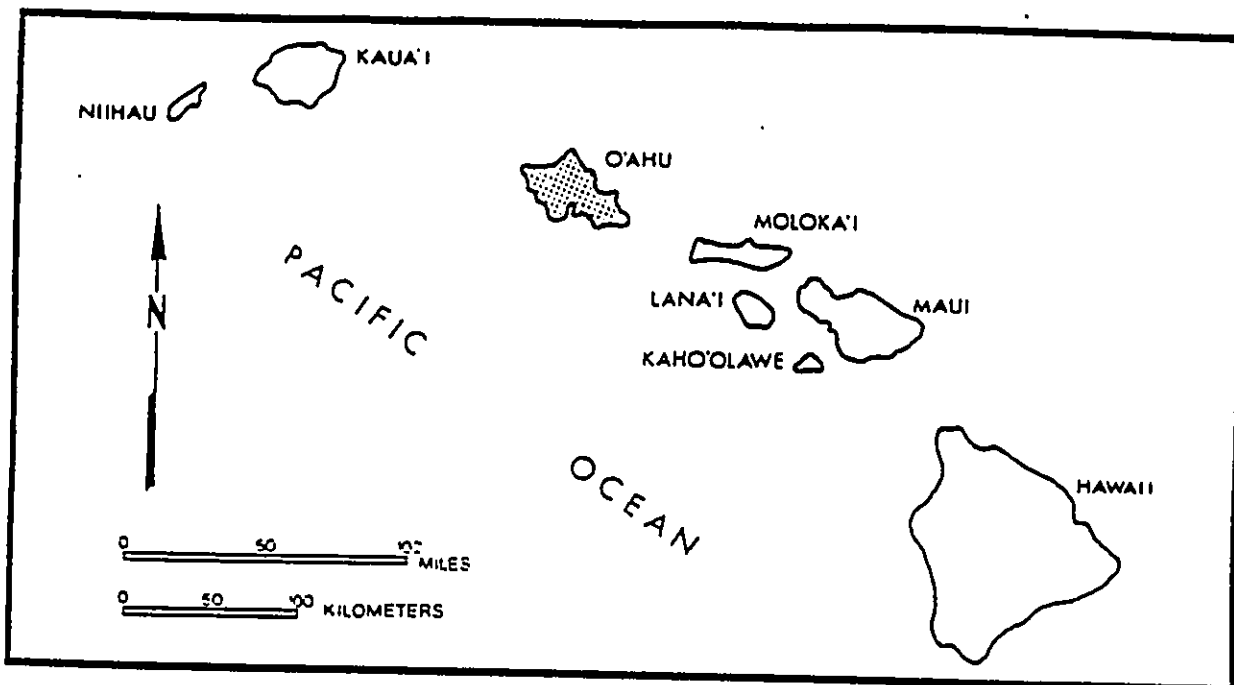


Fig.1. State of Hawaii

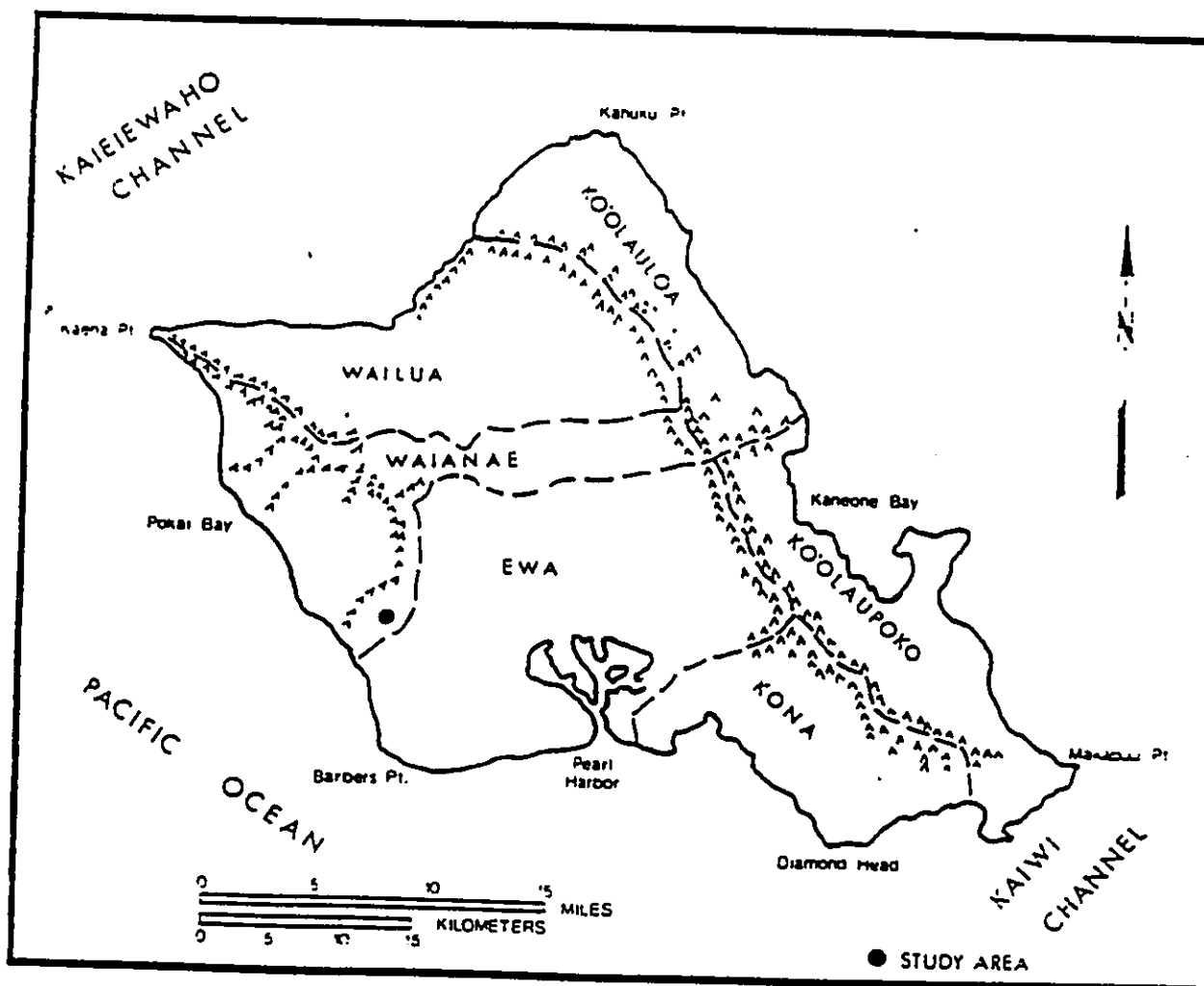


Fig.2. General Location Map, Oahu Island.

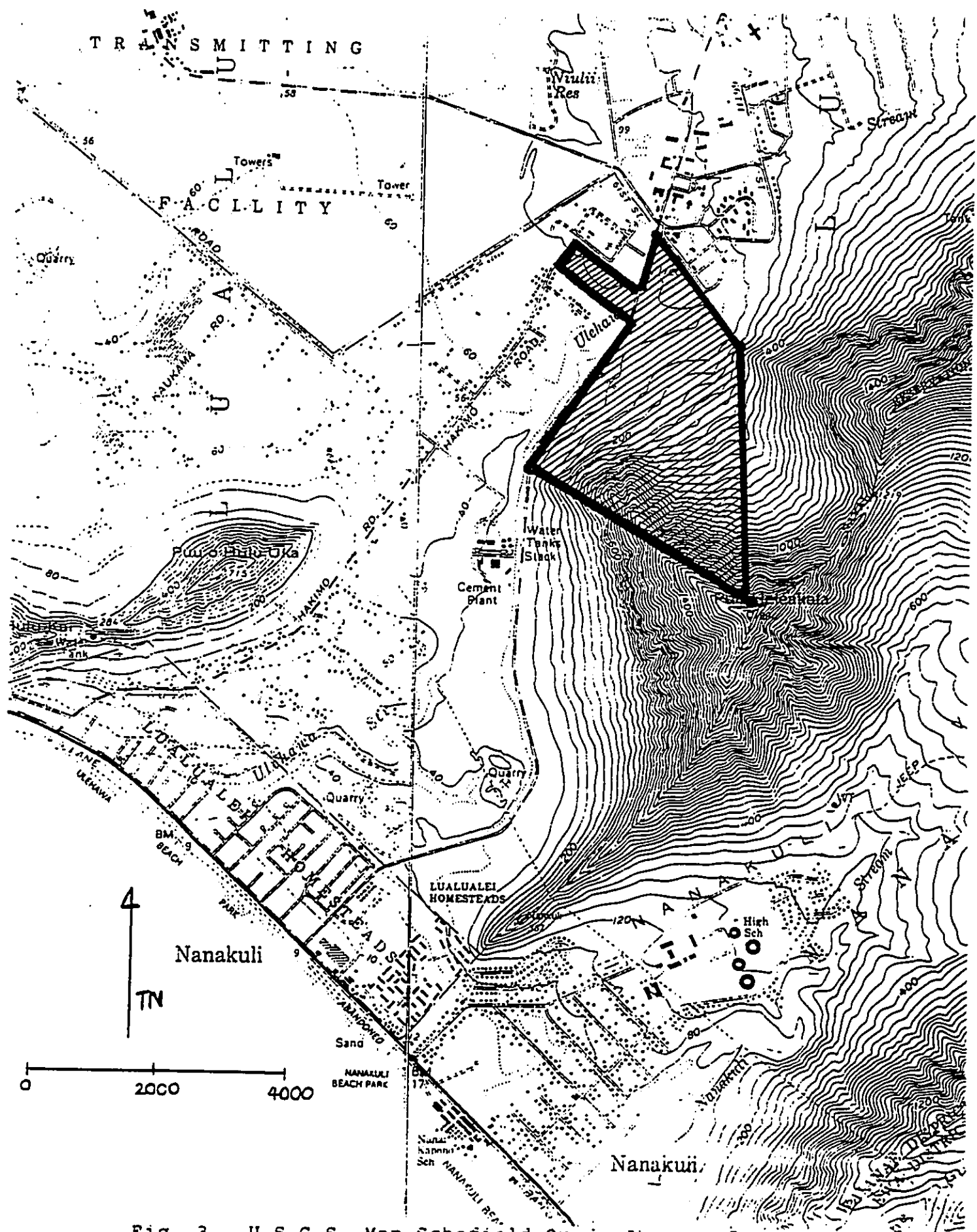


Fig. 3 U.S.G.S. Map Schofield Quad, Showing Project Area (Shaded)

