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MAR 23 2013

**NEIL ABERCROMBIE**
Governor

**RUSSELL S. KOKUBUN**
Chairperson, Board of Agriculture

**SCOTT E. ENRIGHT**
Deputy to the Chairperson

State of Hawaii
**DEPARTMENT OF AGRICULTURE**
1428 South King Street
Honolulu, Hawaii 96814-2512
Phone: (808) 973-9600 FAX: (808) 973-9613

March 11, 2013



Mr. Gary Gill, Acting Director
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 S. Beretania Street, Room 702
Honolulu, Hawai'i 96813

Dear Mr. Gill:

With this letter, the State of Hawai'i Department of Agriculture hereby transmit the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI) for the Kunia Agricultural Park, Kunia, O'ahu, Hawai'i situated (1) 9-4-002:080, in the City and County of Honolulu on the island of O'ahu for publication in the next available edition of the Environmental Notice.

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

If there are any questions, please contact Glenn Okamoto, Project Manager, at 973-9436.

Sincerely,

Russell S. Kokubun, Chairperson
Board of Agriculture

Enclosures

# APPLICANT ACTIONS
# SECTION 343-5(C), HRS
# PUBLICATION FORM (JULY 2012 REVISION)

**Project Name:** Kunia Agricultural Park
**Island:** O`ahu
**District:** ‘Ewa
**TMK:** (1) 9-4-002:080
**Permits:** NPDES Construction Stormwater Permit; Grading Permit; Agricultural Park Plan Review by City Department of Planning and Permitting; HDOT Plan Review; Utility Company Plan Review; Noise Permit
**Approving Agency:** State of Hawai`i, Department of Agriculture
**Applicant:** Chairperson, Hawai‘i Department of Agriculture
**Consultant:** R. M. Towill Corporation (RMTC)

2024 North King Street, Suite 200

Honolulu, Hawai‘i 96819-3494

**Contact: Brian Takeda, (808) 842-1133**

## Status (check one only):

| | |
|---|---|
| _**X**_DEA-AFNSI | Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day comment period ensues upon publication in the periodic bulletin. |
| __FEA-FONSI | Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov; no comment period ensues upon publication in the periodic bulletin. |
| __FEA-EISPN | Submit the approving agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov; a 30-day consultation period ensues upon publication in the periodic bulletin. |
| __Act 172-12 EISPN | Submit the approving agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov. NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin. |
| __DEIS | The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin. |
| __FEIS | The applicant simultaneously transmits to both the OEQC and the approving agency, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin. |
| __ Section 11-200-23 Determination | The approving agency simultaneous transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the applicant. No comment period ensues upon publication in the periodic bulletin. |
| __Statutory hammer Acceptance | The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it failed to timely make a determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and that the applicant’s FEIS is deemed accepted as a matter of law. |
| __Section 11-200-27 Determination | The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin. |
| __Withdrawal (explain) | |

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

Hawai‘i Revised Statutes (HRS), Chapter 166, Agricultural Parks, confers on the Hawai‘i Department of Agriculture (HDOA) the authority to plan, develop and manage agricultural parks on public lands to increase the supply of diversified agricultural lands. The proposed Kunia Agricultural Park, Kunia, O‘ahu, would be located on approximately 150 acres of State lands known to be highly suited to a variety of crops and currently under cultivation. The proposed Kunia Agricultural Park would afford 24 lessees the ability to both farm and live on the property through lease of farm dwelling lots with an associated cluster home to be developed and owned by the State.The Hawai‘i Department of Agriculture will be responsible for developing and maintaining the agricultural infrastructure and for securing irrigation water for the Kunia Agricultural Park. The HDOA’s request for an allocation of agricultural water from the Waiahole Ditch is pending before the Department of Land and Natural Resources, Commission on Water Resource Management.

Draft Environmental Assessment per Hawai‘i Revised Statutes (HRS), Chapter 343

# Kunia Agricultural Park
# Kunia, O‘ahu, Hawai‘i

March 2013

State of Hawai‘i
Department of Agriculture
1428 South King Street
Honolulu, Hawai‘i 96814

Draft Environmental Assessment
per HRS, Chapter 343

# Kunia Agricultural Park
# Kunia, O‘ahu, Hawai‘i

March 2013

State of Hawai‘i
Department of Agriculture
1428 South King Street
Honolulu, Hawai‘i 96814

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Appendix B Assessment: Non-Potable Water for Irrigation, by Development Strategies, LLC, December 2009

Appendix C Traffic Assessment Report, Kunia Agricultural Park, by Julian Ng Incorporated, November 2012

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| BMPs | Best Management Practices |
| CCH | City and County of Honolulu |
| CWA | Clean Water Act of 1972, as amended |
| CWB | Clean Water Branch, State Department of Health |
| CZM | Coastal Zone Management |
| DLNR | State Department of Land and Natural Resources |
| DOH | State Department of Health |
| EA | Environmental Assessment |
| HAR | Hawai‘i Administrative Rules |
| HDOT | Hawai‘i Department of Transportation |
| HRS | Hawai‘i Revised Statutes |
| LUO | Land Use Ordinance |
| NEPA | National Environmental Policy Act |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resources Conservation Service |
| OHA | Office of Hawaiian Affairs |
| RMTC | R. M. Towill Corporation |
| SHPD | State Historic Preservation Division, DLNR |
| SMA | Special Management Area |
| TMK | Tax Map Key |
| USFWS | U.S. Fish & Wildlife Service |

Note: Spelling of Hawaiian place names follows Pukui et al. *Place Names of Hawaii* [1974].

## Project Summary

| | |
|---|---|
| Project: | Kunia Agricultural Park, Kunia, Oʻahu, Hawaiʻi |
| Applicant: | State of Hawaiʻi, Department of Agriculture<br>1428 South King Street<br>Honolulu, Hawaiʻi 96814 |
| Accepting Authority: | State of Hawaiʻi, Department of Agriculture |
| Agent: | R. M. Towill Corporation (RMTC)<br>2024 North King Street, Suite 200<br>Honolulu, Hawaiʻi 96819<br>Contact: Brian Takeda, 842-1133 |
| Tax Map Key(s): | (1) 9-4-002:080 |
| Proposed Action: | Development of a new state agricultural park for the promotion of diversified agricultural production. |
| Land Area: | Approximately 150 acres |
| State Land Use District: | Agriculture |
| Existing Land Use: | Agriculture; open space |
| Present Zoning: | AG-1. Restricted Agriculture |
| Special Management Area: | No |
| Permits That May be Required: | HRS, Chapter 343 Documentation; Noise Permit; NPDES Construction Stormwater Permit; Grading Permit; Agricultural Park Plan Review by City Department of Planning and Permitting; Utility Company Plan Review; HDOT Plan Review |

# 1.0 Introduction

## 1.1 Project Location and Area of Use

The site for the proposed Kunia Agricultural Park is central Oʻahu. The project lies along Kunia Road between the Royal Kunia residential community to the south and Wilikina Drive in Wahiawa to the north. See **Figure 1**. The regional context for the project is an area with predominantly large agricultural parcels surrounding the project site. See **Figure 2**.

## 1.2 Purpose of the Environmental Assessment

In accordance with Chapter 343, Section 5, Hawaiʻi Revised Statutes (HRS), this project involves the following action that requires the preparation of an Environmental Assessment (EA):

> *(1) Propose the use of state or county lands or the use of state or county funds;*

In accordance with Chapter 343, Section 5, HRS, the applicant and accepting authority is the State of Hawaiʻi, Department of Agriculture (HDOA).

Pursuant to the requirements of Chapter 343, HRS, and Chapter 11-200, Hawaiʻi Administrative Rules (HAR), the accepting authority, the HDOA, has preliminarily determined that the proposed project is not expected to have significant environmental effects. Based on analysis and review of environmental conditions, project effects, and proposed mitigation measures, it is anticipated that a Finding of No Significant Impact (FONSI) will be issued for this project.

## 1.3 Purpose and Need for Proposed Project

Following the decline and eventual disappearance of both sugar cane and pineapple production on Oʻahu, there is considerable interest in the use of prime agricultural lands for diversified agriculture. Yet, the barriers to entry for small-scale farmers are significant due to infrastructure cost and the difficulty of securing a stable agricultural water source. The HDOA addresses these barriers by taking responsibility for developing and maintaining agricultural infrastructure and for securing irrigation water at its agricultural parks. The plan for Kunia Agricultural Park also provides the ability for lessees to live near their field lots through lease of farm dwelling lots.

Figure 1, Regional Context

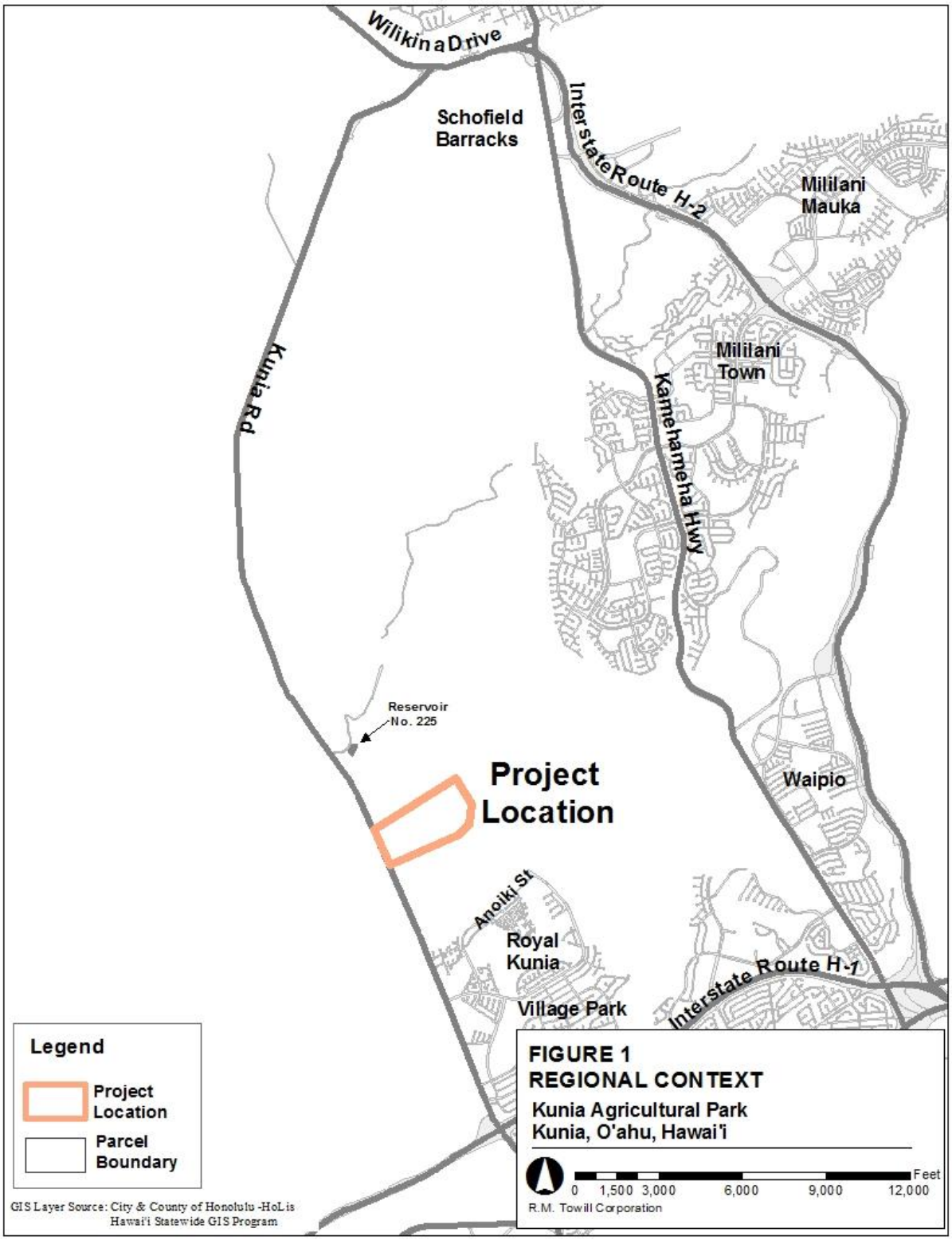
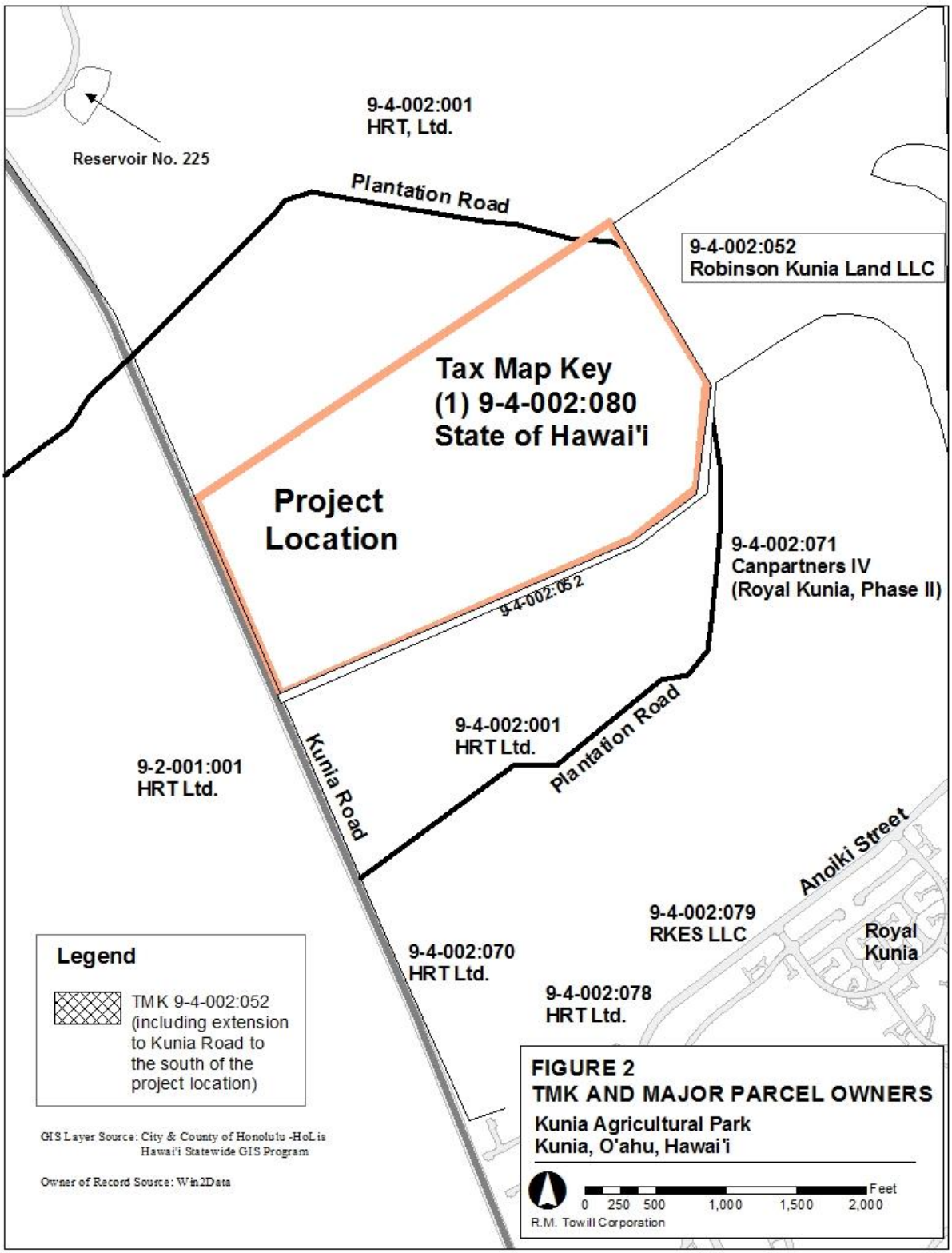