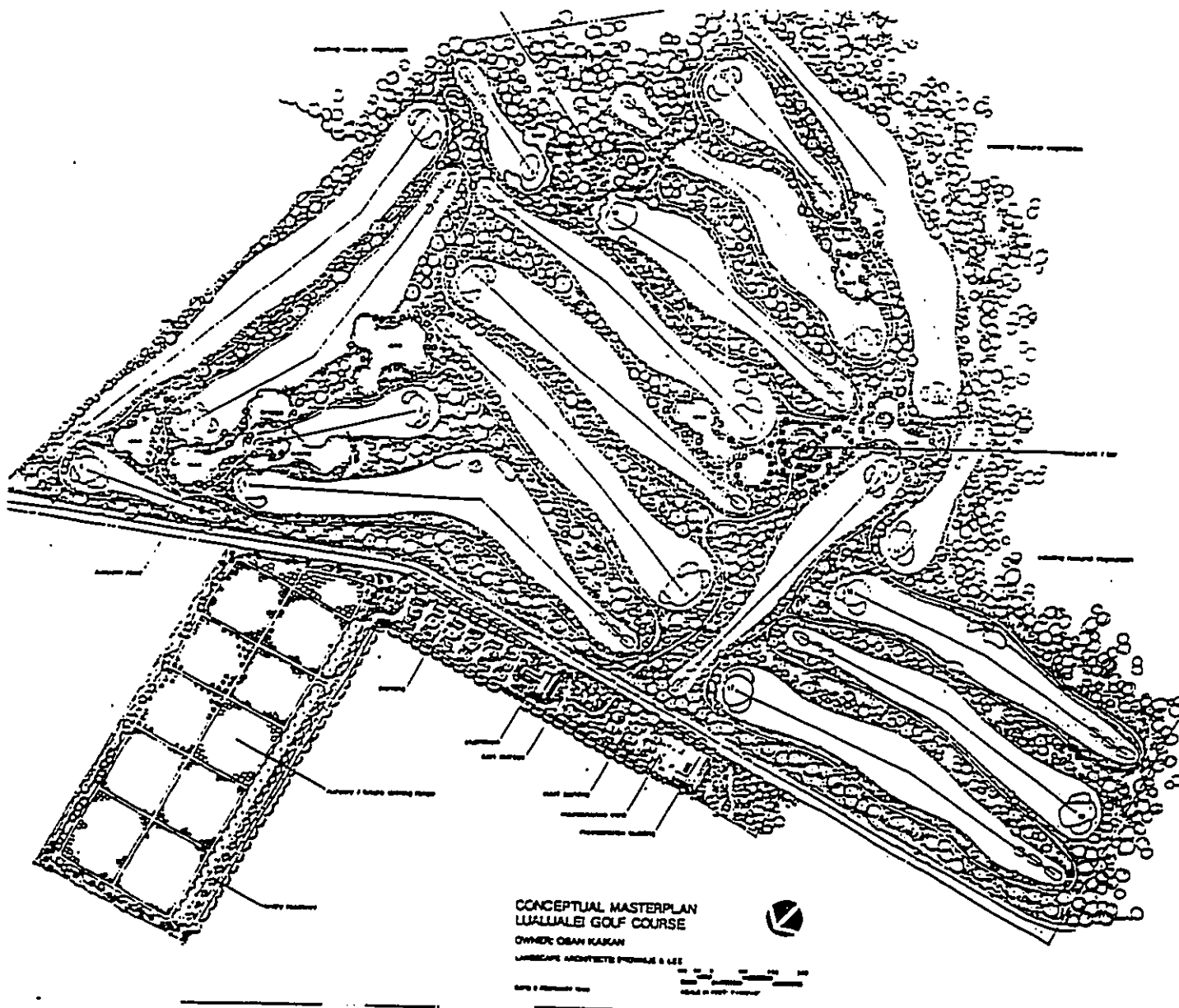


Fig. 4 Proposed Lualualei Golf Course

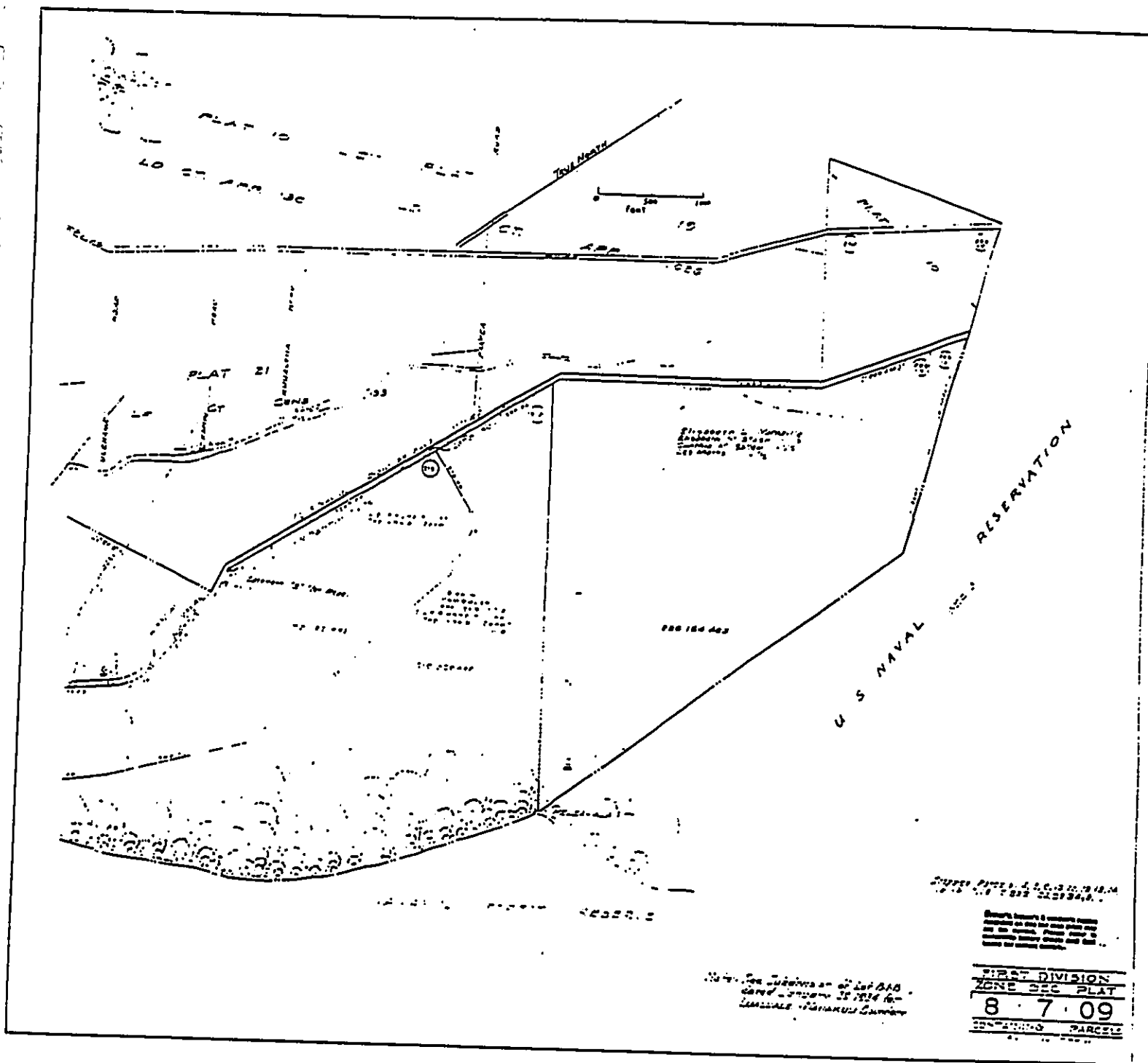


Figure 5 Tax Map of Project Area



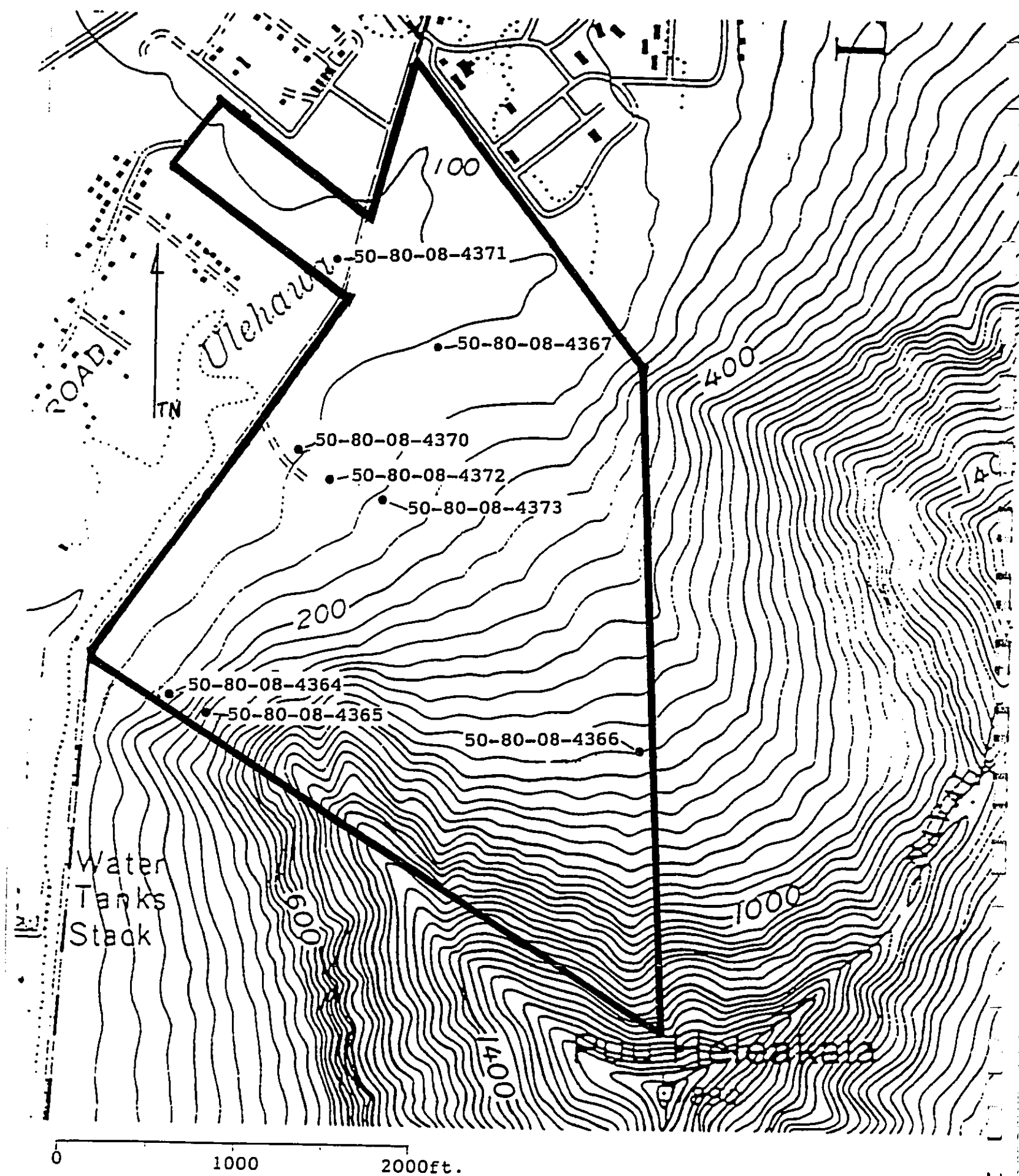


Figure 6 Project Area Showing Site Locations

Access to the property was gained from Lualualei U.S. Naval Road on the northwest boundary. Three gates along this road were used to enter the project area. A crew of three-four archaeologists, spaced at intervals of 50 ft.-100 ft. depending on the vegetation and visibility, systematically surveyed the property by pedestrian sweeps (usually west to east). The steep slope and cliffs along Pu'u Heleakala rendered the ground survey impossible above the 400 ft. to 600 ft. elevation.

All sites were recorded by formal category and given temporary site numbers. Fieldwork at each site included triangulating and mapping its location onto a project map; interpreting the site's nature, extent, and probable function; and searching for the presence of surface artifacts. Specific sites were mapped - using a compass and tape - and photographed. All sites were flagged with heavy yellow construction tape. Edges of sweeps were marked with pink or red flagging tape.

Following the fieldwork all sites were given State Site numbers. Two sites that were originally given temporary site numbers were later determined to be noncultural. Consequently, gaps exist in the temporary site number list.

#### B. Project Area Description

The project area comprises vacant, unused lands. It is undeveloped and contains several remnant and abandoned historic structures.

The project area extends in a northeasterly direction from

# **CORRECTION**

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

Access to the property was gained from Lualualei U.S. Naval Road on the northwest boundary. Three gates along this road were used to enter the project area. A crew of three-four archaeologists, spaced at intervals of 50 ft.-100 ft. depending on the vegetation and visibility, systematically surveyed the property by pedestrian sweeps (usually west to east). The steep slope and cliffs along Pu'u Heleakala rendered the ground survey impossible above the 400 ft. to 600 ft. elevation.

All sites were recorded by formal category and given temporary site numbers. Fieldwork at each site included triangulating and mapping its location onto a project map; interpreting the site's nature, extent, and probable function; and searching for the presence of surface artifacts. Specific sites were mapped - using a compass and tape - and photographed. All sites were flagged with heavy yellow construction tape. Edges of sweeps were marked with pink or red flagging tape.

Following the fieldwork all sites were given State Site numbers. Two sites that were originally given temporary site numbers were later determined to be noncultural. Consequently, gaps exist in the temporary site number list.

#### B. Project Area Description

The project area comprises vacant, unused lands. It is undeveloped and contains several remnant and abandoned historic structures.

The project area extends in a northeasterly direction from

Lualualei Naval Road to the foothills of Pu'u Heleakala. Below the 200-foot elevation level the terrain is fairly level with gradual slope. Above the 200-foot elevation level the terrain slopes steeply uphill toward Pu'u Heleakala Ridge which is at approximately the 1880-foot elevation level (no golf course construction will occur beyond the 400-ft. elevation).

The lower, flatter portion of the project area adjacent to the Lualualei Naval Road consists mostly of weedy grasses and koa haole shrubs. Approximately 15 acres located in the north portion of the project area were cultivated for vegetable crops until early 1988; much of the irrigation system is still evident. Kiawe trees and wild grasses dominate the remaining portion of the project area along the foothills of Pu'u Heleakala. Above the 250-foot elevation level, steep outcroppings dominate and the vegetation is low shrubs and grasses. A number of Williwili trees were present in the project area most especially along the foothills of Pu'u Heleakala.

The major soil types in the project area consist mostly of Lualualei extremely stony clay 3 to 35 percent slopes (LPE) with some Lualualei clay 2 to 6 percent slopes (LuB) covering the flatter portions of the project area adjacent to the Lualualei Naval Road (Foote et al. 1972).

## II. Cultural Setting

### A. Prehistory and Early History

Numerous Hawaiian legends, in addition to archaeological evidence, reveal the Wai'anae coast and mauka interior to be an important center of Hawaiian prehistory and early history.

The present study area is located in the ahupua'a of Lualualei which extends from the leeward ridge of the Wai'anae Range to the coast between Nanakuli Valley to the south and Wai'anae Valley to the north.

Traditional accounts of Lualualei focus on the mythological cycle of the demi-god Maui. Samuel Kamakau cites Ulehawa Stream at the coast of Lualualei as the birthplace of the Polynesian demi-god Maui and his brothers: it was here that Maui learned the secret of making fire for mankind and perfected his fishing skills. Other famous accounts of Maui at Ulehawa Stream refer to: the cave in which Hina (moon goddess, mother of Maui) made her tapa; the fishhook, Manai-a-ka-lani (with which Maui attempted to unite the Hawaiian Islands); the snare for catching the sun (which Maui used to advantage on Haleakala); and the place where Maui's adzes were made (Kamakau, 1961).

John Papa I'i describes three trails crossing over the mountains into Lualualei Valley and running along the coastline from 'Ewa. These trails are certainly of some antiquity with the southern-most trail through Pohakea Pass possibly once traversing a portion of the present study area along Ulehawa Stream.

During prehistory the arid coastal regions of Nanakuli and

Lualualei Valley likely supported a sparse population which was limited to isolated, perhaps temporary, habitations focusing on fishing; this scene was undoubtedly similar to George Vancouver's description of the Wai'anae coast observed at the time of contact. Here, Vancouver reported seeing "one barren, rocky waste, nearly destitute of verdure, cultivation or inhabitants" with only a "few straggling fishing huts" scattered along the coastline (in McGrath et al., 1973:17). Amidst the sparsely inhabited expanse he observed at the leeward coast, Vancouver encountered a village along the beach at Wai'anae, where he was offered a number of hogs and a wide variety of vegetables (Handy and Handy, 1972:468). Wai'anae - the wettest valley on the leeward side of O'ahu - was the largest settlement on the coast. Roger C. Green suggests it was one of the first Hawaiian settlements in the Wai'anae District (Green, 1980:72).

A story told by Mary Kawena Pukui about how Nanakuli Valley got its name clearly reveals the early Hawaiians' struggle and the unique character formed by adapting to the more unfavorable environments of the leeward coast:

'...Because of the great scarcity of water and vegetable food, they [the Nanakuli people] were ashamed to greet passing strangers. They remained out of sight as much as possible. Sometimes they met people before they were able to hide, so they just looked at strangers with expressionless faces and acted as though they were stone deaf and did not hear the greeting. This was so that the strangers would not ask for water which they did not have in that locality...So the place they lived was called Nana, or look, and kuli, deaf--that is, Deaf mutes who just look' (in Sterling and Summers, 1978:61-62)



Although these and various other historic accounts describe the coastal regions of Nanakuli and Lualualei as relatively uninhabited because of their limited subsistence resources, archaeological evidence suggests that late prehistoric and early historic land usage occurred inland of the coastline.

Subsequent to western contact in the area (after ca. 1790), the landscape of Lualualei Valley and the surrounding slopes of the Wai'anae Mountains were adversely impacted by the removal of the sandalwood forest and by the introduction of domesticated animals and new vegetation species.

In the early 1800s when Wai'anae first became involved in the sandalwood trade, King Kamehameha the Great ordered the people of the leeward district to cut sandalwood to pay for the ship "Columbia" which he purchased at the price of "twice the full of the vessel" (in Hammatt et al., 1985:24). In addition to obliterating the sandalwood forest, the intensive sandalwood trade adversely impacted the traditional Hawaiian culture. Kamakau writes that because so many commoners were ordered to participate in the harvesting of sandalwood "famine was experienced from Hawaii to Kauai" forcing the people to "eat herbs and fern roots because there was no food to be had" (in McGrath et al. 1973:18). As a result of an accelerated oppression of the people following the death of Kamehameha in 1819 - when control of the rich sandalwood trade was placed in the hands of local chiefs - the people of Wai'anae pulled out the sandalwood saplings to avoid future harvesting (Ibid.).

Domesticated animals including goats, sheep, and cattle were brought to the Hawaiian Islands by Vancouver in the early 1790s and allowed to graze freely about the land for some time after. It is unclear when the domesticated animals were first brought to O'ahu; however, L.A. Henke reports the existence of a longhorn cattle ranch in Wai'anae by at least 1840 (Frierson, 1972:10). During this same period, perhaps as early as 1790, exotic vegetation species were introduced to the area. These typically included vegetation best suited to a terrain disturbed by the dwindling sandalwood forest and erosional effects of animal grazing. The following dates of specific vegetation introduced to Hawai'i are given by R. Smith and outlined by Frierson (1972:-10-11):

- 1) "early," c. 1790  
Prickly pear cactus, Opuntia tuna  
Haole koa, leucaena glauca  
Guava, Psidium guajava
- 2) 1835-1840  
Burmuda [sic] grass Cynodon dactylon  
Wire grass, Eleusine indica
- 3) Lantana, Lantana camara

The kiawe tree was also introduced during this period, either in 1828 or 1837 (Ibid.:11).

Following the western encroachment into the Wai'anae Coast, a swift decline in population occurred due to disease and a "tendency to move to the city where there was more excitement" (McGrath et al., 1973:25). In 1835, a missionary census listed 1,654 residents on the Wai'anae Coast. This was a small fraction

of the 4000-6000 inhabitants estimated to have lived in Wai'anae in 1778 by state statistician Robert Schmitt (Ibid.). The population of the Wai'anae Coast was decimated by a small pox epidemic in late 1853. In 1855, the Wai'anae tax collector recorded 183 taxpayers on the leeward coast, which is thought to represent a total population of about 800 people. This catastrophic depopulation facilitated the passing of large tracts of land into the hands of few landholders and led to the decline of the traditional Hawaiian economy that once supported the region.

B. Mid to Late 19th Century

During the Great Mahele in the mid 1800s, the ahupua'a(s) of Wai'anae, Lualualei, and Nanakuli became crown lands and were intended to be personal property of the king and his heirs providing sufficient revenue to support the king and his family (Haun and Kelly, 1984:35). In Lualualei six lands claims were awarded to at least eight families in Puhawa'i located at the northern end of the valley. According to information provided by the claimants in the Register of the Land Commissioners to Quiet Land Titles, these families were cultivating "a total of at least 163 lo'i or taro pondfields, in addition to dryland crops on the kula and wauke in the small valleys" (Ibid.:32).

Between 1850 and 1880, ranching was the leading industry of the Wai'anae Coast. During this time and prior to 1886 (year of King Kamehameha IV's death) large tracts of crown lands in the Wai'anae District were sold with fee simple titles or placed

under long-term leases to various entrepreneurs and families such as Samuel Andrews in Makua Valley; the Dowsetts in Nanakuli, Lualualei, Mikilua, and later in Wai'anae; and the Holt clan in Makaha.

In 1878, Hermann A. Widemann - a retired Supreme Court Justice - began Wai'anae Plantation, the first sugar plantation on O'ahu. Roger Green reports that "between 1878 and 1884 the economy and community of Wai'anae underwent a major change, in which the former Hawaiian landscape virtually disappeared" (Green, 1980:12). With the hiring of 20 local Hawaiians, 15 haole technicians and almost 60 Chinese laborers, Widemann essentially created a town at Wai'anae to support the cultivation and processing of sugarcane. This included the building of 24 new houses and a manager's residence along with a sugar mill and various extensive irrigation systems. In 1884, the Hawaiian Directory reported Wai'anae to be the largest settlement on the island outside of Honolulu. By 1890 the Wai'anae Sugar Plantation had over 600 acres in sugar cultivation, 12 miles of railroad and 350 laborers; the 1890 census reported 903 residents in the Wai'anae District.

On George Bower's trip around O'ahu in 1880, he described Lualualei Valley as "occupied as a grazing farm" by Dowsett and Galbraith who leased "sixteen thousand acres from the Crown" (in Haun and Kelly, 1984:32).

Following the overthrow of the Hawaiian monarchy in 1893, crown lands along with government lands became recognized as

public domain and subsequently became available for homesteading.

C. 20th Century

At the turn of this century the ahupua'a of Lualualei was divided into numerous homestead lots. The largest homestead lot (including the present study area) totaled 2,629 acres and was sold to H.M. von Holt in 1903 for ranching cattle (Haun and Kelly, 1984:37-38). The majority of the present study area continued to be used for cattle ranching and was probably once included in the extensive McCandless Cattle Ranch covering a large portion of Lualualei Valley. By 1929 over 8,184 acres of the McCandless Cattle Ranch land, "the area which now constitutes the Lualualei branch" (in Haun and Kelly, 1984:41) had been purchased by the U.S. Military.

Although most of the present study area continued to be utilized for cattle ranching up into modern times, the northeast portion of the lot was used by the military, as is evidenced by the presence of a few quonset huts and associated military debris.

D. Modern Land Use

During more recent times the project area has been vacant and unused with the exception of roughly 15 acres along the northern portion which was leased to tenant farmers - Mr. and Mrs. Ryoei Higa - for vegetable cultivation. After initial protest, an amicable agreement was reached between the owner and

tenants, and the Higas stopped farming and terminated the lease  
in 1988.

### III. Previous Archaeological Work

No archaeological research has been conducted within the project area prior to this present study.

The earliest attempt to record archaeological sites in the nearby regions of Lualualei and Nankuli was in the 1930s by J. Gilbert McAllister. Sites located closest to the present study area include Nioiula Heiau, Ilihune Heiau and a large rock referred to as "Maui" (McAllister, 1933:110).

Nioiula Heiau (State Site no. 50-80-08-1179) is located on Halona Ridge near Pohakea Pass. The site is described as a paved and walled heiau with the northern portion almost completely destroyed after many of its stones were removed to build a cattle pen for the McCandless Ranch. The site is said to have been of ancient antiquity, once belonging to the chief Kakuihewa. In addition, McAllister suggests it to be the "heiau on which was placed the body of the boxer killed by Kewalo" (Ibid.).

Ilihune Heiau (State Site no. ?) is located on the Nanakuli side of the western ridge of Pu'u Heleakala and was originally described by Thomas G. Thrum as "a small walled heiau of Pookana-ka class; used about 1860 by Frank Manini as a cattle pen, for which natives prophesied his poverty and death" (in McAllister, 1933:110). McAllister only approximated the location of this site as no surface structure or structures remained.

The large rock, referred to as "Maui," is located on the coast near Ulehawa Stream. Oral tradition denotes this rock as the place where the demi-god Maui "reposed and sunned himself"



after first arriving in the Hawaiian Islands from the south (McAllister, 1933:110).

A recent archaeological reconnaissance survey specifically conducted in Lualualei Valley by Alan Haun (1985) recorded the presence of a significant number of traditional Hawaiian sites. The project included surveying of approximately 3,130 acres of Lualualei Valley. A total of 376 indigenous (Hawaiian) "features" were recorded, including a wide range of site types from cliff overhang shelters, caves, and habitation platforms to field terraces and mounds, in addition to religious and lithic technology sites; possible burials were also noted. Nine radiocarbon dates obtained from the survey indicate an interior settlement pattern by the 1400s when, according to Haun, "mid-level elevation sites were occupied." Haun further suggests that the majority of the remaining "features" were occupied by the mid-1600s, probably permanently until the 1800s (Ibid.:13). It is important to note that these results and interpretations of the Lualualei fieldwork are preliminary and currently under review by the State Historic Preservation Office.

#### IV. Survey Results

Each of the eight sites located within the project area is described below.

State Site # 50-80-08-4364

CSH Site: 1

Site Type: Wall

Function: Cattle wall

Probable Age: Historic

Condition: Fair

Dimensions: 141 m. (462 ft.) long

Description: Site 50-80-08-4364 is located on the lower portion of the ridgeline oriented northwest/southeast along the west boundary of the project area. This site is a wall constructed of large and small boulders with some cobbles; it measures .6 m. - 1 m. (2 ft. - 3.5 ft.) high, 3-5 courses, and 30 cm. - 45 cm. (.9 ft. - 1.3 ft.) wide. The wall is constructed along a sloping ridgeline and utilizes bedrock cliffs in areas where the wall would not be necessary. The mauka end of the wall has a hook-shaped configuration and terminates where the terrain is too steep at approximately the 200-foot elevation level.

State Site # 50-80-08-4365

CSH Site: 2

Site Type: Wall

Function: Military shelter

Probable Age: Historic

Condition: Fair

Dimensions: 2.5 m. (8.2 ft.) long

Description: This site is located 42 m. (137.7 ft.) upslope of Site 50-80-08-4364 at approximately the 300-foot elevation level. The site comprises a short wall section constructed of piled small boulders; the wall averages 25 cm. (.8 ft.) high and 60 cm. (1.9 ft.) wide. It is situated along a knoll at the edge of a bedrock cliff providing a clear view of Lualualei Valley to the NE and NW. A small pile of bullet shells and military C-rations cans were visible at the site.

State Site # 50-80-08-4366

CSH Site: 3

Site Type: Structural Complex

Function: Habitation

Probable Age: Prehistoric

Condition: Fair

Dimensions: 12 m. (39.3 ft.) N/S by 8 m. (26 ft.) EW

Description: Site 50-80-08-4366 (Fig. 7) is located in the southeast portion of the project area at approximately the 550-foot elevation level on the west side of an intermittent stream bed. The site comprises at least three features including a terrace with an attached enclosure and adjacent modified outcrop.

The terrace is bi-level and is constructed of stacked boulders and cobbles. The uppermost level of the terrace exhibits the most formal construction; it is separated from the lower terrace by a raised boulder alignment 60 cm. (1.9 ft.) high. The upper terrace measures 8 m. (26.2 ft.) long E/W and retains a level area of small boulders and cobbles approximately 2 m. (6.5 ft.)