Figure 2, TMK and Major Parcel Owners



## 1.4 Overview of the State of Hawai‘i Agricultural Park Program

The proposed project is designed to fulfill the State of Hawai‘i’s legislative mandate to increase the supply of leased diversified agricultural land that is known to be highly suited to a variety of crops and has agricultural water available. Hawai‘i Revised Statutes (HRS), Chapter 166, Agricultural Parks, confers on the HDOA the authority to plan, develop and manage agricultural parks on public lands to increase the supply of diversified agricultural lands.

Section 166-1 states the goals and objectives of the state agricultural park program:

*Goals of Agricultural Parks:*

*Important agricultural lands should be preserved for productive purposes; the contribution of diversified agriculture and aquaculture to export and local markets should be expanded, thereby increasing its importance to the State’s economy; and continued use of the State’s agricultural land resources should be ensured by providing lands to new farmers, displaced farmers, and other qualified farmers.*

*Objectives*

*Lands of appropriate size and productive potential, with an adequate supply of water, to ensure economically viable farm operations; lands at reasonable cost with long term tenure and security from urbanization pressure; and lands with common facilities and activities to encourage farm production and distribution economies.*

Section 166-2 defines agricultural parks as:

*… any agricultural or aquacultural complex so designated by the board [of Agriculture, State of Hawai‘i], for which state land or state funds are used, in order to meet the goals and objectives stated in Section 166-1. Agricultural buildings, farm residences, and employee dwellings necessary to the production and distribution of agricultural and aquacultural commodities may be considered part of the agricultural park.*

There are ten existing agricultural parks in the State of Hawai‘i as shown in **Table 1**. Kunia Agricultural Park would be the fifth such facility on O‘ahu. The Kunia Agricultural Park would represent a 15% increase in O‘ahu agricultural park acreage and a 41% increase in the number of agricultural park lots on the island.

| Table 1. State Agriculture Parks (as of December 2010) | | | | |
|---|---|---|---|---|
| Island | Agricultural Park Name / Location | Acres | Total Agricultural Lots | Available Agricultural Lots |
| Oʻahu | Waimānalo | 126 | 14 | 0 |
| Oʻahu | Waiʻanae | 150 | 17 | 2 |
| Oʻahu | Kahuku | 225 | 24 | 0 |
| Oʻahu | Kalaeloa | 10 | 2 | 0 |
| *Subtotal Oʻahu* | | *972* | *58* | *2* |
| Hawaiʻi | Pāhoa | 553 | 56 | 0 |
| Hawaiʻi | Panaʻewa | 460 | 28 | 0 |
| Hawaiʻi | Keāhole | 179 | 34 | 0 |
| Hawaiʻi | Hāmākua | 509 | 11 | 0 |
| *Subtotal Hawaiʻi* | | *1,701* | *129* | *0* |
| Kauaʻi | Kekaha | 158 | 19 | 0 |
| Molokai | Molokaʻi | 753 | 22 | 0 |
| **TOTAL EXISTING** | | **3,584** | **228** | **2** |

Source: HDOA, Agricultural Resource Management Division Website, 2012

The project is expected to be developed in three phases: Master Planning, Design, and Construction.

HAR, Title 4, Subtitle 8, Chapter 153, Agricultural Park Program Rules, sets forth responsibilities of the HDOA in developing new state agricultural parks (Section 153-8(b)).

**Table 2** on the following page compares the responsibilities of HDOA (left column) to the current status of planning (right column).

## 1.5 Project Schedule and Cost

The project's three phases are currently planned according to the following schedule:

**Master Planning Phase**: June 2010 to June 2013

**Design Phase:** June 2013 – June 2014

**Construction Phase:** October 2014 – December 2015 (pending funding)

The estimated cost development is $21,000,000 to be financed with State of Hawaiʻi funds.

| Table 2. Responsibilities of the HDOA in Developing New State Agricultural Parks | |
|---|---|
| **HDOA Responsibility** | **Current Stage of Development** |
| 1. Site selection analysis; | The site has been selected and procured by the State of Hawai'i and a general site plan has been developed. |
| 2. Preliminary engineering report; | Conceptual engineering has identified preliminary infrastructure requirements and costs. A preliminary engineering report is pending. A traffic assessment report has been prepared (Appendix C). |
| 3. Agricultural feasibility analysis; | An agronomic assessment has been completed (Appendix A).<br>A non-potable water study has been completed (Appendix B). |
| 4. Environmental Impact Statement[1] | This Environmental Assessment is anticipated to result in a Finding of No Significant Impact (FONSI). |
| 5. Land use entitlements | No land use entitlements are required for this project.<br>**State Agriculture District –** The current and proposed state land use district will remain "agriculture". A state land use district boundary amendment will not be needed.<br>**County Plans –** The Kunia Agricultural Park will be consistent with current plans. Specifically, the General Plan of the City and County of Honolulu (CCH, 2006) supports the continued use of prime agricultural lands, specifically identified in Kunia, and the further development of diversified agriculture on O'ahu. The regional *Central O'ahu Sustainable Communities Plan* identifies the subject parcel as agricultural, situated outside the Urban District Boundary, providing open space, and preserving present viewplanes.<br>**Zoning Amendments** – No amendment is required. Current zoning is AG-1, Restricted Agriculture. |
| 6. Survey and cadastral work | Survey and cadastral work is pending the completion of the preliminary development stage. |
| 7. Design of project improvements (roads and irrigation facilities) including agency approvals and arrangements with utility companies; and | Detailed design of project improvements will be accomplished during the Design Phase. |
| 8. Consultation and advice during construction. | The construction management responsibilities of HDOA will be carried out during the Construction Phase of developing the new state agricultural park. |

[1] The environmental impacts of agricultural parks have been evaluated primarily via environmental assessments with Findings of No Significant Impact.

# 2.0 Project Description

## 2.1 Existing Land Use

Agricultural operations near the parcel include the seed farms operated by Pioneer, Monsanto, and Syngenta, the test-plot fields of the Hawaii Agricultural Research Center, and the cash-crop (grown for sale) farms of Alec Sou (Aloun Farms) and Larry Jefts (Waikele Farms, Inc.) (Development Strategies, 2009a).

Approximately 70% of the proposed Kunia Agricultural Park site is presently leased for diversified agriculture under a Revocable Permit with a one-year, renewable term, to Waikele Farms, Inc. (Larry Jefts). An unused southern area within the property has similar farm potential. The irrigation water source is the Waiāhole Ditch. Agricultural water is transported by piping (on grade) from Reservoir 225 on Kunia Road.

**Figure 3, Existing Land Use #1** shows Larry Jefts' field within the parcel between crops with the fallow soil showing evidence of harvesting, harrowing, and that the previous crop was melons. Larry Jefts practices crop rotation and long fallowing between crops. The absence of rainfall in late 2009 kept this particular field clean and weed-free. **Figure 4, Existing Land Use #2** shows seed corn grown by Syngenta in the eastern portion of the parcel. Field roads define the perimeter of fields or plots. Portable irrigation pipeline, located on the side of the field road, brings water from the Waiāhole Irrigation System (Development Strategies, LLC, 2009).

Figure 3, Existing Land Use #1

Kunia Agricultural Park
Kunia, Oʻahu, Hawaiʻi

Source: Development Strategies, LLC

Figure 4, Existing Land Use #2

Kunia Agricultural Park
Kunia, O‘ahu, Hawai‘i

Source: Development Strategies, LLC

## 2.2 Existing Access

Although the proposed Kunia Agricultural Park parcel has frontage along Kunia Road, entry from the parcel to Kunia Road is via the paved “Plantation Road” that loops around the property, intersecting it at several points and via graded (dirt) field roads within the site (**Figure 5**). The field roads are graded to follow the perimeter of planted areas.

Plantation Road is paved and circumnavigates the north, east, and south perimeters of the parcel. In places, Plantation Road is as far as 1,000 feet from the parcel to the north, but briefly intersects the eastern boundary of the Parcel. North of the parcel, Plantation Road is well maintained and forms a major crossing with Kunia Road. This crossing is utilized extensively by Syngenta on the west of Kunia Road and by the cash-crop operations located on the east of Kunia Road. Seed farms also access various leased plots on the east side of Kunia Road via this intersection. The east and south portions of Plantation Road are less well maintained. Field roads to the east, some within the parcel, accommodate various farm vehicles and farm equipment (Development Strategies, 2009a).

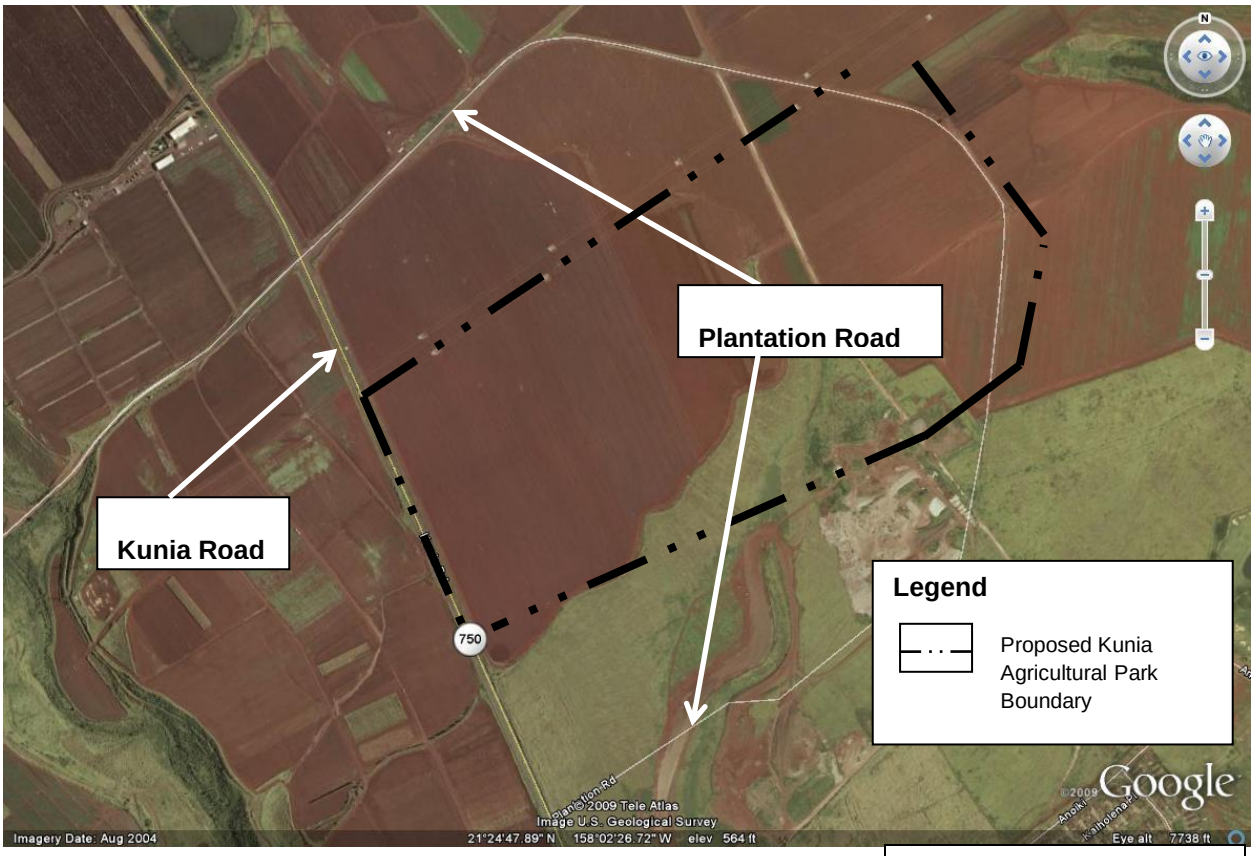



Figure 5, Property Access

Kunia Agricultural Park
Kunia, O'ahu, Hawai'i

## 2.3 Relationship of the Project to Royal Kunia, Phase II

Halekua-Kunia, LLC and HRT, Ltd., are owners of approximately 210 acres bordering part of the subject parcel that are to be developed as the Royal Kunia, Phase II project (Figure 2-4). Halekua-Kunia has received approval of its application for a Planned Development-Housing (PD-H) permit through a Decision and Order from the City and County of Honolulu, Department of Planning and Permitting, dated July 23, 2009 (CCH, 2009).