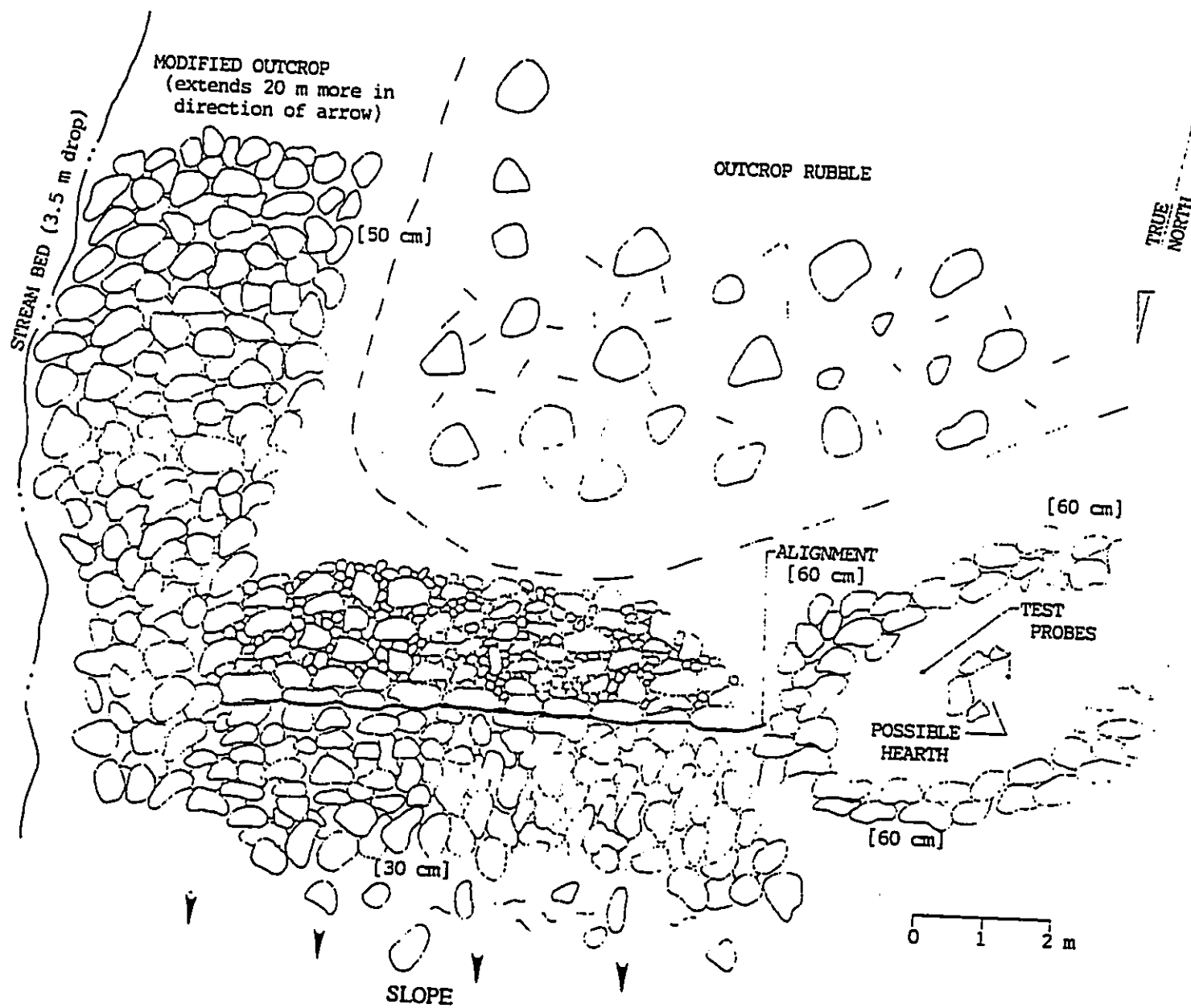


Fig. 7 Site 50-80-08-4366; Plan View

wide N/S. The lower terrace is less formal and somewhat collapsed.

A roughly oval-shaped enclosure abuts the terrace to the west; it is constructed of small and large boulders. It measures 6 m. (19.6 ft.) E/W by 4 m. (13.1 ft.) N/S (exterior) and 2 m. (6.5 ft.) E/W by 1.2 m. (3.9 ft.) N/S (interior). The walls of the enclosure average 60 cm. (1.9 ft.) high and 50 cm. (1.5 ft.) wide. A probable hearth feature - evidenced by a semi-circular configuration of four cobbles - is located at the center of the enclosure.

Directly east of the terrace is a naturally mounded wall of outcrop with minor modifications; this formation extends to the south roughly 30 m. (98.4 ft.) running adjacent to the stream bed and adjoins a sloped bed of outcrop rubble situated west and south of the general site area. Modifications along the naturally mounded wall as well as among the extensive outcrop rubble, include rough facings and circular depressions.

Two test probes were conducted within the suspected hearth feature of the enclosure. A very dark brown soil - which may represent burning episodes - was encountered; no artifacts or midden were observed.

State Site # 50-80-08-4367

CSH Site: 4

Site Type: Wall segment

Function: Possible shelter remnant

Probable Age: Prehistoric

Condition: Poor

Dimensions: 4.5 m. (14.7 ft.) long

Description: Site 50-80-08-4367 is located on fairly level terrain in the northern portion of the project area at approximately the 100-ft. elevation level. The site consists of a short wall segment 4.5 m. (14.8 ft.) long constructed of water-rounded boulders. It stands 60 cm. - 90 cm. (1.9 ft. - 3 ft.) high, 3-4 courses, and one boulder wide; it is situated on the west side of a small, shallow, dry stream bed. The area surrounding this site has been disturbed by heavy erosion or possible bulldozing. Adjacent to this site is a barbed wire fence extending NW/SE. No midden or artifacts were observed at this site.

State Site # 50-80-08-4370

CSH Site: 7

Site Type: Historic house lot

Function: House lot

Probable Age: Historic

Condition: Poor

Description: This site consists of historic features including a garden area, possible cesspool, and other miscellaneous modern debris. Directly to the east of this site is Ulehawa Stream; a dirt road lies immediately to the west. Evidence of a house, including wood, a refrigerator, bottles and jars, are present in this area. Fence posts are still standing near the dirt road. Lualualei Naval Road is located just to the north of this site.

Some minor modifications are evident along the southwest side of the stream bed where some small boulders have been piled in an alignment. There is no evidence of any prehistoric activity in this area. This site is located on level terrain in the west central portion of the project area at approximately the 100-foot elevation level.

State Site # 50-80-08-54371

CSH Site: 8

Site Type: Historic wells

Function: Well site

Probable Age: Historic

Condition: Poor

Dimensions: See Description

Description: This site is the only site located on the portion of the project area NW of Lualualei Naval Road. It consists of two probable well features. Both features consist of a circular depression with a low wall bounding the depression. The depressions average 1 m. (3.2 ft.) deep and 4 m. (13.1 ft.) in diameter. Wood and metal fragments are present within the depressions; these may have represented a well cover at one time.

Feature A is located at the north end of a dry stream bed. A low L-shaped wall was constructed on the NE bank. The low wall is constructed of piled small boulders and cobbles and measures 5 m. (15 ft.) N/S by 4 m. (13 ft.) E/W.

Feature B (Figure 8) is located directly to the NE of Feature A at the SW end of a dry stream bed. Some piling of cobbles



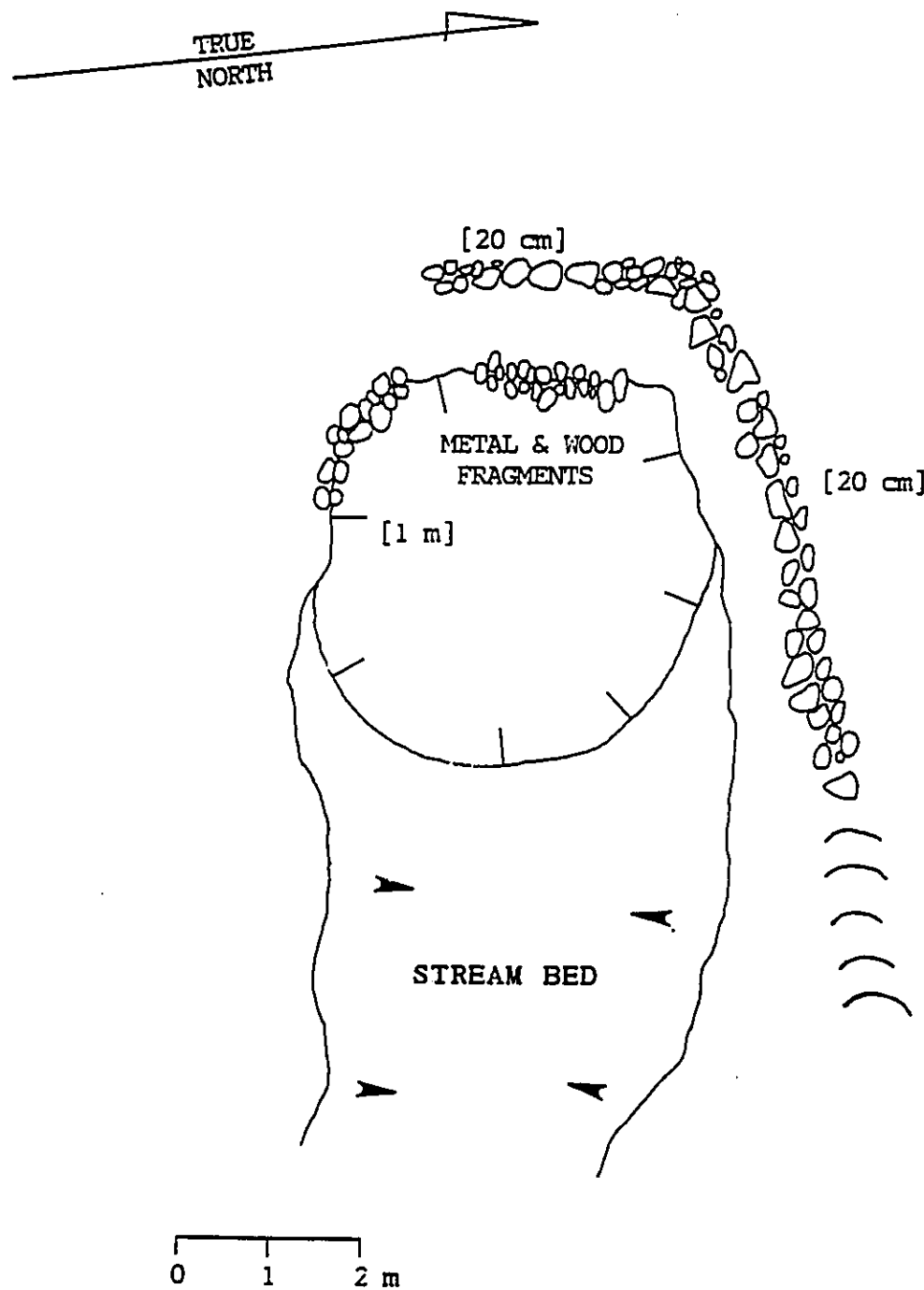


Fig. 8 Site 50-80-08-4371 Feature B; Plan View



Probable Age: Historic

Condition: Fair

Dimensions: 5.4 m. (17.7 ft.)

Description: This site is located in the west central portion of the project area. The historic incinerator is 5.4 m (17.7 ft.) high and 2.1 m. (6.8 ft.) in diameter and is cylinder-shaped. Two openings exist at the base and at the top of the structure (a metal staircase allows access to this top opening). The interior floor of the structure - visible through the lower opening - contains a circular metal plate covered primarily with burned bullet casings and miscellaneous metal debris. Bullet casings were also observed along the ground surface outside of the incinerator.

### Summary and Recommendations

A total of 8 archaeological sites was identified in the Lualualei Golf Course project area.

Only two of these sites (50-80-08-4366 and -4367) are interpreted as being attributable to traditional Hawaiian activity, with one site (50-80-08-4366) probably representing prehistoric, recurrent habitation at the foothills of Pu'u Heleakala. This is primarily evidenced by the presence of a probable hearth feature within the site complex. Site 50-80-08-4367 - a remnant wall section running adjacent to an intermittent stream bed - suggests an agricultural usage possibly constructed to retain or divert water. Given the weathered condition of the structure this site may be prehistoric.

The six remaining sites identified within the project area are attributable to historic land usage. Five sites (50-80-08-4364, -4370, -4371, -4372, and -4373) are associated with cattle ranching and include cattle walls, a historic house lot and various other ranching infrastructure. One site (50-80-08-4365) represents a military shelter evidenced by the presence of bullets and C-ration cans. In addition to this site, three quonset huts are present in the project area. These structures, however, are considered to have been built within the last 50 years and have not been included in the present study.

Seven sites of the the site inventory are evaluated as no longer significant because of lack of cultural or scientific interest beyond their plotted distribution.

Site 50-80-08-4366 is likely to yield information important in prehistory or history. According to the Lualualei Golf Course development plan this site lies outside of the impact area and thus should be spared any disturbance. However, in the event that the impact zone is extended into the site area, we recommend that it be preserved given that it represents the only traditional Hawaiian habitation site present in the project area.

A summary of site significance and recommended action is presented in Table 1.

Table 1: Site Summary and Significance

<u>CSH#</u>	<u>State Site #</u>	<u>Site Type/Function</u>	<u>Sig.</u>	<u>Recommend.</u>
1	50-80-08-4364	Wall/Ranching	NLS	None
2	50-80-08-4365	Shelter/Military	NLS	None
3	50-80-08-4366	Struc. Complex/Hab.	D	Preserve
4	50-80-08-4367	Wall remnant/Agric.	NLS	None
7	50-80-08-4370	House lot/Ranching	NLS	None
8	50-80-08-4371	Wells/Ranching	NLS	None
9	50-80-08-4372	Foundation/Ranching	NLS	None
10	50-80-08-4373	Incinerator/Ranch.-Mil.	NLS	None

CODES FOR CRITERIA FOR SITE SIGNIFICANCE

NS	Not Significant
NLS	No Longer Significant
A	Site reflects major trends or events in the history of the state or nation.
B	Site is associated with the lives of persons significant in our past.
C	Site is an excellent example of a site type.
D	Site may be likely to yield information important in prehistory or history.
E	Site has cultural significance; probable religious structures (shrines, <u>heiau</u> ) and/or burials present.

### Summary of Site Distribution

The few traditional Hawaiian sites identified during the present study suggest that most of the project area was sparsely inhabited during prehistory and early history. This would be due primarily to the lack of fresh water resources in the vicinity. Archaeological site patterning in the Lualualei Valley has revealed that Hawaiian populations were typically present within the wetter upland valleys where wetland agriculture proved to be productive. Although surface run-off and intermittent drainages present in the project area would allow some potential for seasonal agriculture, the attraction for settling in the wetter upland valleys would surely have been greater.

The absence of sites within the project area along Ulehawa Stream, however, may not necessarily indicate the lack of Hawaiian usage of the area, as the lower regions of the project area have been extensively altered by ranching, military and modern farming activity.



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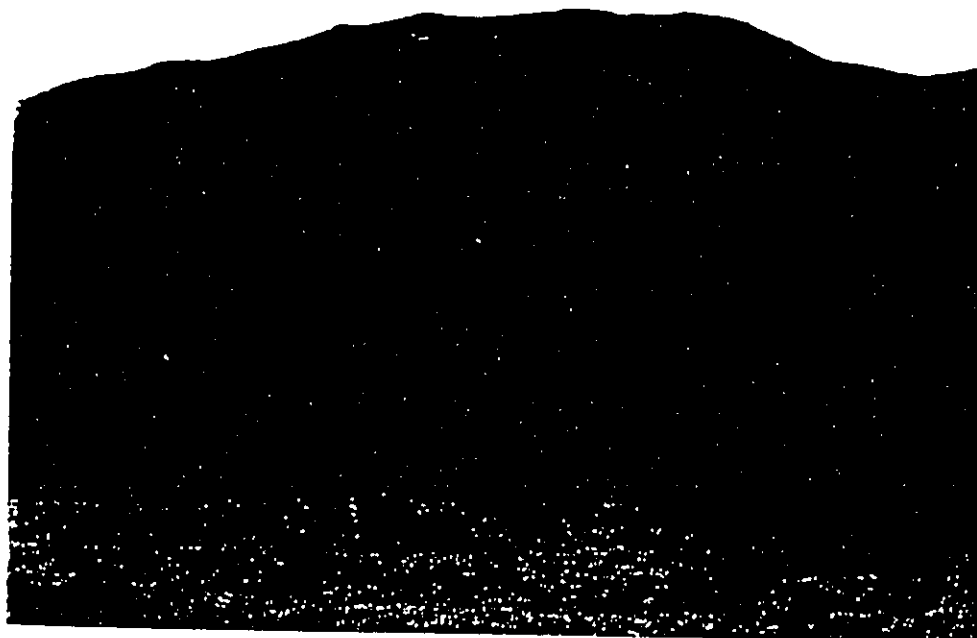
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**VI. Photographic Appendix**

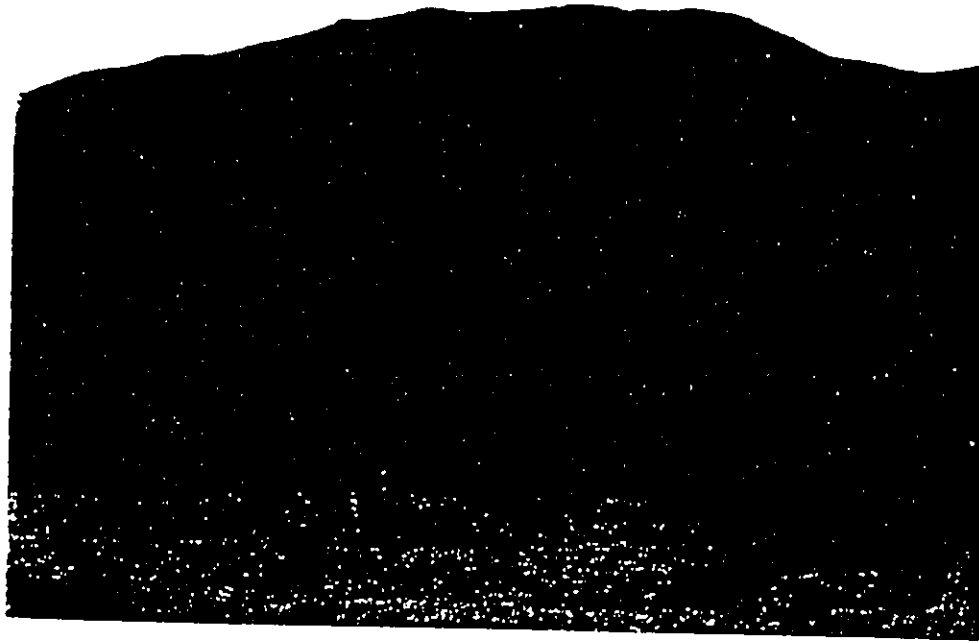


Project Area: View South With Pu'u Heleakala in Background



Project Area: View Northeast

RECEIVED AS FOLLOWS



Project Area: View South With Pu' Heleskala in Background



Project Area: View Northeast

RECEIVED AS FOLLOWS



Site 60-60-09-4344: Wall, View Northwest



Site 60-60-09-4344: Wall, View Southwest

**RECEIVED AS FOLLOWS**



Site 50-30-08-4365; Military Shelter



Site 50-30-08-4366; Terrace



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Site 50-10-08-4266; Enclosure

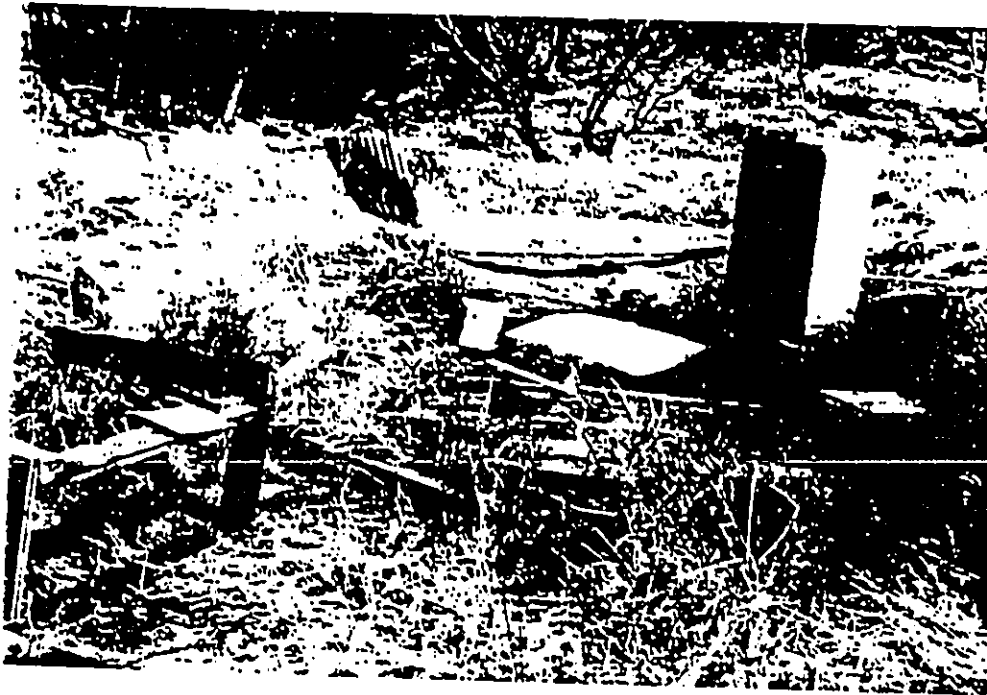


File: 60-10-08-4267: Wall Segment

RECEIVED AS FOLLOWS



Site 50-30-08-4270; Historic House Lot, Grill

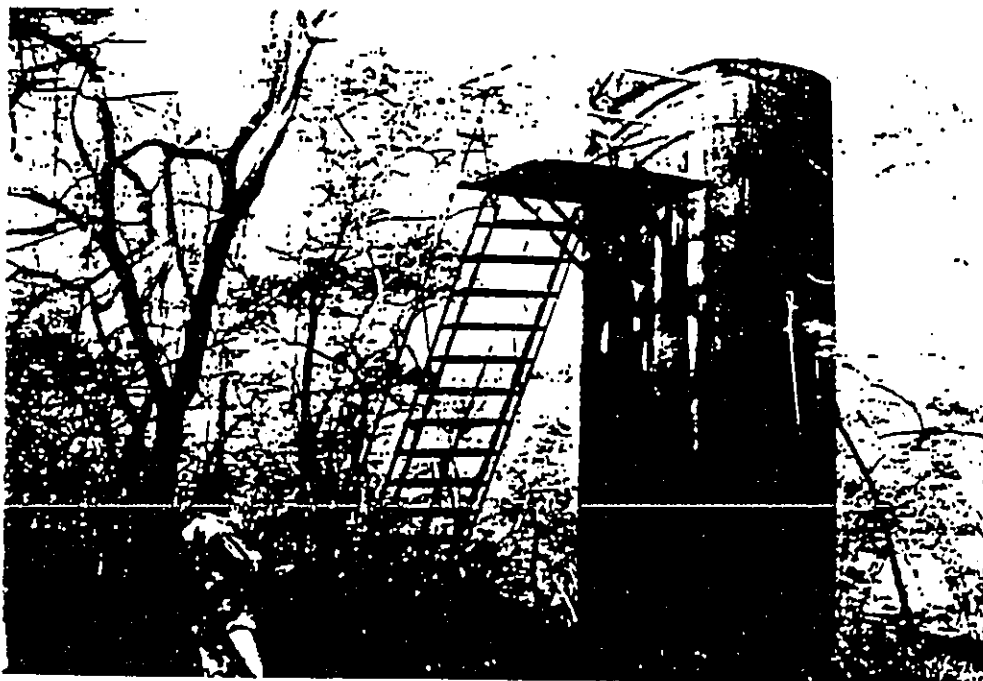


Site 50-30-08-4270; Historic House Lot, Showing Debris and Cesspool

RECEIVED AS FOLLOWS



Site 50-20-08-4372; Concrete Retaining Wall



Site 50-20-08-4373; Metal Incinerator

## **APPENDIX G**

Cultural Impact Assessment—Final Report. Janelle L. Kaohu,  
Angelita S. Aipoalani, and Hanalei Y. Aipoalani, July 2009

# Cultural Impact Assessment – Final Report

Project known as Nanakuli Community Baseyard  
Located in Lualualei, Waianae, Oahu Island  
TMK: (1) 8-7-009:002

Prepared by: Janelle L. Kaohu of JLK Management, LLC  
Angelita S. Aipoalani of Mother Earth Foundation  
Hanalei Y. Aipoalani of Mother Earth Foundation

July 10, 2009

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## **Section I: Summary of Assessment**

JLK Management, LLC (herein “Preparer”), a project management firm based in Nanakuli, Hawaii, in collaboration with Mother Earth Foundation has been engaged by Tropic Land, LLC (herein “Client”) for the purpose of preparing a Cultural Impact Assessment for its project known as Nanakuli Community Baseyard; located in Lualualei, Waianae, Oahu Island—TMK: (1) 8-7-009:002.

The preparer designed its assessment in accordance to Chapter 343 of the Hawaii Revised Statutes, set forth by the Hawaii State Legislature and administered & enforced by the Hawaii State Department of Health’s Office of Environmental Quality Control.

Preparer has successfully engaged in interview sessions with four (4) credible Hawaiian culture practitioners; Mr. Lawrence Adams, Sr., Kahu Kamaki Kanahele, Mrs. Verna Landford-Bright, and Mr. Albert H. Silva. Neither found the proposed light industrial development project to be intrusive nor destructive toward the Hawaiian culture, practices and/or beliefs relative to the Ahupua’a of Lualualei.

Furthermore, review of culturally appropriate and relative reference and resource materials conclusively suggest that the project site is free of any culturally historic site, to include heiau (ancient burial or gravesite). Moreover, due to extensive improvements and developments of nearby, surrounding and neighboring properties, significant historic sites are not anticipated to be located within or near the property boundaries of the project site.

## **Section II: Interviewee**

Preparer has successfully engaged in interview sessions with four (4) credible Hawaiian culture practitioners; Mr. Lawrence Adams, Sr., Mrs. Verna Landford-Bright, Kahu Kamaki Kanahele, and Mr. Albert H. Silva. Neither found the proposed light industrial development project to be



intrusive nor destructive toward the Hawaiian culture, practices and/or beliefs relative to the Ahupua'a of Lualualei.

### **Identification and Selection Processes**

Preparer identified a short list of prospective interviewees based on the following criteria: 1) first-hand knowledge of Hawaiian culture, 2) first-hand knowledge of Ahupua'a of Lualualei and 3) familiarity of the current state of Ahupua'a of Lualualei.