Plans for Royal Kunia, Phase II include 2,007 single-family and multi-family dwelling units to be conveyed as fee simple properties. The project also will include several community parks and associated recreational facilities. See **Figure 6.**

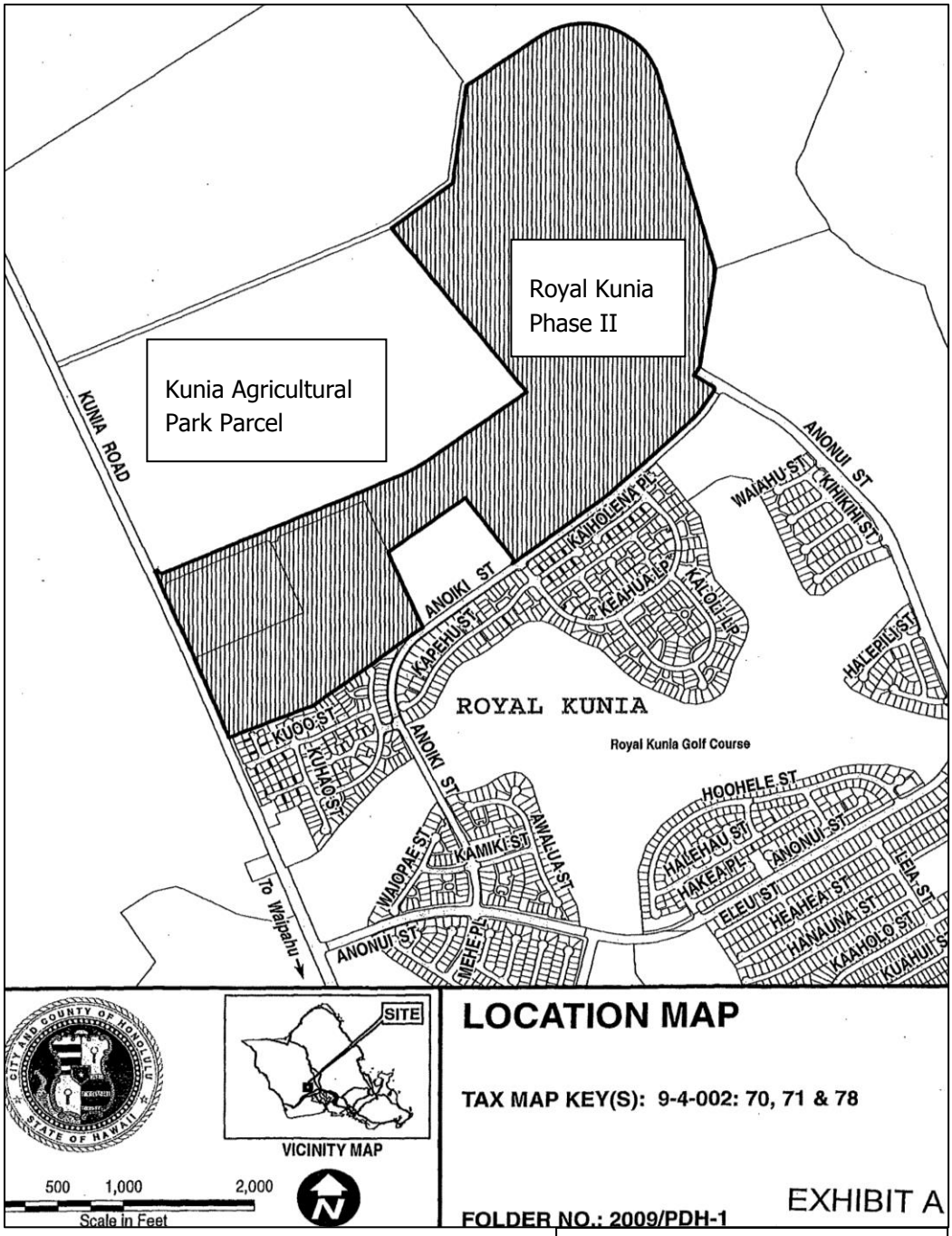



Figure 6, Royal Kunia, Phase II

Kunia Agricultural Park
Kunia, O'ahu, Hawai'i

Source: DPP 2009

## 2.4 Memorandum of Understanding

Under the terms of a Memorandum of Understanding, land for the proposed Kunia Agricultural Park was conveyed from Halekua Development Corporation (Halekua), owner of lands planned for development of Royal Kunia, Phase II, to the HDOA. The lands were conveyed by Halekua for "the HDOA's use as and to establish a state agricultural park thereon."

> Paragraph A. Confirmation of Conveyance of 150-Acre Parcel.
>
> HDOA does hereby acknowledge and confirm that by Warranty Deed with Reversion dated February 23, 2004…the agreed-upon 150 acres of land within the Royal Kunia Phase II developed was conveyed by Halekua to the State of Hawai'i…
>
> Paragraph B. Use of State Agricultural Park.
>
> The state agricultural park is intended to benefit the small diversified farmer and use of the state agricultural park shall be intended for diversified agricultural production, including, without limitation, floriculture, foliage and orchard production.
>
> In addition, the HDOA shall have the right and option (but is not required) to develop and construct up to a maximum of fifty (50) related agricultural farm dwellings or farm employee housing units with the state agricultural park. If any of these agricultural farm dwellings or farm employee housing units are developed by the HDOA on the state agricultural park the same shall not at any time be offered for sale by the HDOA.
>
> Paragraph C. Certain Prohibitions within State Agricultural Park.
>
> Since the state agricultural park will be located adjacent to an urban residential community [the future Royal Kunia, Phase II], commercial livestock and aquaculture production or other activities associated with or related thereto shall be prohibited within the state agricultural park.
>
> Paragraph D. Halekua to Include State Agricultural Park in Land Plan for Royal Kunia, Phase II.
>
> Halekua shall incorporate the state agricultural park into its land plan for the Royal Kunia Phase II subdivision and jointly with the HDOA shall prepare a preliminary site plan for the state agricultural park reflecting the locations of the roadway and infrastructure connections to be provided to the boundary of the state agricultural park parcel…The HDOA shall determine the final layout of the state agricultural park's interior configuration, subject to review and concurrence by Halekua, and shall arrange for and provide funding for construction of the improvements within the interior of the state agricultural park.
>
> Paragraph E. Halekua to Design and Construct Certain Off-Site Infrastructure to the State Agricultural Park.
>
> Halekua shall design and construct off-site infrastructure improvements for the state agricultural park including roadway, potable and irrigation water lines (exclusive of water commitment), and

sewer lines and utility connection, up to the property boundary of the state agricultural park at no cost to the HDOA.

Time limits for developing the preliminary site plan under Paragraph E above have caused several updates of the Memorandum of Understanding, which remains in effect.

## 2.5 Evaluation of Agronomic Feasibility for the Agricultural Park

A *Preliminary Agronomic Assessment* of the subject parcel was completed in December 2009 by Development Strategies, LLC (Development Strategies, 2009a). The purpose of the study was to determine the agricultural value of the subject parcel and evaluate its agronomic potential for various crops. The discussion below is based on the analysis and conclusions of the *Preliminary Agronomic Assessment* and another consultant study, entitled, *Assessment, Non-Potable Water for Irrigation, Kunia Agricultural Park* (Development Strategies, 2009b).

Agronomic (crop cultivation) feasibility is analyzed using numerous feasibility factors, including:

1 Land availability (per lot; overall);
2 Soil suitability;
3 Topography;
4 Climatic conditions (rainfall, temperature, wind) expressed as a comparative "crop factor";
5 Agricultural water for irrigation;
6 Infrastructure requirements; and
7 Economic viability of anticipated crops.

### Agronomic Feasibility Factor 1: Land Availability

To maximize flexibility in implementing development of Kunia Agricultural Park, HDOA has the leased land under one-year Revocable Permit No. 26 to Waikele Farms, Inc. (Larry Jefts) which is annually renewable and can be terminated with 30 days' notice.

### Agronomic Feasibility Factor 2: Soils

According to the agronomic assessment for the project (Appendix A), soils contribute significantly to the productive potential of the Kunia fields. Soils within the subject parcel are typically very deep, well drained, highly weathered, geographically homogenous, uniformly well structured, easily tilled to practical depths, accommodating of grading for conservation planning, trafficable, and responsive to amendments (organic and chemical). They are also friendly to drip irrigation designs and irrigation schedules. Under cultivation by O'ahu Sugar, the fields in the southern portion of Kunia consistently produced among the highest sugar yields in the state (Development Strategies, 2009a).

The *Soil Survey of Islands of Kaua'i, O'ahu, Maui, Moloka'i and Lāna'i* (USDA, 1972) rated the Wahiawa, Lahaina, and Moloka'i soil series among the state's most highly productive soils. Although rock-free soils are truly rare, even among Wahiawa and Lahaina soil series, relatively few stones, rocks and boulders in much of the Kunia plateau makes its soils that much easier to cultivate, compared to the soils of similarly large open-field areas.

As shown in **Figure 7**, the Wahiawa and Lahaina soils on the parcel were classified "1" (Prime Agricultural Land) in the Agricultural Lands of Importance to the State of Hawai'i rating system, although the limited productivity of the gully was recognized with a lesser classification of "3". The Land Study Bureau assigned the entire parcel its highest productivity rating of "A" (on a scale of A to E). **Figure 7, Soils** also shows the continuity of agricultural value among the surrounding parcels, which share the same classification and rating.

Agronomic Feasibility Factor 3: Topography

See **Figure 8**. Overall the parcel slopes gently downward from northwest to southeast at about 3%. Specifically, the western 70% of the parcel (with 3 to 7% slope), is separated from the eastern area (with 0-3% slope) by a soil-rich gully which forms the limits of the 100-year storm hazard area (with 7 to 15% slope) (USDA, 1972).

Agronomic Feasibility Factor 4: Climate

The *Preliminary Agronomic Assessment* (Development Strategies, 2009a) assessed the climate of the parcel as very favorable for a variety of diversified agricultural crops in terms of rainfall, solar intensity, wind conditions and temperature. The favorable climate has contributed to the consistently high agricultural productivity of the subject lands.

Agronomic Feasibility Factor 5: Agricultural Water for Irrigation

Irrigation is perhaps the single most defining crop productivity factor (Development Strategies, 2009a). Agricultural water, as it relates to feasibility, is a function of both *supply* (procuring a dependable source) and *demand* (how much water is required for a certain crop mix on the specific parcel).

Agricultural water demand for various diversified agricultural crops was analyzed in the *Assessment [of] Non-Potable Water for Irrigation, Kunia Agricultural Park* (Development Strategies, 2009b) (Appendix B). Historically, O'ahu Sugar Company used both Waiāhole Irrigation System water and well water on the southern Kunia fields to achieve maximum production (Development Strategies, 2009b).

Three alternative sources of agricultural water for the proposed Kunia Agricultural Park were examined: Kunia Wells, Honolulu Board of Water Supply (BWS), and the Waiāhole Irrigation System.

*Kunia Wells* – In selling their agricultural lands in Kunia, the Estate of James Campbell ("Estate") made provisions to service the fields located to the west of Kunia Road with water from three agricultural wells located in proximity to Kunia Village in Central O'ahu ("Kunia Wells"). To assure the long-term availability of agricultural water, the Estate also formed a private water company made up of the various landowners in the service area to assume ownership, management and maintenance of the Kunia Wells and the related water distribution system.

Although located directly across Kunia Road from the Kunia Wells service area, the property is not eligible to use Kunia Wells agricultural water.