Persons meeting the requirements were selected to participate in this particular Cultural Impact Assessment.

### **Biographical Information**

Mr. Lawrence Adams, Sr., born & raised and resides in Nanakuli, Hawaii is knowledgeable in the Hawaiian culture. Mr. Adams is familiar with the Lualualei Ahupua'a; particularly the immediate region surrounding and including Tropic Land, LLC's parcel.

Kahu Kamaki Kanahele, born on Ni'ihau and raised in Nanakuli, is a respected cultural practitioner. Kahu Kahele has first-hand knowledge of Nioiula Heiau. His contribution to this assessment is solely related to Nioiula Heiau.

Mrs. Verna Landford-Bright, born & raised in Maili and Lualualei, Hawaii and a respected resident of Waianae, Hawaii. Mrs. Landford-Bright is knowledgeable in the Hawaiian culture and mo'olelo.

Mr. Albert H. Silva, born & raised and resides in Waianae, Hawaii. He is a highly regarded rancher and well respected individual of the community. He is knowledgeable

in the Hawaiian culture. More importantly, he has first-hand knowledge of the use of the Ahupua'a of Lualualei.

### Section III: Interview Process

Interviews were limited to phone and in-person conversations. Discussions were documented by Interviewer and summarized for the purpose of preparing a succinct, yet comprehensive Cultural Impact Assessment.

#### Methodology

Interviewees were contacted by phone, initially. Interviewer described the project matter. Interviewer then proceeded with the interview (see Questions). Follow-on in-person interviews were conducted for clarification purposes.

#### Questions

The following questions were asked of each interviewee:

1. What is your recollection of the Ahupua'a of Lualualei?
2. What is your recollection of the specific property owned by Tropic Land LLC?
3. Is there any cultural significance associated with the Ahupua'a of Lualualei? If any, please describe.
4. Would Tropic Land LLC's proposed project to develop a light industrial park impact the cultural essence of the Ahupua'a of Lualualei? The particular project site? If so, please explain.
5. As a native Hawaiian cultural practitioner, would you support Tropic Land LLC's project to develop a light industrial park?

### Section IV: Historical and Cultural Source Materials

Preparer has the following Historical and Cultural Source Materials in its custody:

1. April 1991 Final EIS for Lualualei Golf Course; TMK: (1) 8-7-009:002

2. November 1993 rev. (January 1991) Final Archaeological Inventory Survey of 170-acre parcel in the Ahupua'a of Lualualei
3. June 8, 1997 Final EIS and Special Management Area Permit Application for BHP Gas Express Station Number 46
4. July 2000 Waianae Sustainable Communities Plan—Cultural Resources Map
5. June 2005, National and State Register of Historic Places, <http://hawaii.gov/dlnr/hpd/register/oaind/oaqu08.pdf>
6. January 19, 2006 Blessing and Consecration of Lualualei Property—Mo'olelo of Maui
7. Hawaii State Historic Preservation division of Department of Land and Natural Resources, Geographic Information System.
8. Honolulu City & County Department of Planning and Permitting, Geographic Information System.
9. Alameida, Roy and Dunford, Betty, 1997. A Story About Kawelo—Na Mo'olelo Hawai'i o ka Wa Kahiko, Stories of Old Hawai'i, Section 7: Sports and Games, Page 104.
10. McAllister, J.G., 1933. *Archaeology of Oahu*. Bishop Museum Bulletin 104, Honolulu.
11. O'Leary, O.L. and M. McDermott, 2006 *Archaeological Inventory Survey of 200 Acres for the Proposed Nānākuli B Site Materials Recovery Facility and Landfill, Lualualei Ahupua'a, Wai'anae District, Island of O'ahu, Hawai'i (TMK [1]8-7-09:01)*. Prepared for URS Corporation by Cultural Surveys Hawai'i, Kailua, Hawai'i.
12. Thrum, Thos G., 1907. Hawaiian Almanac and Annual—The Reference Book of Information and Statistics—relating to the Territory of Hawaii, of value to Merchants, Tourists and Others.

Reference and resource materials conclusively support that it is highly unlikely that any historic or prehistoric artifacts exist on-site.

## Section V: Cultural Resources, Practices and Beliefs

It is suggested that areas within the Lualualei Ahupua'a were used for the cultivation of the warrior art of Lua—native Hawaiian form of martial arts. Contrary, there is no evidence confirming that the project area was or is currently being used for traditional practices such as gathering or any cultural or religious purposes. No burials are believed to exist within the project area. There were no commoner land claims within the project area. Although some native Hawaiian activity may have occurred on the project area, the patterns of land use are relatively clear as the native Hawaiians did not utilize this land nearly as intensively as the coastal areas, well-watered areas and forest zones.

Recorded Hawaiian legends, mo'olelo, describes a said location within the Lualualei Ahupua'a as the birth place of Maui—son of Mauiakalana and Hina'akealoha. According to literature, Maui's birthing place is located on the south side of Waianae at Ulehawa and Kaolae (west-south-west of project site). O'Leary and McDermott's 2006 inventory survey report for "Nanakuli B Site Materials Recovery Facility and Landfill" (TMK: 8-7-009:001 and 8-7-009:007) contains a map showing known archaeological sites near their project area (O'Leary and McDermott's 2006:42). The map shows a Site 148 "Maui Rock" nearly a mile west-south-west of the project area, along Farrington Highway; thereby, confirming the existence of said rock.

**MAUI ROCK**—In the 1930s, McAllister recorded Site 148 in his work. McAllister describes a large rock referred to as "Maui" located about 1.1 miles from Nanakuli station toward Pu'u O Hulu (McAllister 1933:110). This rock represents the place where Maui first landed in the Hawaiian Islands from the south. The stone was surrounded by water and is where he reposed and sunned himself. The rock is reportedly on the "northeast of the road" (McAllister 1933:110); memorialized at Garden Groves, a private-condominium development off of Farrington Highway in Lualualei.

Hawaiian mythology also accounts for Maui venturing the Waianae Coast of the island of O'ahu. Kaneana, cave of Kane, commonly known as Makua cave, is said to have been frequented by

demigod Maui. This cave is located at the base of a 200-foot outcropping of rock along Farrington Highway in Makua (near Kaena Point); approximately nine (9) miles west-north-west of project site. Kaneana cave goes back approximately 100 yards and ends. Legend has it that the cave was the home of Nanue, the shark man.

Also, worth noting is the fact that there are no registered historic sites within the project site boundaries. That said, however, according to the “National and State Register of Historic Places” there is one registered historic site within a 100-foot radius of the project site perimeters—Nioiula heiau (TMK: 8-8-01:01).

**NIOIULA**—Roy Kakulu Alameida, author of *Na Mo'olelo Hawai'i o ka Wa Kahiko*, references Nioiula heiau in his story about Kawelo. Alameida writes, “Kawelo then picked up the man. He took him to the ali'i nui of O'ahu to offer as a sacrifice to the gods at Nioiula heiau at Lualualei.”

In contrast to Alameida's writings, Thos G. Thrum's compilation of data, recorded in the *Hawaiian Almanac and Annual* for 1907, clearly states that Nioiula heiau (Halona, Lualualei), a paved and walled heiau of pookanaka class, about 50 feet square, in two sections; [was] recently destroyed.

According to Kahu Kamaki Kanahele, a long time resident of Nanakuli and respected cultural practitioner, “Nioiuola is located on Halona ridge in Lualualei next to the forest reserve. Part of the heiau has been completely destroyed with the stones being used by the McCandless, ohana (1930's-40's) of the Silva family. It was kapu when we were little because kupuna(s) told us that people were sacrificed there to the ancient gods. It belonged to the Oahu god—King Kaku'ihewa.”

Research and review of relative historical data at the Hawaii State Historic Preservation Division clearly indicates that there are no cultural or historical sites on the project site (TMK: (1) 8-7-

009:002); therefore, reaffirming Thrum's recordings. More significantly, a cross-reference of the City & County of Honolulu and Hawaii State Department of Land and Natural Resources' Geographic Information Systems (GIS) concludes that Nioiula Heiau is situated on property fee owned by the United States of America and occupied by the United States Navy (TMK: 8-8-001:001).

It is therefore concluded that the project site does not directly nor indirectly adversely impact, destruct or obstruct access to culturally significant sites.

### **Analysis of Project Effects**

Effects stemming from the development of the proposed project on Hawaiian culture would be minimal due to its geographical location and lack of surface water, unique topographic features, burial sites, and commoner land claims within the project area. If Hawaiian activity occurred on the project area, it would not have been nearly as intensively utilized as coastal areas, well-watered areas, and forest zones.

### **Section VI: Bibliography of References**

Adams Sr., Lawrence (June 2008), resident of Nanakuli, born and raised in Lualualei and Nanakuli, Phone Interview-JLK Management, LLC.

Alameida, Roy and Dunford, Betty, 1997. A Story About Kawelo—Na Mo'olelo Hawai'i o ka Wa Kahiko, Stories of Old Hawai'i, Section 7: Sports and Games, Page 104.

Kanahele, Kamaki (July 2009), resident of Nanakuli, born on Ni'ihau, Electronic mail communication-JLK Management, LLC.

Landford-Bright, Verna (June 2008), resident of Waianae, born and raised in Maili and Lualualei Ahupua'a, Phone Interview-JLK Management, LLC.

McAllister, J.G., 1933. *Archaeology of Oahu*. Bishop Museum Bulletin 104, Honolulu.

July 10, 2009

O’Leary, O.L. and M. McDermott, 2006 *Archaeological Inventory Survey of 200 Acres for the Proposed Nānākuli B Site Materials Recovery Facility and Landfill, Lualualei Ahupua’a, Wai’anae District, Island of O’ahu, Hawai’i (TMK [1]8-7-09:01)*. Prepared for URS Corporation by Cultural Surveys Hawai’i, Kailua, Hawai’i.

Silva, Albert H. (June 2008), resident of Makaha, born and raised along the Waianae Coast with substantial ties to Lualualei Ahupua’a, Phone Interview-JLK Management, LLC.

Thrum, Thos G., 1907. *Hawaiian Almanac and Annual—The Reference Book of Information and Statistics--relating to the Territory of Hawaii, of value to Merchants, Tourists and Others.*

## Section VII: Addendums

Summaries of Interview sessions are provided herein.

### Records of Interviews

Mr. Lawrence Jay Adams, Sr. recalled that the Lualualei Ahupua’a, like the Nanakuli Ahupua’a, was used for cattle grazing in the 1940’s and 1950’s. There were some agriculture lots, but nothing significant--the particular property was left barren for many years; there was no activity for as long as my kupuna were around in the late 1800s. The Lualualei Ahupua’a holds the mo’olelo of Maui. But the proposed project will in no way affect Maui’s legend. Mr. Adams supports the proposed development project.

Mrs. Verna Landford-Bright suggested that areas in the Lualualei Ahupua’a may have been used by native Hawaiian men for the cultivation of the warrior art known as “Lua”—art of Lua. It is not known for certain, if the immediate region surrounding and including Tropic Land, LLC’s parcel was used for cultural practices like the art of Lua. The significance of the mo’olelo of Maui and its relationship to Lualualei is important to note. It is unlikely that Tropic Land, LLC’s project will negatively impact the Hawaiian culture. Mrs. Landford-Bright takes no position on whether to support the project or not.

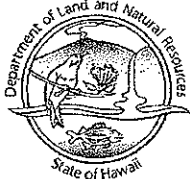
Mr. Albert H. Silva vividly recalls the Ahupua'a of Lualualei being used for agriculture and ranching purposes. The particular region, to include Tropic Land, LLC's parcel was used for cattle ranching. The Lualualei clay made it impossible for farming of produce. Aside from the mo'olelo of Maui, there are no points of cultural significance on or nearby the property being proposed for the development of a Light Industrial Park. Although there are claims suggesting that this particular area was used to practice the Art of Lua, Mr. Silva firmly stated that this was impossible due to the natural habitat and non-conducive climate. Mr. Silva supports the proposed development project.



## **APPENDIX H**

Correspondence from the State Historic Preservation Division  
Related to Chapter 6E-42, Historic Preservation Review for TMK: (1)  
8-7-009: 002

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

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

ROBERT K. MASUDA  
DEPUTY DIRECTOR - LAND

DEAN NAKANO  
ACTING DEPUTY DIRECTOR - WATER

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

November 15, 2006

Dominic Miles  
Lyon Associates, Inc.  
841 Bishop Street, Suite 2006  
Honolulu, Hawai'i 96813

LOG NO: 2006.3748  
DOC NO: 0611AJ06  
Archaeology

Dear Mr. Miles:

**SUBJECT: Chapter 6E-42 Historic Preservation Review –  
Notice of Intent Form C – Lualualei Grubbing Permit  
Lualualei Ahupua'a, Wai'anae District, Island of O'ahu  
TMK: (1) 8-7-009:002**

Thank you for the opportunity to review the aforementioned project, which we received on August 16, 2006. We apologize for the long delay in response. The proposed undertaking involves the clearing, grubbing, and mulching of the 60-acre area of potential effect.

A review of available documents indicates that the proposed undertaking will affect 60-acres of a larger 170-acre project area surveyed by Cultural Surveys Hawai'i (Hammatt *et al.* 1993. *An Archaeological Inventory Survey of a 170-acre Parcel in the Ahupua'a of Lualualei, Wai'anae District, Island of O'ahu.* [TMK: 8-7-9: portion 2; 8-7-10; 8-7-19: portion 1] SHPD Rpt No. O-792). The Hammatt *et al.* (1993) was accepted by this office in a letter (LOG NO: 10208, DOC NO: 9311EJ32) dated December 1, 1993.

There are two archaeological sites within the 60-acre APE of the proposed undertaking. These are: site -4371, remnants of a historic well, and site -4367, a historic wall segment. As stated in a letter (LOG NO: 9258, DOC NO: 9308ej17) dated September 7, 1993, we believe these sites have been adequately documented in the Hammatt *et al.* (1993) inventory survey. However, one archaeological site, SIHP NO. 50-80-08-4366 identified during the Hammatt *et al.* (1993) study was recommended for preservation. Site -4366 does not lie within the current APE, and thus, we believe it will not be impacted by the proposed undertaking.

Therefore, we believe the current undertaking will have "no effect" on historically-significant resources. However, should the APE or the scope of work for the proposed undertaking change, or if other portions of the subject parcel are to be developed, proactive archaeological mitigation (*e.g.* preservation plan for site -4366) will be required.

In the event that historic resources, including human skeletal remains, are identified during the construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, O'ahu Section, needs to be contacted immediately at (808) 692-8015.

Mr. Dominic Miles  
Page 2

Please contact Mr. Adam Johnson if you have any questions or concerns about this letter.

Aloha,



Melanie Chinen, Administrator  
State Historic Preservation Division

AJ:



DEPUTIES

GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT  
PROGRAM

AQUATIC RESOURCES  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
DIVISION  
LAND DIVISION  
STATE PARKS  
WATER AND LAND DEVELOPMENT

STATE OF HAWAII

October 24, 1997 DEPARTMENT OF LAND AND NATURAL RESOURCES

Jan Naoe Sullivan, Director  
Department of Land Utilization  
City and County of Honolulu  
650 South King Street, 7th Floor  
Honolulu, Hawaii 96813

STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

LOG NO: 20361 ✓  
DOC NO: 9710EJ21

Dear Ms. Sullivan:

**SUBJECT: Chapter 6E-42 Historic Preservation Review -- Request for a Special Use Permit  
(File No. 97/SUP-4) Mr. Robert Kava for Portion of Proposed Haleakala Golf  
Course  
Lualualei, Wai'anae, O'ahu  
TMK: 8-7-9:. por. 2**

In February of 1996 we commented on the rezoning of this parcel for the proposed Lualualei Golf Course (former name) from agricultural to preservation district. Our comments stated that:

An archaeological inventory survey of the proposed golf course parcel identified eight archaeological sites, two of which were related to traditional Hawaiian activity and six to historic land use. Seven of the eight sites are considered "no longer significant" due to their lack of cultural or scientific interest beyond the information retrieved during the survey. One site, 50-80-08-4366, is likely to yield information in prehistory and is recommended for preservation. This site is situated upslope of the golf course modification plans as submitted for the survey and as such will not be disturbed.

Also at that time we stated that the zone change application would have "no effect" on historic sites and asked that if development plans for the golf course were changed which may impact site -4366, that protective measures should be taken to assure the site's preservation.

The current application proposes development of 14.85 acres of the total project area. Site 50-80-08-4366 is not located in the current 14.85 acre parcel being considered under this permit and therefore we believe that the proposed development of the 14.85 acre parcel considered in this SUP, will have "no effect" on historic sites.

If you have any questions please call Elaine Jourdane at 587-0015.

Aloha

A handwritten signature in black ink, appearing to read "Don Hibbard", written over a horizontal line.

Don Hibbard, Administrator  
Historic Preservation Division

EJ:jk

OCT 24 1997

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII

1996 JAN 29 AM 8:00  
DEPT. OF LAND UTILIZATION  
CITY & COUNTY OF HONOLULU



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

96-00507  
MICHAEL D. WILSON, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY  
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT  
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ENVIRONMENTAL AFFAIRS  
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FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
DIVISION

LAND MANAGEMENT

STATE PARKS

WATER AND LAND DEVELOPMENT

January 12, 1996

Patrick T. Onishi  
Director of Land Utilization  
Department of Land Utilization  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

LOG NO: 16202 ✓  
DOC NO: 9601EJ03

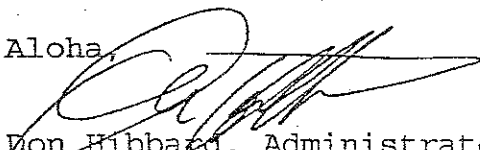
Dear Mr. Onishi:

SUBJECT: Application for a Zone Change, from AG-1 Restricted  
Agricultural District and AG-2 General Agricultural  
District to P-2 General Preservation District  
Lualualei, Wai'anae, O'ahu  
TMK: 8-7-10: 6, 10; 8-7-19: por. 1, por. 2

Thank you for the opportunity to review the zone change application, from agricultural to general preservation, for the proposed 18-hole golf course. The rezoning application accurately summarizes historic preservation concerns for the area. An archaeological inventory survey conducted for the proposed golf course found eight historic sites. Seven of these sites were considered no longer significant. The remaining site, a possible prehistoric habitation area (Site 50-80-08-4366), is located outside of the development area of the golf course and therefore will not be affected by current development plans. Therefore we believe that this zone change action will have "no effect" on historic sites.

If you have any questions please call Elaine Jourdane at 587-0015.

Aloha,

  
Don Hibbard, Administrator  
State Historic Preservation Division

EJ:jen



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

KEITH AHUE, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCE

DEPUTIES

JOHN P. KEPPELER II  
DONA L. HANAKE

AQUACULTURE DEVELOPMENT  
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LAND MANAGEMENT  
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WATER AND LAND DEVELOPMENT

December 1, 1993

Mr. Harvey K. Hida, P. E., President  
Hida, Okamoto & Associates, Inc.  
1440 Kapiolani Blvd.  
Honolulu, Hawaii 96814

LOG NO: 10209  
DOC NO: 9311EJ33

Subject: Lualualei Golf Course Wells I through 4  
Lualualei, Wai'anae, O'ahu  
TMK: 8-7-09:002 and 8-7-10:010

Dear Mr. Hida:

This is to inform you that Cultural Surveys Hawaii has submitted an acceptable archaeological inventory survey report to our office. We have notified the Commission on Water Resources Management that the report has been submitted and is acceptable and that the condition requested for this permit has been met.

If you have any questions please contact Elaine Jourdane at 587-0015.

Sincerely Yours,

A handwritten signature in dark ink, appearing to read "Don Hibbard".

DON HIBBARD, Administrator  
State Historic Preservation Division

EJ:jt

DEC 01 1993



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

KEITH AILU, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

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DONA L. HANAUKE

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DIVISION

LAND MANAGEMENT  
STATE PARKS


WATER AND LAND DEVELOPMENT

December 1, 1993

MEMORANDUM

LOG NO: 10208  
DOC NO: 9311EJ32

TO: Rae M. Loui, Deputy Director  
Commission on Water Resource Management

FROM: Don Hibbard, Administrator  
Historic Preservation Division 

SUBJECT: Well Construction & Pump Installation Permit Applications  
Lualualei Golf Course Wells 1 through 4  
Well Nos. 2508-10 through 2508-13  
Lualualei, Waiane, O'ahu  
TMK 8-7-09:002 and 8-7-10:010

Pursuant to our memorandum to you on September 7, 1993 (LOG 9258 and DOC 9308EJ18), we would like to inform you that an acceptable archaeological inventory survey report has been submitted to the Historic Preservation Division of the Department of Land and Natural Resources and that the condition requested for this permit has been met.

EJ:jt

DEC 01 1993

## **APPENDIX I**

Nānākuli/Mā'ili Neighborhood Board Resolutions



## RESOLUTION

### **SUPPORTING THE AMENDMENT OF THE WAI'ANAE SUSTAINABLE COMMUNITIES PLAN TO INCORPORATE THE INPUT AND IDEAS OF THE NANAKULI-MAILI NEIGHBORHOOD BOARD #36, INCLUDING ITS SUPPORT FOR THE DEVELOPMENT OF A LIGHT-INDUSTRIAL PARK IN LUALUALEI VALLEY, NANAKULI, OAHU.**

WHEREAS, on or about March 12, 2007, the Department of Planning and Permitting of the City and County of Honolulu ("DPP") began the official process to update and revise the existing Wai'anae Sustainable Communities Plan ("WSCP") which was adopted in December 2000;

WHEREAS, as a part of DPP's 5-year review process (see Section 24-9.10 of the Revised Ordinances of Honolulu), DPP is in the process of evaluating and re-assessing the appropriateness of the WSCP's regional vision, policies, design principles and guidelines and implementing actions;

WHEREAS, DPP contracted the services of Townscape, Inc. ("Townscape") to lead the "community participation processes" as DPP's planning consultant;

WHEREAS, Townscape began the community participation process in April 2007, and a planning advisory committee ("PAC") was established and its members were selected by June 2007;

WHEREAS, also as a part of the community participation process, Townscape attended several meetings of the Wai'anae Neighborhood Board meetings;

WHEREAS, the Neighborhood Commission established the Nanakuli-Maili Neighborhood Board # 36 ("Nanakuli NB") in February 2008, and its members were elected and seated in March 2008;

WHEREAS, since the Nanakuli NB was formed and its members seated after the commencement of the community participation process, and since Townscape has not had the opportunity to attend any of Nanakuli NB's meetings, the Nanakuli NB has not been able to make any meaningful input or comment to the community participation process to revise the WSCP;

WHEREAS, on or about July 15, 2008, the Nanakuli NB unanimously supported the development of a light-industrial park in Lualualei Valley, specifically that project known as the Nanakuli Community Baseyard, and which unanimous support is evidenced by the adoption of that certain Resolution dated July 15, 2008 ("7/15/08 Resolution") and that certain letter of Mr. Victor Kila dated July 21, 2008 ("Kila Letter") (copies of the 7/15/08 Resolution and Kila Letter are attached hereto as Exhibit "A");

WHEREAS, the 7/15/08 Resolution specifically recognizes the Nanakuli NB's desire to have the WSCP amended to support the development of the Nanakuli Community Baseyard Project in Lualualei Valley;

WHEREAS, although copies of the 7/15/08 Resolution and Kila Letter were delivered to Townscape, the September 5, 2008 version of Townscape's WSCP Public Review Draft did not reflect the Nanakuli NB's position to have a light-industrial park developed in Lualualei Valley

WHEREAS, the Nanakuli NB took further action to adopt at its general meeting held on September 16, 2008, a Resolution to specifically support an amendment to the WSCP to include the designation of the proposed Nanakuli Community Baseyard Project in Lualualei Valley ("9/16/08 Resolution");

WHEREAS, at the most recent PAC meeting which was held on September 18, 2008, Board Member Kimo Kelii "pressed" to have heard the need for input and participation from the Nanakuli NB in the community participation process and delivered to Townscape the 9/16/08 Resolution, together with a cover letter signed by all 9 members of the Nanakuli NB (a copy of the 9/16/08 Resolution and the accompanying cover letter are attached hereto as Exhibit "B");

WHEREAS, since the September 18 PAC Meeting, Townscape has accepted the further comments from Nanakuli NB members and has incorporated some, but not all, of the input into the current revised draft of Townscape's WSCP Public Review Draft which is dated October 1, 2008 ("10/1/08 Draft");

WHEREAS, since Townscape has announced its intention to develop a further revised WSCP Public Review Draft by November 2008 and to submit to DPP its proposed Final Revised WSCP by mid-December 2008, it is crucial that the Nanakuli NB continue to make known to Townscape its ideas, suggestions and proposals regarding any further amendment of the WSCP and to continue to oversee the implementation of the Nanakuli NB's ideas and suggestions into the Final Revised WSCP;

WHEREAS, Townscape has scheduled future PAC meetings and is scheduled to attend Nanakuli NB's general meeting which is scheduled for October 21, 2008; now, therefore,

BE IT RESOLVED that the Nanakuli-Maili Neighborhood Board #36 hereby supports the amendment of the WSCP to incorporate the input and ideas of the Nanakuli NB (some of which have been already included in the 10/1/08 Draft), and including the new and additional input and comments to the 10/1/08 Draft which are set forth in Exhibit "C" which is attached hereto and incorporated herein;

BE IT FURTHER RESOLVED that the Nanakuli-Maili Neighborhood Board # 36 hereby re-states its support for the development of the Nanakuli Community Baseyard Project, and states its support to amend the WSCP to provide for the development of a light-industrial park in Lualualei Valley, Nanakuli, Oahu, and which is identified on Map B of the 10/1/08 Draft;

BE IT FURTHER RESOLVED that the Nanakuli-Maili Neighborhood Board # 36, except for the specific amendments previously requested by the Nanakuli-Maili Neighborhood Board and the additional changes requested in Exhibit "C," hereby reserves judgment and makes no comment regarding other aspects of the 10/1/08 Draft; and

BE IT FINALLY RESOLVED that copies of this Resolution be transmitted to the Mayor of the City and County of Honolulu, the Director of the Department of Planning and Permitting of the City and County of Honolulu, the Chairperson of the Honolulu Planning Commission and the Chairperson of the Honolulu City Council.