Figure 7, Soils

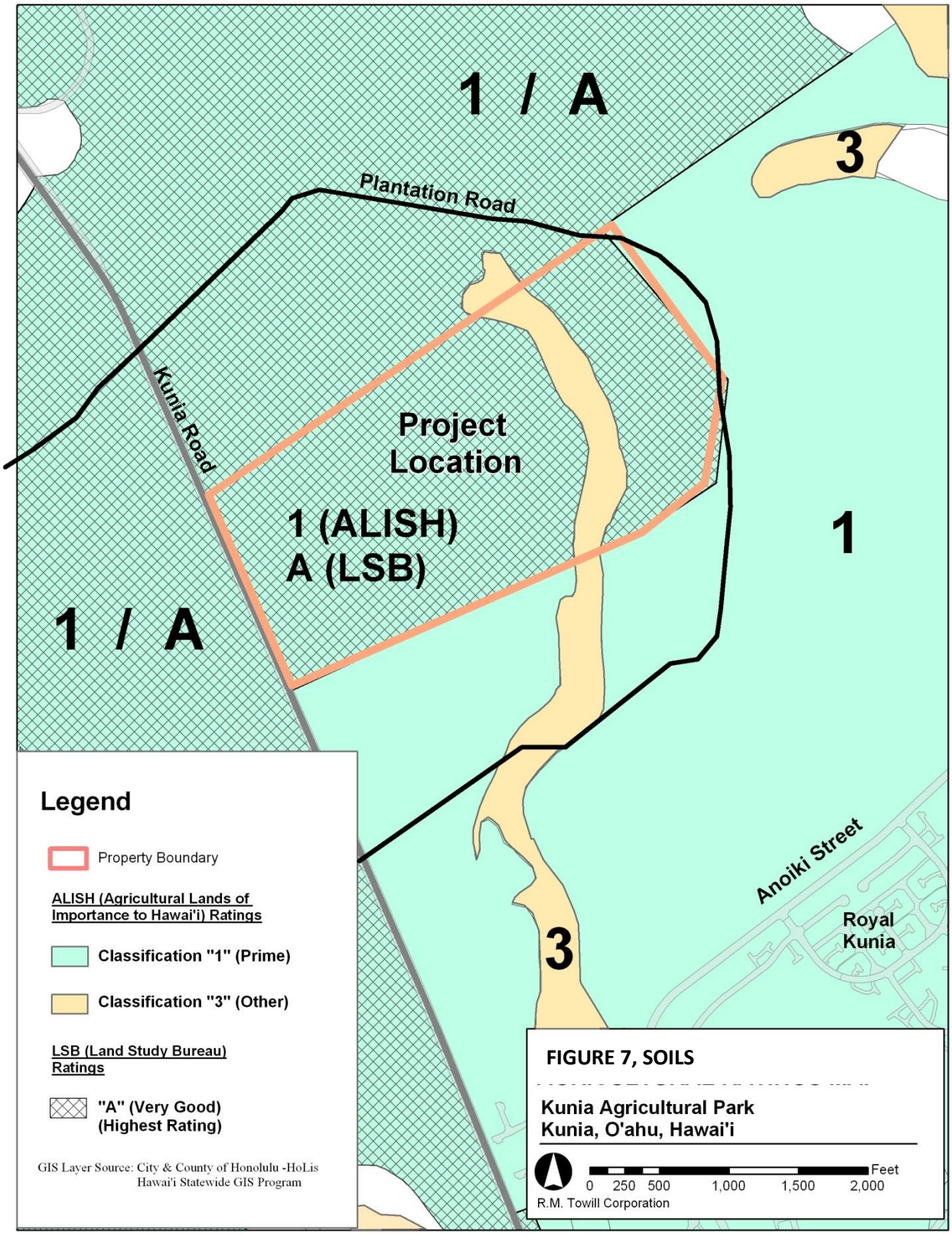
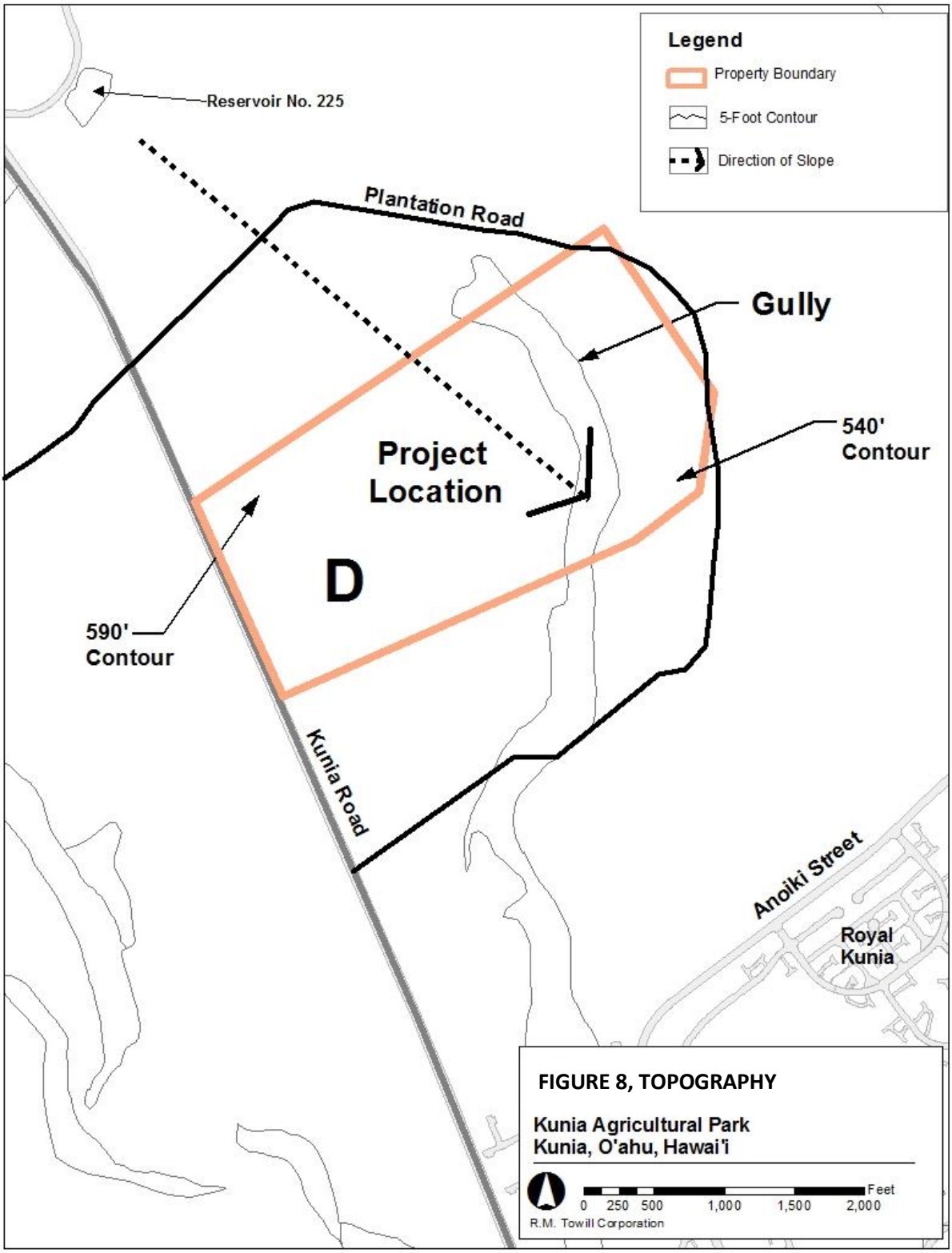


Figure 8, Topography



*Honolulu Board of Water Supply* – Agricultural water from the BWS was regarded as infeasible for the state agricultural park because 1) the BWS prioritizes use of potable water for domestic purposes; 2) use of potable water from BWS sources is even less likely if other agricultural water sources exist in project vicinity; and 3) potable water is prohibitively expensive as an irrigation source for small-scale farming.

*Waiāhole Irrigation System (aka "Waiāhole Ditch")* – This facility is considered the best choice for a source of agricultural water for the Kunia Agricultural Park. It has numerous advantages, including: 1) location: the water flows through the Kunia plateau; 2) current usage: it serves the subject parcel and adjacent agricultural parcels and is physically connected to the parcel already; and 3) infrastructure: a Waiāhole Irrigation System Reservoir 225 is located north of the property on Kunia Road.

While the Waiāhole Irrigation System is the most advantageous supply of agricultural water supply, its use requires allocation by the State Department of Land and Natural Resources. The HDOA plans to request an allocation, based on estimated demand of agricultural water from the Waiāhole Irrigation System to service the proposed Kunia Agricultural Park (see below, Demand for Agricultural Water).

Regarding demand for agricultural water, the water needs of various crops vary. A comparison of crops' tendency for water loss vs. water retention, the so-called "crop factor," can be used to estimate the demand for agricultural water (Development Strategies, 2009a). **Table 3** identifies the various diversified agricultural crops deemed feasible on the subject property and their crop factors (relative need for water).

Table 3. Comparative Crop Water Loss / Retention (Development Strategies, 2009a)

| 91% Crop Factor | 95% Crop Factor | 1.02 Crop Factor | 1.12 Crop Factor |
|---|---|---|---|
| Lettuce | Lychee | Banana | Taro |
| Ong Choi | Malongai | | Taro Leaf |
| Bitter Melon | Lalot | | |
| Chives | Fruit Trees | | |
| Basil Leaf | Long Beans | | |
| Curry Leaf | Eggplant | | |
| Basil | Long Eggplant | | |
| Peppermint | Galonga | | |

**Table 4** summarizes the estimated water requirements for the proposed Kunia Agricultural Park.

| Table 4. Summary of Agricultural Water Requirements (Development Strategies, 2009b) | | |
|---|---|---|
| A. 12-month Average Daily Demand per Acre for Kunia Agricultural Park (gallons per acre per day) | B. Net Cultivated Lot Area | E. A x B<br><br>Total Average Daily Water Demand for Kunia Agricultural Park (gallons per day) |
| 3,700 gallons per acre per day<br><br>(Note: This figure is a maximum. If this amount cannot be allocated to the Kunia Agricultural Park, specific water conservation practices will need to be employed.) | 124 Acres | 459,000 gallons per day (rounded)<br><br>Note: This figure is a maximum. |

**Table 5** provides the detailed analysis which is summarized in the table above (Development Strategies, 2009a).

Table 5. Preliminary Evaporation Projection (leading to agricultural water demand) (Development Strategies 2009a)

**Kunia Agricultural Park**

Irrigation Requirements

Weather Data - Station 738.40

Oahu Sugar Company Field 155

| Month | Adj. Mean Rainfall | Mean Pan Evaporation | Net Evaporation | Ave. Crop Factor | Adj. Net Evaporation | Irrigation Efficiency | Projected Demand | Days per Month | Daily Demand | 1" per Acre/Day | Demand Acre/Day |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JAN | 6.42 | 5.06 | - | 0.95 | - | 0.85 | - | 31 | - | 27,154 | - |
| FEB | 4.29 | 5.31 | 1.02 | 0.95 | 0.97 | 0.85 | 1.14 | 28 | 0.04 | 27,154 | 1,106 |
| MAR | 3.11 | 6.28 | 3.17 | 0.95 | 3.01 | 0.85 | 3.54 | 31 | 0.11 | 27,154 | 3,103 |
| APR | 2.36 | 6.10 | 3.74 | 0.95 | 3.55 | 0.85 | 4.18 | 31 | 0.13 | 27,154 | 3,661 |
| MAY | 1.65 | 7.12 | 5.47 | 0.95 | 5.20 | 0.85 | 6.11 | 31 | 0.20 | 27,154 | 5,355 |
| JUN | 0.83 | 7.38 | 6.55 | 0.95 | 6.22 | 0.85 | 7.32 | 30 | 0.24 | 27,154 | 6,626 |
| JUL | 0.83 | 7.68 | 6.85 | 0.95 | 6.51 | 0.85 | 7.66 | 31 | 0.25 | 27,154 | 6,706 |
| AUG | 0.98 | 7.63 | 6.65 | 0.95 | 6.32 | 0.85 | 7.43 | 31 | 0.24 | 27,154 | 6,510 |
| SEP | 1.18 | 6.79 | 5.61 | 0.95 | 5.33 | 0.85 | 6.27 | 30 | 0.21 | 27,154 | 5,675 |
| OCT | 2.56 | 6.19 | 3.63 | 0.95 | 3.45 | 0.85 | 4.06 | 31 | 0.13 | 27,154 | 3,554 |
| NOV | 2.99 | 5.07 | 2.08 | 0.95 | 1.98 | 0.85 | 2.32 | 30 | 0.08 | 27,154 | 2,104 |
| DEC | 4.69 | 4.40 | - | 0.95 | - | 0.85 | - | 31 | - | 27,154 | - |
| | Annual Total | | 44.77 | | | | 50.04 | Total Daily Demand/Acre (12-Months) | | | 44,401 |
| | 12-Month Average | | 3.73 | | | | 4.17 | 12-Month Average Daily Demand/Acre | | | 3,700 |
| | | | | | | | | Peak Month Average Daily Demand/Acre | | | 6,700 |

| 91% Crop Factor | | 95% Crop Factor | | 1.02 Crop Factor | GROSS PROJECT AREA | 150.0 | acres |
|---|---|---|---|---|---|---|---|
| | | | | | Less: Housing and Roads | 16.0 | acres |
| Lettuce | Lychee | Long Beans | Banana | | Less: Major Gully | 4.0 | acres |
| On Choi | Malongai | Eggplant | | | NET LOT AREA | 130.0 | acres |
| Cucumber | Lalot | Long Eggplant | | | Less: Field Roads/Drainage | 6.0 | acres |
| Bitter Melons | Fruit Trees | Galonga | | 1.12 Crop Factor | NET CULTIVATED LOT AREA | 124.0 | acres* |
| Chives | | | | | | | |
| Basel Leaf | | | Taro | | *Note: No adjustment for field rotation.* | | |
| Curry Leaf | | | Taro Leaf | | | | |
| Basel | | | | | AVERAGE DAILY WATER DEMAND | 458,809 | gpd |
| Peppermint | | | | | SAY | 459,000 | gpd |

Agronomic Feasibility Factor 6: Infrastructure Requirements

Infrastructure within the Kunia Agricultural Park will vary according to land use, i.e., field lots vs. farm dwelling lots. See **Figure 9.**

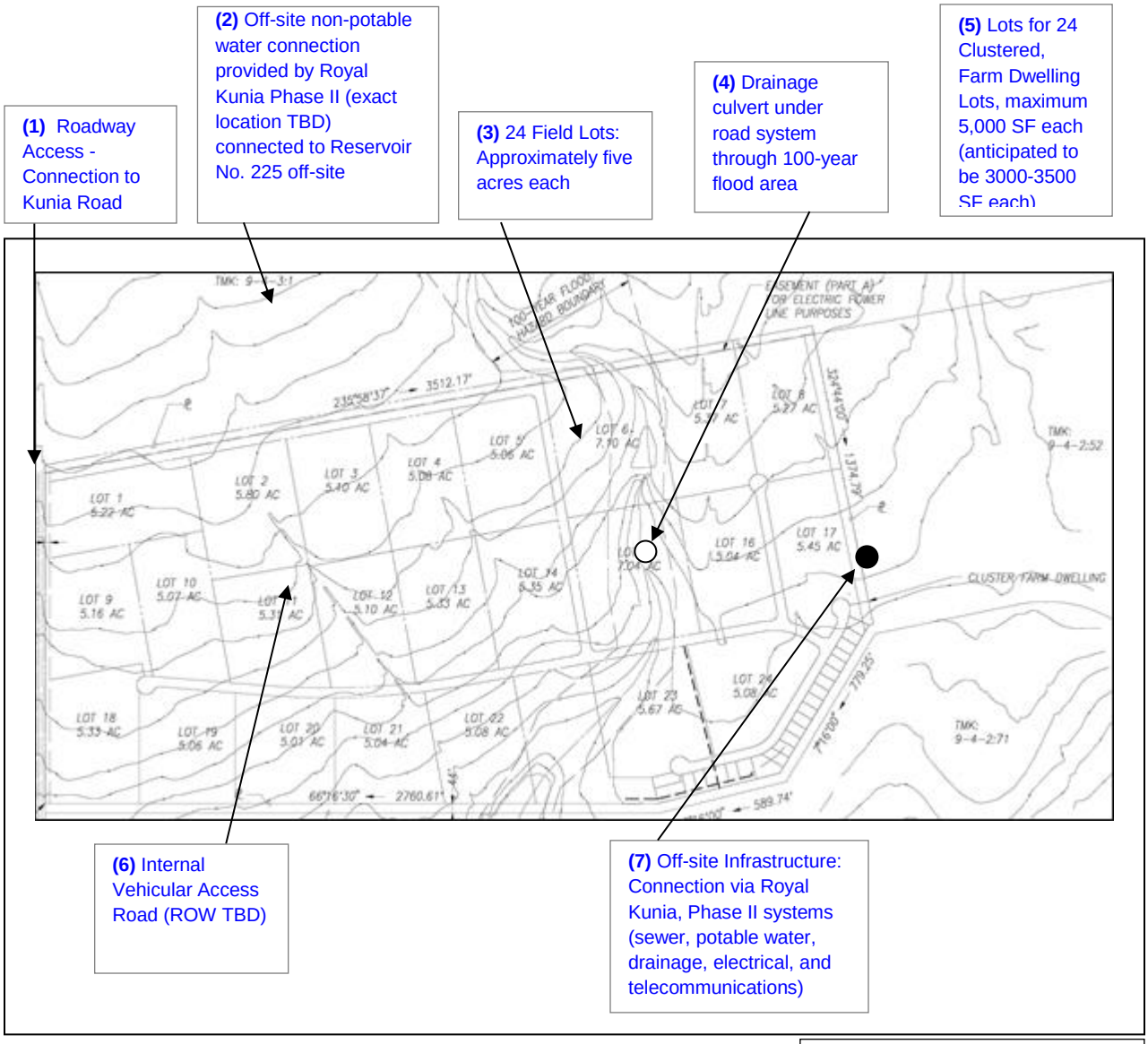



Figure 9, Infrastructure

**Kunia Agricultural Park**
**Kunia, Oʻahu, Hawaiʻi**

Infrastructure planned for the site, clockwise from the top left in **Figure 9**, includes:

(1) Roadway Access – the connection point to Kunia Road will be determined under a pending agreement with HDOT, Highways Division.
(2) 24 field lots – approximately five acres each with electrical, agricultural water, and limited potable water services to the lot's property line.
(3) Off-site Non-Potable Water Connection – This is to be provided along the north border of the property by Royal Kunia Phase II under their Memorandum of Agreement with HDOA.
(4) Drainage Facilities - Natural drainage through the existing gully will be aided by culverts beneath each intersection of the gully with the internal access road.
(5) 24 Clustered Farm Dwelling Lots – A paved access road with curb and gutter and utilities will be constructed to serve the farm dwelling lots.
(6) Off-Site Infrastructure – The Kunia Agricultural Park site plan limits the urban on-site and off-site infrastructure requirements to the area designated for clustered farm dwellings. The off-site infrastructure (sewer, potable water, drainage, power and telecommunications) will be provided to the southeastern portion of the property by the Royal Kunia, Phase II owners, and will connect to that project's infrastructure for water, sewer, drainage, electrical, cable, and telephone.
(7) Internal Vehicular Access Road – The HDOA plans to construct a paved agricultural access road to provide access to the field lots and farm dwelling lots. The right-of-way width is to be determined. This internal roadway will include a connection to Kunia Road.

As shown in **Figure 9** above, the Preliminary Site Plan calls for the following land uses: crop cultivation lots, clustered farm dwelling lots, on-site and off-site infrastructure, open space farm lots through the existing gully to accommodate stormwater runoff. The existing gully may not be suitable for cultivating all types of crops.

The approximately 150-acre property is expected to provide approximately 124 net acres of agricultural land divided into 24 field lots.

**Agronomic Feasibility Factor #7: Economic Viability**

Use of the site for crop production is expected to be economically viable based on experience within the subject parcel and surrounding agricultural land uses. These include the Waikele Farms, Inc. (Larry Jefts), Aloun Farms, Monsanto and Syngenta operations.

Historically, the subject property was used successfully by the Oʻahu Sugar Company for sugar production until commodity prices for sugar and other factors forced the company to cease operations. Today, the proposed use of the site for an agricultural park will allow for a diversified and economical approach to maintaining the use of the prime land in agriculture.

# 3.0 Environmental Setting, Potential Impacts and Mitigation Measures

## 3.1 Climate

The climate in Kunia is characterized as semi-tropical and is influenced by Hawai'i's geographic location, southwest of the Pacific High or anticyclone region. The outstanding features of the climate are the equable temperatures from day to day and season to season, the persistent northeasterly trade winds and the marked variation in rainfall from the wet to the dry season, and from place to place. According to data from Weather Station 738.40, O'ahu Sugar Company Field 155, average monthly rainfall in the project area varies from a low of 0.8-0.9 inches in the summer months to a high of 6.4 inches in January.

The average monthly temperature recorded at the Wheeler Army Airfield ranges from 66 and 80 degrees. Normal annual rainfall is over 40 inches. Three-fourths of this total, on the average, falls during the seven-month wet season which extends from October through April. The dry season includes the months of May through September. Winds are predominantly from the northeast at speeds of 10 to 13 knots. Relative humidity, moderate to high in all seasons, is slightly higher in the wet season than in the dry. The area is known for relatively high solar radiation intensity (Juvik and Juvik, 1998).

***Potential Effects and Mitigation***

The proposed project will not affect the climate of the region. The favorable trade winds, temperature conditions, and intense sunlight at the site are anticipated to contribute to the productivity of diversified crops.

## 3.2 Geology, Topography and Soils

Geography

The project is located in O'ahu's central region in an area known as the "Kunia plateau." This large and productive plateau has been the subject of preservation efforts for its agricultural value. Agricultural operations that are presently nearest to the parcel include the corporate seed farms of Pioneer, Monsanto, and Syngenta, the test-plot fields of the Hawai'i Agricultural Research Center, and the cash-crop farms of Alec Sou (Aloun Farms) and Larry Jefts.

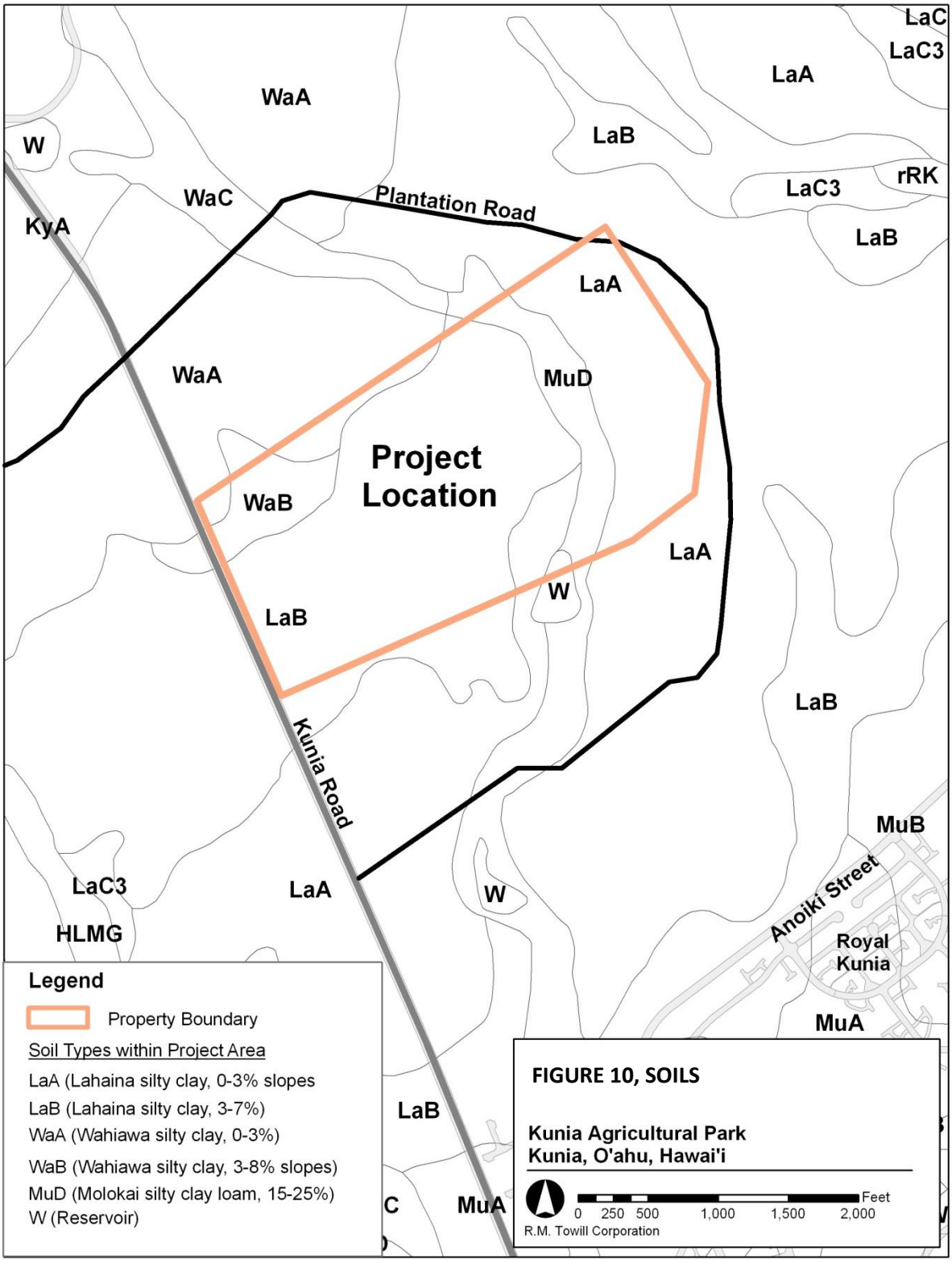
Topography

The parcel's topography slopes gently from northwest to southeast at about 3% which is consistent with the general s slope of the Kunia plateau. A gully intersects the property with slopes of 7 to 15%.

Soils

See **Figure 10**. Soils information for the project site was obtained from the Soil Survey of Islands of Kaua'i, O'ahu, Maui, Moloka'i and Lāna'i, State of Hawai'i, as prepared by the U.S. Department of

Figure 10, Soils



Agriculture, 1972. The Soil Survey shows the composition of the parcel to be about 10% Wahiawa silty clay (Northwest corner), 80% Lahaina silty clay, and 10% sloping Molokai silty clay loam that forms a gully running from the center of the Parcel to the South boundary.

Observations on an agronomic site visit in August 2009 support the descriptions above and support the soils classification of the parcel among the surrounding agricultural units. No obvious limitations were observed to distinguish the parcel as potentially less productive than surrounding agricultural parcels.

***Potential Effects and Mitigation***

No significant effects to soils, topography or geology are expected to result from this project. The project general plan was designed to take advantage of natural grades with a minimal amount of ground disturbance. Erosion control measures will be employed during construction.

BMPs will include structural (e.g., silt fences, berms, barriers, filter fabric), vegetative (e.g., grass, mulch, ground cover, soil stabilization), and management measures (e.g., project scheduling and phasing, material storage and equipment maintenance procedures, BMP monitoring), as necessary.

## 3.3 Groundwater

An important source of groundwater supply for the Island of O‘ahu is an exceptional lens of basal groundwater in the Honolulu-Pearl Harbor area (USDA, 1972). Southern O‘ahu’s coastal plain is underlain by sedimentary deposits that form a caprock which retards the seaward movement of fresh ground water from the basal aquifer. The caprock extends along the coastline from 800 to 900 feet below sea level.

O‘ahu has been divided into seven major groundwater areas, primarily on the basis of geologic or hydrologic differences (Figure 11). The entire project area is located within the designated Southern O‘ahu Groundwater Area. Water levels in the Southern O‘ahu Groundwater Area generally range from about 25 to 30 feet above sea level inland to about 15 to 20 feet above sea level near the shore where the water is under artesian pressure because it is confined by caprock. The caprock impedes the seaward movement of fresh ground water. In the eastern part of the area, thick valley fill and underlying weathered rocks form partial barriers to groundwater flow. In the western part of the area, the weathered zone near the unconformity separating Ko‘olau Basalt from underlying Wai‘anae Volcanics impedes the flow of water between the two volcanic-rock aquifers (USGS, 1999).

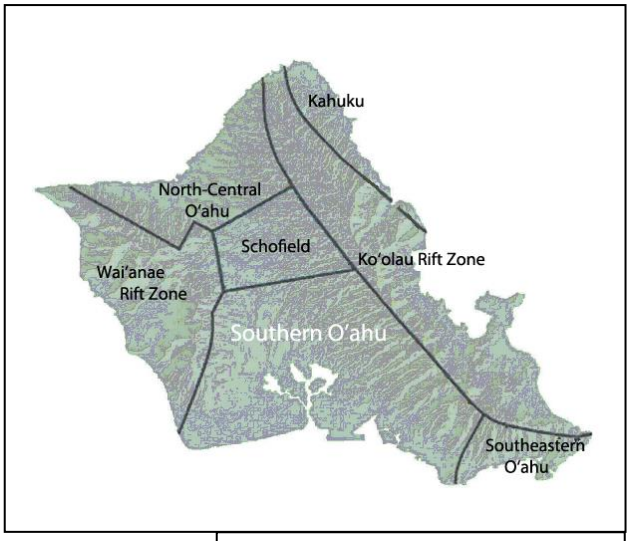



Figure 11, O'ahu Aquifers

**Kunia Agricultural Park**
**Kunia, O'ahu, Hawai'i**

Source: USGS, 2009

The Honolulu Board of Water Supply (BWS) has potable wells, storage tanks and transmission facilities on the Kunia plateau. A major transmission main is located in the right-of-way for Kunia Road which runs along the western border of the Kunia Agricultural Park.

***Potential Effects and Mitigation***

The potential for adverse effects on groundwater and hydrogeological resources is not anticipated. Appropriate and sufficient mitigative measures and controls will be applied consistent with sound engineering and operating practices.