INTRODUCED AND SUPPORTED BY THE FOLLOWING MEMBERS OF THE NANAKULI-MAILI NEIGHBORHOOD # 36:

<u>Farah U. Aye</u>	<u>Victory P. Kila</u>
<u>Antoinette J. Maiana-Tunuka</u>	<u>Patty K. Teruya</u>
<u>Clyde E. ...</u>	<u>...</u>
<u>...</u>	<u>...</u>
<u>...</u>	<u>...</u>

The Nanakuli-Maili Neighborhood Board # 36 adopted this Resolution at its meeting which was held on October 21, 2008.

Patty K. Teruya  
Chairperson

10-21-08

EXHIBIT "A"

RESOLUTION

**SUPPORTING THE DEVELOPMENT AND CONCEPT OF THE PROPOSED NANAKULI COMMUNITY BASEYARD PROJECT, A LIGHT-INDUSTRIAL PARK IN LUALUALEI VALLEY, NANAKULI, OAHU.**

WHEREAS, a new 96-acre light industrial park is being proposed for development on a portion of TMK No. 8-7-9: 02 in Lualualei Valley, Nanakuli, Oahu (herein called "Industrial Park Project"); and

WHEREAS, the Industrial Park Project will be a center for many new employment in the construction trades, automotive repair, trucking, warehousing and other light-industrial businesses and that the type of employment created in this proposed project are quality jobs that pay well and are also the type of jobs that are being sought after by many Leeward Coast residents; and

WHEREAS, the Industrial Park Project is being planned to included an "incubator" facility for new or developing businesses in the Leeward Coast; and

WHEREAS, Tropic Land, LLC, the owner and developer of the Industrial Park Project, made a public presentation regarding the Industrial Park Project to the Planning and Zoning Committee of the Nanakuli-Mailii Neighborhood Board # 36 (herein "Neighborhood Board") on June 24, 2008; and

WHEREAS, in its recent presentation to the Planning and Zoning Committee, Tropic Land has made commitment with several unilateral agreements regarding the development of the Industrial Park Project which are attached hereto and incorporated herein as Exhibit "A;" and

WHEREAS, the Planning and Zoning Committee has received an informational booklet describing the project with more than 590 signatures/letters of support for the Industrial Park Project from many Leeward Coast residents and community groups; and

WHEREAS, in order for this project to become a reality for the residents of the Leeward Coast, various governmental approvals (herein collectively "Government Permitting Process") are required, which may include (i) an amendment of the Wai'anae Sustainable Communities Plan, (ii) the rezoning of the 96-acre site from P-2 (general preservation district) to I-1 (limited industrial district), (iii) a State Land Use Boundary amendment to reclassify the 96-acre site from Agricultural to Urban use, and (iv) an amendment of the Leeward Coast Enterprise Zone to include the 96-acre site; and

WHEREAS, the Planning and Zoning Committee, upon the unanimous vote of its members at the Committee's meeting held on June 24, 2008, adopted a motion to support the Industrial Park Project and recommend the action of the Nanakuli-Mailii Neighborhood Board #36 to support the Industrial Park Project at the Board's upcoming meeting on July 15, 2008; and

WHEREAS, the Nanakuli-Mailii Neighborhood Board No. 36 recognizes the need for a project in the Leeward Coast, which has traditionally "lagged" behind the rest of Oahu in terms of economic development and employment opportunities for its coastal residents; now, therefore,

BE IT RESOLVED that the Nanakuli-Mailii Neighborhood Board No. 36 supports the development of the Industrial Park Project; and

BE IT RESOLVED that the Nanakuli-Mailii Neighborhood Board No. 36 hereby supports and encourages the approvals of the various governmental agencies that will be reviewing the Industrial Park Project in the Government Permitting Process; and

BE IT FINALLY RESOLVED that copies of this Resolution be transmitted to the Mayor of the City and County of Honolulu, the Director of the Department of Planning and Permitting of the City and County of Honolulu, the Chairperson of the Honolulu Planning Commission, the Chairperson of the Honolulu City Council, the Governor of the State of Hawaii, the Executive Director of the Office of Planning of the State of Hawaii, the Chairperson of the State Land Use Commission, and the Director of the Department of Business and Economic Development of the State of Hawaii.

INTRODUCED AND SUPPORTED BY:

NANAKULI-MAILI NB#36

James K. Keli  
Antoinette B. Miaman-Murphy  
Karalee U. Oigofani  
Cheryl H. H. H.  
Mervana K. M. Castor-Kao  
Caroline K. H. H.  
John P. H. H.  
John P. H. H., Chair, NB#36

The Nanakuli-Mailii Neighborhood Board # 36, hereby certifies that this Resolution was adopted by the Nanakuli-Mailii Neighborhood Board # 36 at its meeting held on July 15, 2008.

7-15-08



**Tropic Land LLC agrees to the Unilateral Agreement and Promise to the Community along the Leeward Coast.**

1. An MSW/composting/construction debris landfill will not be built on any Tropic's land LLC located in Nanakuli, Oahu.
2. A golf course *will not* be built on Tropic's land, LLC, Nanakuli, Oahu.
3. Any future housing development *will not* be built on Tropic's land.
4. Strip clubs, hostess bars, night clubs, or any alcohol establishments stores and pornography stores *will not* be allowed on Tropic's land, LLC, Nanakuli Oahu.
5. Tropic LLC, Nanakuli, Oahu *will* do an Environmental Impact Statement ("EIS") covering traffic, infrastructure and other pertinent issues. To be presented to the community and board members.
6. Tropic LLC, Nanakuli, Oahu *will* go green on energy consumption.
7. Tropic LLC, Nanakuli, Oahu *will* be sensitive to cultural practices and places and will work with Nanakuli or Leeward Coast residents cultural monitors.
8. Tropic LLC, Nanakuli, Oahu *will* contribute \$1,000,000 for the a community benefits program which will be used to benefit the Nanakuli and Maili communities.
9. Tropic LLC, Nanakuli, Oahu *will* apply for Enterprise Zone designation for the project.
10. Tropic LLC, Nanakuli, Oahu *will* find an appropriate permanent name for the project site, acceptable to the community and offer community involvement on names for the site. To add the word "Nanakuli", in naming the site.

*The Planning and Zoning Committee has requested of Tropic Land the additional language to these promises which are indicated by the underlined text.*



NANAKULI-MAILI NEIGHBORHOOD BOARD NO. 36

c/o NEIGHBORHOOD COMMISSION • 530 SOUTH KING STREET ROOM 400 • HONOLULU, HAWAII, 96813  
PHONE (808) 768-3710 • FAX (808) 768-3711 • INTERNET: <http://www.honolulu.gov>

July 21, 2008

Kahu Victor Allen Kila  
Pacific Faith Fellowship Church  
Maili Commercial Center  
87-1784 Farrington Highway, Unit 8  
Wai'anae, Hawaii 96792

RE: Support of Tropic Land LLC proposed Light Industrial Project – Lualualei, O'ahu

Aloha Chair Teruya:

As you know I was on a religious mission in Jamaica and have recently returned home. Being away, I was unable to attend the Nanakuli-Maili NB#36 regular meeting on July 15, 2008. I understand that Tropic Land LLC did a presentation to the full board and the board introduced a Resolution and an exhibit agreement was supported unanimously of a vote 8 aye; 0 opposition.

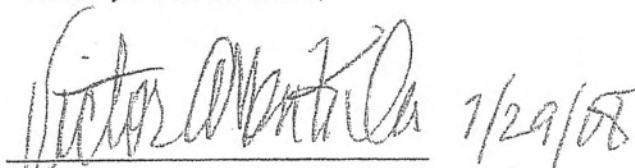
As a member of the Planning & Zoning Committee which met on June 24, 2008, I was in attendance and voted with a motion to support this project and send to the full board meeting. This support recommendation did come from the P&Z Committee meeting.

This letter is to clarify my position and for the record as a member of the Nanakuli-Maili NB#36, and as the (9) ninth member of the board, I would like to state that my vote is to support this project and my vote be noted in the records through this process.

I'm very aware of this project and that Tropic Land LLC will continue to work with the board with updates but, this project will benefit our community with many opportunities.

Chair Teruya, I'm asking to be included in the support of Tropic Land LLC project and state my vote as "aye", as a member of the board I did not want my vote to be excluded.

Thank you and Aloha,



Ms. Victor Allen Kila, NB#36 member  
Committee Chair, Health & Public Safety

Cc: Neighborhood Commission Office  
P&Z Committee Chair, Eli





NANAKULI-MAIL NEIGHBORHOOD BOARD NO. 36

c/o NEIGHBORHOOD COMMISSION • 530 SOUTH KING STREET ROOM 408 • HONOLULU, HAWAII, 96813  
PHONE (808) 768-3710 • FAX (808) 768-3711 • INTERNET: <http://www.honolulu.gov>

Townscape Inc.  
900 Fort Street Mall, Suite 1160  
Honolulu, Hawaii 96813

Attn: Ms. Harmonie Williams

RE: Revised Wai'anae Sustainable Communities Plan

Ladies and Gentlemen:

We have received and reviewed the Revised Wai'anae Sustainable Communities Plan (2009) Preliminary Draft dated September 5, 2008.

However, based upon our review, it has come to our attention that the preliminary draft makes no mention of a proposed 96 acre light industrial park project in Luahualei Valley, that is supported by our Board and community.

Enclosed for your information is a copy of our formal support Resolution adopted and signed by all 8 Board members in attendance at our meeting held on July 15, 2008, supporting the proposed project and its inclusion in the Amendment to the Wai'anae Sustainable Communities Plan. Also enclosed is a copy of a letter dated July 21, 2008, signed by Mr. Victor Kila, the ninth Board member



who was unable to attend the meeting, also confirming his support of the resolution and the project.

It is also our understanding that you had previously been provided with a Community Support Report for the proposed light industrial project, that contains approx. 590 petition signatures and support letters evidencing the widespread community support for the proposed 96 acre light industrial park project.

We hereby request that the following language be added to the next Public Review Draft of the Revised Wai'anāe Sustainable Communities Plan (2009), that is scheduled to be issued in early October, 2008. We propose that the following language be added to Section 2.4.11( new language in bold) :

“Other economic opportunities discussed include expansion of retail and commercial centers in the four major ahupua'a and the creation of a light industrial park in the **Lualualei/Ma'ili ahupua'a known as the Nanakuli Community Baseyard Project.** Similar to the other sectors, it is recommended that locally-owned businesses be given priority, and that they hire residents as much as possible.

**The Nanakuli-Maili Neighborhood Board #36 at its formal meeting held on July 15, 2008, formally issued a support Resolution unanimously supported by all of its Board members, supporting the development of a proposed new 96 acre light industrial park known as**

the Nanakuli Community Baseyard project, located in Lualualei Valley. The resolution issued by the Nanakuli-Maili neighborhood board supports an amendment to the Wai'anae Sustainable Communities Plan, that would include the designation of the proposed project for the development of a light industrial park in Lualualei Valley. The proposed project has also received widespread community support along with endorsements from several business organizations located in the Leeward Coast."

Thank you for your consideration and kokua on this matter that is important to the economic future of our community.

Issued this 16th day of September, 2008:

NANAKULI-MAILI NEIGHBORHOOD BOARD #36

[Signature]  
[Signature]  
Antoinette A. Maiorano-Munuka  
Paeleli U. Oropoala  
[Signature]  
Maryna K. M. Calkins  
[Signature]  
[Signature]  
[Signature]

### Exhibit "C"

The 10/1/08 Draft includes the following language in the third paragraph on page 2-11:

"It is recognized that the four ahupua'a have different concerns and needs, and thus, the Wai'anae Sustainable Communities Plan must be flexible enough to take this into account. For example, the current land use and economic opportunities in Makaha Valley are very different from the circumstances in the Lualualei/Ma'ili and Nanakuli ahupua'a. As such, the land use policies and guidelines must allow for variance between the differing ahupua'a."

We believe that all ahupua'a along the Waianae Coast probably are in agreement with the concept in the above language; however, implementing the concept that we are all in agreement with must still be addressed.

The Nanakuli NB suggests that all further work on Townscape's Public Review Draft of the WSCP should progress with the understanding and agreement with the concept that greater weight be given to each ahupua'a's opinion when it comes to land use decisions made in their own ahupua'a. Although everyone should be able to voice their opinions, shouldn't there be greater weight given to the opinions of the residents in the ahupua'a involved?

This is especially true with respect to the drawing of the Wai'anae Concept Map in Section 2.3 and working out the details in Chapter 5, Implementation, both of which have not been prepared and circulated for review and comment. The Nanakuli NB strongly believes that the Nanakuli-Maili communities should be given greater consideration and weight when deciding issues in the Lualualei/Maili and Nanakuli ahupua'a. Likewise, we understand that that it is only fair and reasonable that the opinions of the Nanakuli-Maili communities will have less weight when involving land use issues in the Wai'anae and Makaha ahupua'a.

The Nanakuli NB has already expressed its position to support the identification of the industrial park project in the Lualualei/Maili ahupua'a as identified on Map B of the Wai'anae Concept Map in Section 2.3, and we hereby make no further comment and reserve our judgment with respect to the proposed land uses identified on the Wai'anae Concept Map for the other three ahupua'a.