Project activities will be conducted in compliance with regulatory standards including NPDES requirements as regulated by State of Hawai'i, Department of Health. Wastewater from new farm dwelling lots will be collected and treated in accordance with DOH wastewater regulations as prescribed in HAR, Chapter 11-62, Wastewater Systems.

Since the parcel sits at the lowest elevation on Kunia's agricultural plateau, conservation planning is crucial both to water conservation during normal rainfall and to runoff protection during the rare high rainfall events. A conservation plan for the parcel should consider the operations to the North. It is recommended that a conservation plan be prepared by the Natural Resources Conservation Service (NRCS). The expertise and recommendations of NRCS will help to refine optimal utilization of the parcel for agriculture. To initiate conservation planning by NRCS, a lessee must be a registered "Cooperator" in the West Oahu Soil and Water Conservation District (SWCD) (Development Strategies, 2009a). HDOA will require proof of an approved conservation plan in all lease agreements.

## 3.4 Drainage

Natural drainage flows into the parcel from the north, and exits into the non-agricultural developments to the south (Royal Kunia, Phase I and Village Park), which is consistent with the northwest-to-southeast slope of the Kunia plateau. The farming activities on and around the parcel all appear to have conservation plans in place to divert drainage water into the fields and thus capture potential runoff and increase stored soil moisture (Development Strategies, 2009a).

The internal drainage system of the state agricultural park will be constructed and maintained by the HDOA. Provisions in the design have been made for drainage within the 100-year flood boundary to pass through culverts within the field lots where the internal access road intersects the natural path of the drainageway. Drainage facilities for impervious area surrounding the farm dwellings will be incorporated into the roadway design in the cluster area.

***Potential Effects and Mitigation***

Short-Term

Drainage effects related to construction activities will be of short duration and will cease upon completion of the project.

Planned improvements will require excavation and grading work to remove existing agricultural berms in the field lots and to achieve proper elevations and grades for the farm dwelling lot infrastructure. There will be a small increase in impervious area on the property from the internal access road as well as roadways, dwelling units, sidewalks, curbs and gutters to be constructed to serve the clustered farm dwelling lots. Potential effects include discharge of sediments or other pollutants in construction-related storm water runoff.

During construction, project activities will be conducted in compliance with HAR 11-54 Water Quality Standards; HAR 11-55 Water Pollution Control. Because planned improvements will result in more than one acre of ground disturbance during construction, project activities will be subject to a NPDES Notice of Intent (NOI) Form C for Storm Water Discharges Associated with Construction Activity from DOH, Clean Water Branch (CWB) and possibly NOI Form F, Hydrotesting Waters. These permits require implementation of BMPs, including site management measures and physical controls (e.g. diversion berms, silt fences, detention ponds) to reduce pollutants in construction storm water runoff and ensure that the project complies with State water quality standards. As feasible, any discharges of treated, dechlorinated effluent will be reused for dust control, or offered as irrigation water to area farmers.

General BMPs for urban-type development areas will include the following:

Construction will be limited near drainage ways to avoid the potential for release of sediments into stormwater.

*Before Construction*

- Existing ground cover will not be destroyed, removed or disturbed more than 20 calendar days prior to start of construction.
- Erosion and sediment control measures will be in place and functional before earthwork may begin, and will be maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at the end of the work day.

*During Construction*

- Clearing shall be held to the minimum necessary for grading, equipment operation, and site work.
- Construction shall be sequenced to minimize the exposure time of cleared surface areas. Areas of one phase shall be stabilized before another phase can be initiated. Stabilization shall be accomplished by protecting areas of disturbed soils from rainfall and runoff by use of structural controls such as PVC sheets, geotextile filter fabric, berms or sediment basins, or vegetative controls such as grass seedling or hydromulch.
- All control measures shall be checked and repaired as necessary, e.g., weekly in dry periods and within 24 hours after any heavy rainfall event. During periods of prolonged rainfall, daily checking shall be conducted.

*During Adverse Weather Conditions*

- The contractor shall listen to weather reports daily while conducting work. If an emergency weather warning is issued, work shall cease. All equipment and materials shall be secured against wind, rainfall and flooding, and the work area cleared of construction debris to the extent practicable. Work shall not resume until conditions improve and weather warnings are rescinded.
- Prior to recommencement of work activities following an event, the Contractor shall inspect all BMPs, including silt fence, sandbag barriers, and stabilized construction entrance, to ensure that they are not damaged, and that all BMP's are properly installed and functioning
- Construction materials and debris that is dispersed due to wind or rainfall shall be collected by the Contractor and reused or disposed of in compliance with State and County regulations.

Due to the installation of new potable water lines on the property, the project may require a NPDES Notice of Intent (NOI) Form F for Hydrotesting Discharges from the DOH, CWB. As feasible, any discharges of treated, dechlorinated hydrotesting effluent will be reused for dust control, or offered as irrigation water to area farmers.

*Long-Term*

Planting large portions of the property will provide a long-term benefit by providing control of storm water and promoting recharge of the aquifer.

Long term effects will include increased runoff due to the urbanization of undeveloped areas. The increased runoff is mainly a result of the vehicular access roads and cluster dwelling lots. Runoff changes from the farm lots are anticipated to be small due to the limited development of the lots.

A permanent detention basin will be utilized to hold any increase in runoff that would cause downstream drainage systems limit impacts to downstream improvements should available capacity not be available.

Water quality features may include detention basins, grassed swales, diversion berms, and hydrodynamic devices to remove pollutants from stormwater runoff.

## 3.5 Flora and Fauna

Flora and Fauna prior to its transfer to the HDOA, ownership of the subject was part of the original Royal Kunia, Phase II development. Previous environmental documentation that includes the subject parcel includes: Royal Kunia, Phase II, Environmental Impact Statement (Halekua Development Corporation, 1989) and Royal Kunia, Phase II, Increment III, Final Environmental Assessment (Halekua Development Corporation, 1996). As the land use on the parcel has remained unchanged since those assessments, botanical and faunal studies performed for past environmental documentation still have validity.

A botanical survey included the subject property and concluded that there were no federally listed, proposed, or candidate species situated within the study area. In addition, since the area had and has continued to be extensively used for crop production, there is little botanical interest in the project site (Char & Associates, *in* Halekua Development Corporation, 1996).

An avifaunal survey concluded that there were no resident endemic or resident indigenous species of birds in the project area or surroundings. Of the migratory indigenous bird species, only the Pacific Plover (*Pluvialis fulva*) was recorded, mostly along agricultural roads and temporarily cleared field areas. A total of 15 species of exotic birds were also recorded, most of which are commonly found in this type of agricultural habitat along the Waipiʻo and Central Oʻahu area (Bruner, 1988, *in* Halekua Development Corporation, 1996).

***Potential Effects and Mitigation***

The construction of the proposed Kunia Agricultural Park is not anticipated to result in adverse effects to any protected plant or animal species. Human-generated disturbance will continue to inhibit potential habitat at a level comparable to the present. No negative effect on plant or animal habitats or specific communities is expected.

## 3.6 Visual and Scenic Resources

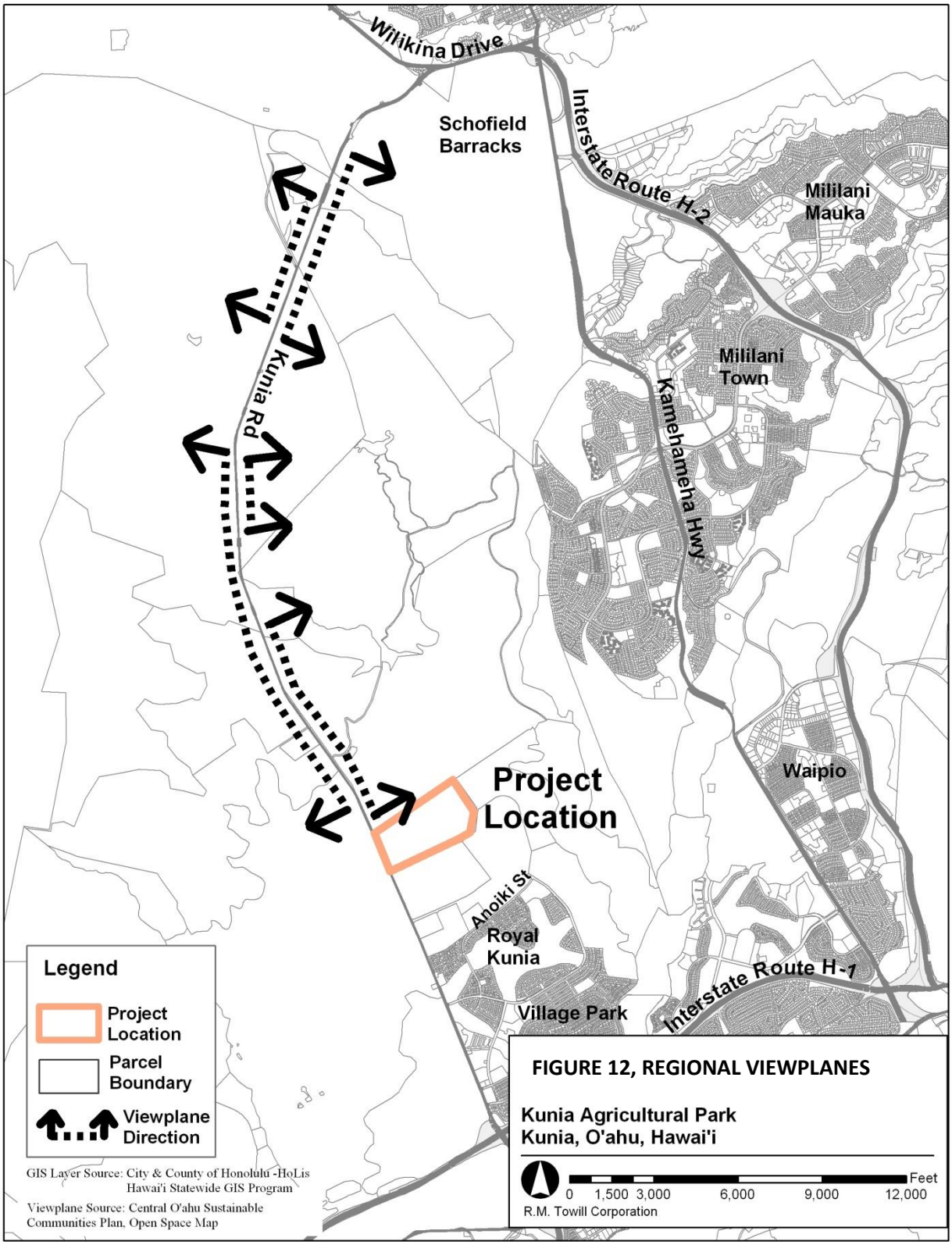
The Kunia plateau has long been, and still is, characterized by open space and vistas to the Koʻolau Mountains (east), Waiʻanae Mountains (west), and, in the project vicinity, urban development descending down the Pacific Ocean (south). The project area is immediately south of significant

viewplanes identified in the Open Space Map of the Central O'ahu Sustainable Communities Plan (CCH, 2003). See **Figure 12**.

***Potential Effects and Mitigation***

The project will support open space plans by continuing in agricultural use. Placement of the farm dwelling lots clustered close to the planned housing within the Royal Kunia, Phase II project will result in a vista quite similar to the current one. No adverse impacts to visual resources are expected.

Figure 12, Regional Viewplanes



## 3.7 Air Quality

Air quality in the Kunia area is generally good. Although information on other pollution sources was not generally available from the DOH for the proposed project, the DOH in its assessment of statewide air quality has noted, "Air quality in the State of Hawai‘i continues to be one of the best in the nation, and criteria pollutant levels remain well below state and federal ambient air quality standards." (DOH, 2006).

***Potential Effects and Mitigation***

Short Term

Short-term effects on air quality will occur either directly or indirectly as a consequence of project construction activities. The operation of vehicles, heavy equipment, and generators at the project site will generate some fugitive dust and pollution emissions. Adjacent areas will be temporarily affected during the period of construction by dust and pollution, however, these effects will be temporary and will cease when construction is completed.

State air pollution control regulations require that there be no visible fugitive dust emissions at the construction site boundary. Therefore, an effective dust control plan will be implemented by the project contractor to ensure compliance with HAR, Chapter 11-59 and 60. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, keeping adjacent paved roads clean, and by covering open-bodied trucks.

Dust control measures will include, but not be limited to, the following:

- Planning phases of construction to minimize dust generating activities;
- Minimizing the use of dust generating materials and centralizing material transfer points and on-site vehicle travel ways;
- Locating dusty equipment in areas of least effect;
- Providing an adequate water source at the site prior to start-up of construction activities;
- Landscaping bare areas, including slopes, starting from the initial grading phase; and,
- Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction.
- Construction-related exhaust emissions will be mitigated by ensuring that project contractors properly maintain their internal combustion engines and comply with HAR Chapters 11-59 and 11-60, regarding Air Pollution Control.

Long Term

No long-term negative consequences related to air quality are expected as a result of the project. Plowing and other dust-generating activities will continue to be practiced to minimize the loss of topsoil. The measures to reduce loss of soils include: erection of dust screens, planting of trees, and use of water trucks, as applicable.

Restriction on application of pesticides and herbicides on the property will be dictated by the prevailing wind conditions and will be aimed at minimizing impacts on air quality in developed areas of Royal Kunia.

## 3.8 Noise

Ambient noise in the proposed project area is generated from natural and man-made sources. The project vicinity along Kunia Road is immediately north of the de facto dividing line between active agricultural areas to the north, east and west, future development (Royal Kunia, Phase II), and existing development (Royal Kunia, Phase I and Village Park), to the south.

Construction activities will generate noise which could affect nearby areas. Noise levels of diesel powered construction equipment typically range from 80 to 90 dBA at 50 feet distance. The actual noise levels produced are dependent on the construction methods employed during each phase of the construction process. Earth moving equipment, including diesel engine powered bulldozers, trucks, backhoes, front-end loaders, graders, etc. will probably be the noisiest equipment used during construction.

The planned farm dwellings will result in human generated noise, which includes vehicular traffic, recreational activities, and individual home uses. In the field lot area, the sound of farm machinery, plus that of existing active farming activities in the vicinity, will mix with naturally occurring sounds from wind and other sources, generating relatively low background noise.

***Potential Effects and Mitigation***

Short Term

Construction noise will be temporary and will cease when construction is complete. Adverse effects from construction noise are not expected to pose a hazard to public health and welfare due to the temporary nature of the work, the absence of sensitive land uses in the surrounding area, and the application of mitigation measures that will be employed to minimize noise effects.

All project activities will comply with HAR Chapter 11-46, Community Noise Control. Excessive noise levels generated by construction activities will require that a noise permit be filed with the DOH, Noise, Radiation and Indoor Air Quality Branch. The provisions of the noise permit will require that contractors use mufflers on all combustion powered construction vehicles and machinery, and maintain all noise attenuation equipment in good operating condition. Faulty equipment will be repaired or replaced. Additionally, trucks and other construction vehicles will be routed to avoid residential communities whenever possible.

Under current permit procedures, noisy construction activities are normally restricted to the hours between 7:00 AM and 6:00 PM, Monday through Friday, and between 9:00 AM and 6:00 PM on Saturday. Construction activities and use of heavy equipment will be scheduled as much as possible during daylight hours to avoid disturbing area residents during the evening. If work during the nighttime hours is required, a variance from the existing state noise regulations will be requested from the DOH. Construction activities will be suspended on Sundays and during holidays.

Long Term

The noise generated by farming within the proposed Kunia Agricultural Park is expected to be similar to existing conditions, which feature active cultivation on the subject parcel and adjacent lots. What will change is the greater proximity of residential development as Royal Kunia, Phase II is constructed. The project site plan, and cluster concept for farm dwellings, is designed to use the on-site residential area as a buffer between the Royal Kunia , Phase II development and the farm lots within the state agricultural park.

## 3.9 Flood Hazards

The entire project area (parcel and surrounding area) is characterized by the Federal Emergency Management Agency, Digital Flood Insurance Rate Map (FEMA-FIRM) as category "D", in which flood risk is undetermined but flooding is possible. See **Figure 13**.

***Potential Effects and Mitigation***

The project is not expected to exacerbate flood conditions or be adversely affected by flooding. The 100-year flood hazard boundary has been kept out of areas to be used for farm dwellings.

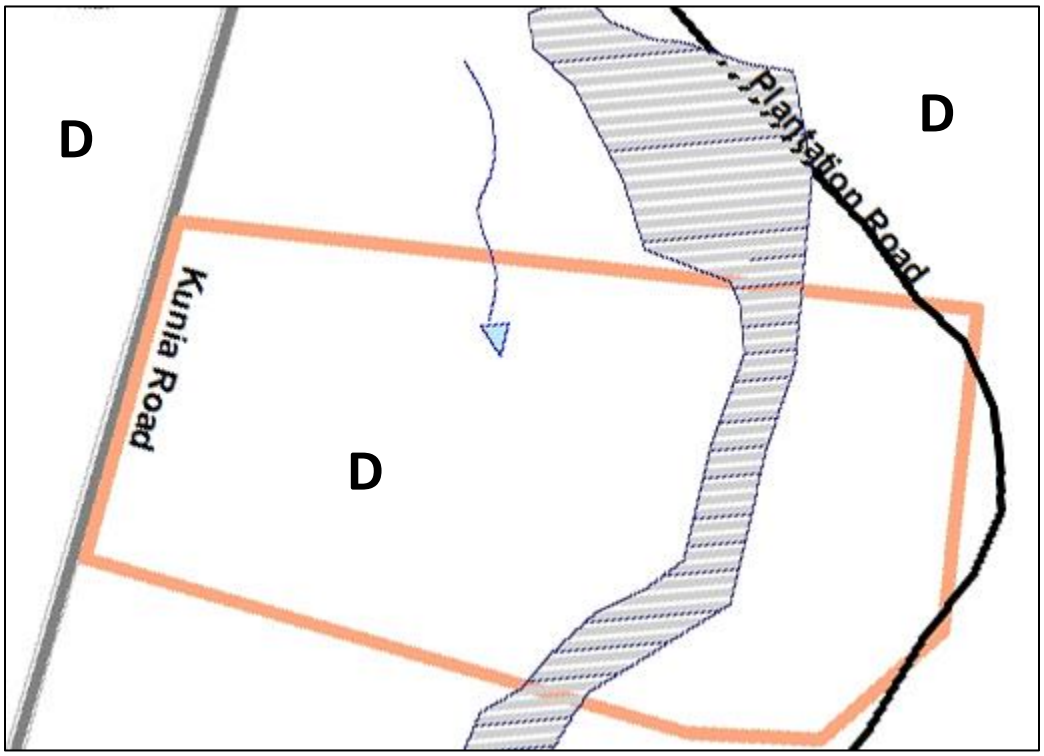
## 3.10 Hurricanes

The Hawaiian Islands are seasonally affected by Pacific hurricanes from the late summer to early winter months. O'ahu has been affected twice since 1982 by hurricanes, 'Iwa in 1982 and 'Iniki in 1992. It is difficult to predict these natural occurrences, but it is reasonable to assume that future events will occur. The project site is, however, no more or less vulnerable than the rest of the island to the destructive winds and torrential rains associated with hurricanes. Damage would be expected to be to crops in various stages of growth, and, to a lesser degree, on the 24 farm dwellings permitted under the site plan.

***Potential Effects and Mitigation***

The project is not expected to contribute to adverse effects from hurricanes. The main effect would be crop loss and possible damage to 24 farm dwellings. Drainage facilities are in place to mitigate the effects of storm water.

Figure 13, Flood Hazard Map




**Legend**

Property Boundary

D — Flood Zone D (flood risk undetermined but flooding is possible (entire map)

Direction of Storm Water Flow

100-year Flood Hazard Boundary

GIS Layer Source: City & County of Honolulu -HoLis Hawai'i Statewide GIS Program

**FIGURE 13**
**FLOOD HAZARD MAP**
**Kunia Agricultural Park**
**Kunia, O'ahu, Hawai'i**

0 250 500 1,000 1,500 2,000 Feet

R.M. Towill Corporation

## 3.11 Earthquake

Earthquakes occurring in Hawai‘i are closely linked to volcanic activity. Numerous earthquakes take place every year, with the majority occurring beneath the island of Hawai‘i. The project location on the island of Oahu has a peak acceleration value between 10 and 12 (expressed as a percentage of gravity).

***Potential Effects and Mitigation***

Damage from earthquakes on the subject property is not expected to result in major loss to life or property due to the predominant open space land use. As necessary, farm dwellings will be required to comply with seismic standards for residential development.

# 4.0 Public Services, Potential Impacts and Mitigation Measures

## 4.1 Traffic and Circulation

**Interstate Route H-1 (H-1 Freeway)**

The H-1 Freeway is a five-lane interstate route in the vicinity of the property. The closest H-1 Freeway interchange is the Kunia Interchange, located 1.4 miles directly south of the project site. There are three through westbound lanes and two through eastbound lanes on the Kunia Interchange overpass. The posted speed limit on this segment of H-1 Freeway is 55 miles per hour (mph) (PBA, 2008).

***Potential Effects and Mitigation:***

The project is not expected to have any adverse effect on traffic conditions on the H-1 Freeway or its Kunia Interchange.

**Kunia Road**

Kunia Road is a principal north-south arterial roadway. At the road's southern terminus, its intersection with Farrington Highway, Kunia Road becomes Fort Weaver Road. Kunia Road is a six-lane principal arterial from Farrington Highway to the H-1 Interchange; a four-lane principal arterial through the Royal Kunia, Phase I area; and a two-lane minor from Anonui Street to Schofield Barracks. North of Schofield Barracks it opens back up to a four-lane arterial. The posted speed limit on Kunia Road is 35 mph, transitioning to 45 mph north of Anonui Street (PBA, 2008).

The land use entitlements for the Royal Kunia, Phase II project include the dedication to the State of Hawai'i additional right-of-way on the east and west sides of Kunia Road from the H-1 Kunia Interchange to the northern boundary of the proposed Kunia Agricultural Park. The State of Hawai'i, Department of Transportation (HDOT), has ordered the Royal Kunia, Phase II developer to prepare a new Traffic Impact Analysis for the Royal Kunia, Phase II project. The DOT has expressed concern about the impact of the Royal Kunia, Phase II development on traffic congestion associated with the Kunia Interchange as well as the location and amount of widening of Kunia Road required to maintain an acceptable level of service along the roadway (DPP, 2009).

A *Traffic Assessment Report [TAR] for Kunia Agricultural Park* was prepared by Julian Ng (2012) Incorporated to identify the potential impacts of an agricultural park that includes cluster homes planned on the project site (Appendix C). All project-generated traffic was assumed to use a new access road that connects directly to Kunia Road. According to the TAR, traffic generated by the proposed project would increase the existing traffic volumes on Kunia Road by 0.4% in the AM Peak Hour and 2.5% in the PM Peak Hour. These estimates assume worst-case conditions that all of the project traffic will be destined for or originate from areas to the south. Distribution of traffic both north and south would reduce the traffic impact. Analyses of the intersection of the access road with Kunia Road found that, while a southbound left turn lane is not warranted, a median refuge lane for left turns onto Kunia Road will mitigate very long delays for that movement and should be part of the intersection improvements.

***Potential Effects and Mitigation:***

*Short Term*

Construction activities may result in temporary slow-downs along Kunia Road for motor vehicle, bicycle, and pedestrian traffic due to construction detours and the presence of large, slow-moving vehicles and heavy equipment in the project area. A traffic control plan will be prepared for the project during the design phase and will be submitted to the City and County with the construction drawings for approval during plan review. Traffic control measures may include barricades, cones, signage, and lighting as necessary to alert drivers and delineate construction boundaries. Approach signs and a flag person will be positioned to direct traffic through temporary traffic control zones, and officers from the Honolulu Police Department (HPD) will be employed to direct traffic at road intersections as necessary. To minimize traffic effects to the nearby residents, the contractors may be required to schedule heavy truck activity as much as possible between the hours of 9:00 a.m. and 3:00 p.m. on weekdays. The HPD will be notified prior to periods of heavy truck activity or during transport and operation of heavy equipment. All traffic control measures will be designed to minimize effects on continued traffic flow. With traffic control measures in place, significant short-term adverse effects to traffic are not anticipated.

The project will also result in a temporary increase in vehicle trips attributable to workers traveling to and from work sites, and the use of construction vehicles during the course of work. All construction-related traffic effects are temporary, however, and will cease upon project completion.

*Long Term*

The long term traffic impacts from the proposed Kunia Agricultural Park are not expected to be significant. Intersection improvements for the proposed Kunia Road connection will need to be designed to accommodate school buses and 30-foot single unit trucks. A median left turn refuge area for southbound vehicles turning left out of the project site onto Kunia Road is recommended to alleviate delays. A separate left turn lane is recommended for southbound vehicles turning into the project site.

Intersection lighting is proposed at the Kunia Road connection and will be designed in accordance with the Roadway Lighting Design Guide, AASHTO, 2005. The results of the traffic analysis do not indicate the need to install a traffic signal at the Kunia Road intersection.

**Plantation Road**

Current access to the property is via the so-called “Plantation Road” and via graded (dirt) field roads within the site. See **Figure 14**. Plantation Road is paved and circumnavigates the north, east, and south perimeters of the parcel. North of the parcel, Plantation Road is well-maintained and forms a major crossing with Kunia Road (Development Strategies, 2009a).

***Potential Effects and Mitigation:***

No adverse effects to Plantation Road are expected as a result of the project. When an access way from the agricultural park to Kunia Road is established, traffic generated from the property is expected to diminish on Plantation Road but not cease entirely.

**Figure 14, Plantation Road**

**Kunia Agricultural Park**
**Kunia, Oʻahu, Hawaiʻi**

**Source: Development Strategies, LLC**

## 4.2 Parks and Recreation

There are no recreational resources in the project area as it is in active agricultural production or temporarily fallow ("resting" between crops to regenerate the soil). The nearest park facility is Kunia Neighborhood Park to the south which serves the Royal Kunia master planned community. Additional parks to the south, but closer to Interstate Route H-1, are Kupuoni Neighborhood Park and Hoaeʻae Community Park. Central Oʻahu Regional Park, located along Kamehameha Highway opposite Waipiʻo, is located several miles east of the project. However, there is no direct roadway access between the property and the Central Oʻahu Regional Park due to large (100 acres +) agricultural parcels in between.

The Royal Kunia, Phase II development is committed to construct two 5+ acre community parks and construct recreational amenities within those facilities (DPP, 2009).

***Potential Effects and Mitigation:***

No adverse effects to parks and recreational resources are expected from the proposed Kunia Agricultural Park. The 24 single-family farm dwelling lots are not expected to result in any significant difference in the demand for park and recreational facilities.

## 4.3 Fire, Police and Medical Services

The Waipahu fire station currently provides emergency service for the project area. The Waipahu Fire Station has an engine and a ladder company. In addition, a new fire station is required to be built by the developer of Royal Kunia, Phase II, as a condition of its land use entitlements. At that point, back-up protection will be provided by the Waipahu Fire Department.

Police protection is provided to the project area by District 3, Pearl City Police Station, which serves the Waipahu, ʻEwa and Waiʻanae areas.

The nearest medical service is available at St. Francis West Medical Center in West Loch and Pali Momi Medical Center in Pearl Ridge. The parcel is within a 30-40 minute commute of the major hospitals in the Oʻahu's primary urban center.

***Potential Effects and Mitigation:***

As agriculture is a low-intensity land use with regard to population, the project is not expected to have adverse effects on fire, police or emergency services. Police and emergency medical service providers will respond to emergency calls for service from agricultural park lessees on the 24 farm dwelling lots. The project is not expected to result in a significant increase in calls for services.

## 4.4 City and County of Honolulu Water System

The Honolulu Board of Water Supply (BWS) is responsible for managing the supply of potable water on the island of Oʻahu. Off-site connections for the cluster of farm dwelling lots to BWS waterlines to the proposed Kunia Agricultural Park will be provided by the Royal Kunia, Phase II project.

***Potential Effects and Mitigation:***

There are no adverse effects expected from the use of potable water on the project site. No potable water will be used for agricultural irrigation purposes within the property with the possible exception of minor landscape irrigation in the residential area of the property. Infrastructure costs to provide domestic water service will be minimized by grouping the farm dwellings into a single area rather than running domestic water to each field lot. Low-demand potable service laterals will be provided to the field lots to provide limited water for workers.

A water allocation will be obtained from BWS by Halekua. HDOA will coordinate water requirements with Halekua. Water service will be dependent on the adequacy of BWS source,

storage, and transmission facilities at the time of development. *Potential Impacts and Proposed Mitigation.*

## 4.5 Surface Water

No public surface water currently serves the property. The Waiāhole Irrigation System is discussed in Section 2.5.5 as the most favorable source of agricultural water for the proposed Kunia Agricultural Park. The Waiāhole Irrigation System is a privately-owned facility but its use is allocated through application to a public agency, Department of Land and Natural Resources.

***Potential Effects and Mitigation:***

The HDOA is in the process of applying for a Ground Water Use Permit (allocation) to use surface water from the Waiāhole Irrigation System for the proposed state agricultural park. The Commission on Water Resource Management will act after consideration of the entire irrigation system, including current usage via existing Water Use Permits in Leeward O'ahu and the potential effect of the requested allocation.

## 4.6 Wastewater

Wastewater treatment for the project area is provided by the City and County of Honolulu via the Honouliuli Wastewater Treatment Plant.

***Potential Effects and Mitigation:***

Each cluster farm dwelling will be provided with sewer facilities through an off-site connection to the sewer infrastructure of Royal Kunia, Phase II. The increase in population and wastewater production from 24 single-family lots on the property will not be material and therefore is expected to have negligible impact on treatment capacity. There will be no wastewater facilities serving the agricultural lots.

## 4.7 Electrical Demand

Hawaiian Electric Company (HECO) provides electrical service to the project area. The primary source of electricity for the vicinity is the Waiau Power Plant.

***Potential Effects and Mitigation:***

The present electric system is adequate to meet the needs of the project in both the construction and maintenance phases. Short-term electrical power will be required during construction. Long-term electrical power will be required for limited lighting on agricultural lots, for the 24 clustered farm dwellings, and for the Kunia Road intersection.

## 4.8 Communications (Cable, Internet, Telephone)

Local cable providers include Oceanic Time-Warner Cable and Hawaiian Telcom. Cellular phone service in a majority of the project area is covered by Verizon, T-Mobile, AT&T, Sprint, and Nextel.

***Potential Effects and Mitigation:***

No effects to cable, television, or telephone infrastructure or services will result from planned project activities. The only usage of communications infrastructure will be by the farm dwellings (with the exception of cellular phone usage). Connections to off-site communications infrastructure will be through the Royal Kunia, Phase II development.

# 5.0 Socioeconomic and Related Environment, Potential Impacts and Mitigation Measures

## 5.1 Socioeconomic Characteristics

The subject property is not expected to materially change the socio-economic characteristics of Central O‘ahu or its immediate vicinity. This is largely because the agricultural land use is a continuation of current use and only 24 households are expected to be added to the population base.

The 2010 and projected 2020 population of various areas within Central O‘ahu are presented in **Table 6** and **Table 7**. The population growth for the project area is contained in the “Village Park/Kunia” designation and reflects the development of Royal Kunia Phase II for residential use.

Table 6. Residential Population and Housing Units, 2010

| Region | District | Total Resident Population | Visitor Housing Units | Resident Housing Units |
|---|---|---|---|---|
| **Central O‘ahu** | **Village Park/Kunia** | **14,848** | **0** | **4,532** |
| | Waipahu | 35,118 | 0 | 8,990 |
| | Waikele | 7,273 | 0 | 2,985 |
| | Waipi‘o | 11,690 | 0 | 4,131 |
| | Waiawa | 9 | 0 | 3 |
| | Mililani | 32,876 | 0 | 11,239 |
| | Mililani Mauka/Launani | 19,647 | 0 | 7,770 |
| | Wahiawa/Whitmore | 20,359 | 15 | 7,117 |
| | Schofield/Wheeler | 17,145 | 197 | 4,689 |
| **O‘AHU TOTAL** | | **911,841** | **33,596** | **340,906** |

Table 7. Residential Population and Housing Units, 2020 Projection

| | Total Resident Population | Population in Group Quarters | Visitor Housing Units | Resident Housing Units |
|---|---|---|---|---|
| **Central O'ahu** | **Village Park/Kunia** | **17,027** | **0** | **5,405** |
| | Waipahu | 35,465 | 0 | 9,429 |
| | Waikele | 7,080 | 0 | 2,992 |
| | Waipio | 11,717 | 0 | 4,257 |
| | Waiawa | 4,855 | 0 | 1,671 |
| | Mililani | 33,679 | 0 | 11,867 |
| | Mililani Mauka/Launani | 19,282 | 0 | 7,859 |
| | Wahiawā/Whitmore | 20,192 | 13 | 7,300 |
| | Schofield/Wheeler | 16,781 | 169 | 4,693 |
| **O'AHU TOTAL** | | **969,467** | **35,703** | **372,256** |

***Effects and Mitigation:***

No adverse effects to population are expected as a result of the project. Short-term economic benefits include expenditure of funds and creation of jobs during construction. Long-term, the project is expected to provide farm-related jobs and crop revenues.

## 5.2 Archaeological and Historical Resources

No archaeological or historical resources are known on the project site. An archaeological reconnaissance survey of the property was conducted in 1988 when it was still part of Royal Kunia, Phase II project. The report was referenced in the FEIS for Royal Kunia, Phase II (Halekua Development Corporation, 1989). The conclusion of the archaeological reconnaissance survey and review of maps was that there is no need for additional archaeological work on the property.

At the time of the archeological reconnaissance survey, the entire property was covered with sugar cane and as a result, the archaeologist anticipated the prospect of any remaining archaeological sites to be "remote." This proved to be the case as no above-ground representatives of past use were indicated on the subject property. Three archival maps were examined: the W.H. Pease Map prepared in 1850, the 1873 Alexander Map of Honouliuli, and the Pearl Lochs Map prepared by officers of the USS Bennington in 1879. Functional indications for this portion of Hoaeae (Kunia area) were nonexistent on these maps.

The archaeological survey concluded that the property contains no remaining, above-ground archaeological features and offers little opportunity for subsurface recovery. Supporting data included survey results, lack of indicator data from the literature and map sources, and an environmental setting that does not lend itself to permanent habitation. Gathering, limited dryland cultivation, and later ranching have clearly taken place on the site.

***Potential Effects and Mitigation:***

No adverse effects to archaeological or historical resources are expected from the project. However, should any archaeologically or historically significant artifacts, or other indicators of previous on-site activity be uncovered during the construction phase, their treatment will be conducted in strict compliance with the requirements of the State Historic Preservation Division, Department of Land and Natural Resources.

## 5.3 Cultural Resources and Practices

The historical land use context for this project is continual agricultural production for at least 100 years, and urban development to the south. No cultural resources or practices are known on the site, according to *Sites of O'ahu* (Sterling and Summers, 1978).

***Potential Effects and Mitigation:***

Adverse impacts to traditional/cultural resources or practices at the project site are not anticipated. The proposed project involves diversified agriculture and limited residential (farm dwelling) use. The property has been under cultivation since the early 1900s and is still in active agricultural use.

Construction and accessory use of the site for agricultural uses over the past decades is expected to have resulted in extensive ground disturbance and alteration of land forms. Potential cultural uses and archaeological and cultural sites that may have once been present would have been discovered and recovered, or have been unfortunately destroyed. There are no known traditional or contemporary cultural sites or practices in use. Agricultural use employs modern equipment for tilling and harvesting. There will be temporary disruption of agricultural uses while agricultural park infrastructure is installed. However, diversified agricultural production will resume after construction.

There are no known plants on the property that are of significant importance for traditional or cultural uses.

The project site is located approximately seven miles from the coastline. Therefore, access to the shoreline will not be affected by the project.

Further consultation to preempt the potential for adverse cultural impacts will also be provided through the distribution of this Draft EA to agencies and the community for review in accordance with the parties identified in **Section 8.0**, **Agencies, Organizations and Individuals Consulted**.

# 6.0 Relationship to Land Use Plans Policies and Controls of the Potentially Affected Area

## 6.1 Overview

State and City and County of Honolulu policies, plans, and land use controls are established to guide development in a manner that enhances the environment and quality of life. The establishment of policies, plans, and land use controls at all levels of government are further promulgated to help ensure that the long-term social, economic, environmental, and land use needs of the community and region can be met. The proposed project's relationship to land use policies, plans, and controls for the region and proposed activity are as follows.

## 6.2 Federal – Clean Water Act

The Environmental Protection Agency (EPA) is responsible for administering the Clean Water Act. States can use their water quality standards in Section 401 certifications to review and approve, condition, or deny all federal permits or licenses that might result in a discharge to State waters, including wetlands. States and Tribes make their decisions to deny, certify, or condition permits or licenses primarily by ensuring the activity will comply with State water quality standards. In addition, States and Tribes look at whether the activity will violate effluent limitations, new source performance standards, toxic pollutants, and other water resource requirements of State/Tribal law or regulation.

National Pollutant Discharge Elimination System (NPDES) permits are regulated under Section 402 of the Clean Water Act. In Hawai'i, the approval and enforcement of such permits are the responsibility of the State of Hawai'i, Department of Health, Clean Water Branch (DOH-CWB).

The DOH-CWB *Guidelines for Notice of Intent, Form C*, differentiate between land to be disturbed "for the sole purpose of growing crops" and land to be used for construction of "buildings and roads of agricultural or agriculture-related operations".

**1.** Construction Site Area
**b.** Disturbance Area is the area of the project that is expected to undergo any disturbance, including, but not limited to excavation, grading, clearing, demolition, uprooting of vegetation, equipment staging, and storage areas. Clarification of disturbed areas is as follows…
**vii.** Areas which are cleared, graded, and/or excavated for the sole purpose of growing crops are considered to be agricultural and are therefore not included in the disturbed area quantity. This exemption **does not** extend to the construction of buildings and roads of agricultural or agriculture-related operations that disturb one (1) acre or more.

> **Discussion:**
> A NPDES permit application will be required from DOH-CWB for stormwater runoff associated with construction of roadways, infrastructure and utilities. However, ground disturbances on the 24 field lots, where only cultivation will occur, will be exempt from coverage under the NOI Form C stormwater permit per the Guidelines for Notice of Intent, Form C, stated above. As

required, a NPDES permit application will be prepared to address discharges of hydrotesting effluent associated with installation of new potable water lines on the property.

## 6.3 State of Hawai'i Constitution

The development of the state agricultural park is consistent with provisions of the State of Hawai'i Constitution related to agricultural policy under "Conservation, Control and Development of Resources."

**Article XI – Conservation, Control and Development of Resources**

**Agricultural Lands (emphasis added)**

*Section 3. The State shall* ***conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands****. The legislature shall provide standards and criteria to accomplish the foregoing.*

*Lands identified by the State as important agricultural lands needed to fulfill the purposes above shall not be reclassified by the State or rezoned by its political subdivisions without meeting the standards and criteria established by the legislature and approved by a two-thirds vote of the body responsible for the reclassification or rezoning action.*

**Discussion:**

The subject agricultural parcel is identified as important agricultural lands and thus receives protection under the State of Hawai'i Constitution. This project is also consistent with Article XI, Section 3 (above) because it promotes diversified agriculture and assures the availability of agriculturally suitable lands.

## 6.4 Hawai'i State Plan

The Hawai'i State Plan, Chapter 226, HRS, was adopted in 1978 and revised in 1988. The Plan serves as a guide for the future long range development of the State by identifying goals, objectives, policies, and priorities. The purpose of the Hawai'i state planning process, as defined in HRS, Chapter 226, is to:

- *Guide the future long-range development of the State;*
- *Identify the goals, objectives, policies, and priorities for the State;*
- *Provide a basis for determining priorities and allocating limited resources;*
- *Improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and*
- *Establish a system for plan formulation and program coordination to integrate major state, and county activities.*

With regard to the State's role in promoting the agricultural industry, the Hawai'i State Plan provides the following legislative intent.

*§**226-7 Objectives and policies for the economy--agriculture.***

*(a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:*

*(2) Growth and development of diversified agriculture throughout the State.*

*(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawai'i's strategic, economic, and social well-being.*

*(b) To achieve the agriculture objectives, it shall be the policy of this State to:*

*(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.*

*(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.*

*(12) Expand Hawai'i's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.*

***§226-103 Economic priority guidelines.***

*(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture.*

*(3) Assist small independent farmers in securing land and loans.*

*(9) Continue the development of agricultural parks.*

**Discussion:**

In conformance with Hawai'i State Plan policies, the proposed Kunia Agricultural Park will provide incentives, land and agricultural water for small independent farmers on prime agricultural lands. State ownership with extended leases to farmers will "assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs," promote diversified agriculture and continue the statewide development of state agricultural parks.

## 6.5 State Land Use Law

State-level land use control is enabled by Chapter 205, HRS, Land Use Commission, adopted in 1961. Also known as the "State Land Use Law," Chapter 205 is meant to preserve and protect Hawai'i lands and encourage the uses to which the lands are best suited. All lands in Hawai'i are classified as Urban, Rural, Agriculture or Conservation. The proposed Kunia Agricultural Park is within the state agriculture district. See **Figure 15, State Land Use District**. Intended uses, focusing on cultivation of crops and a cluster of single family farm dwellings, and the creation of an new agricultural park are all consistent with the following provisions of the Chapter 205 (with emphasis added in **bold**):

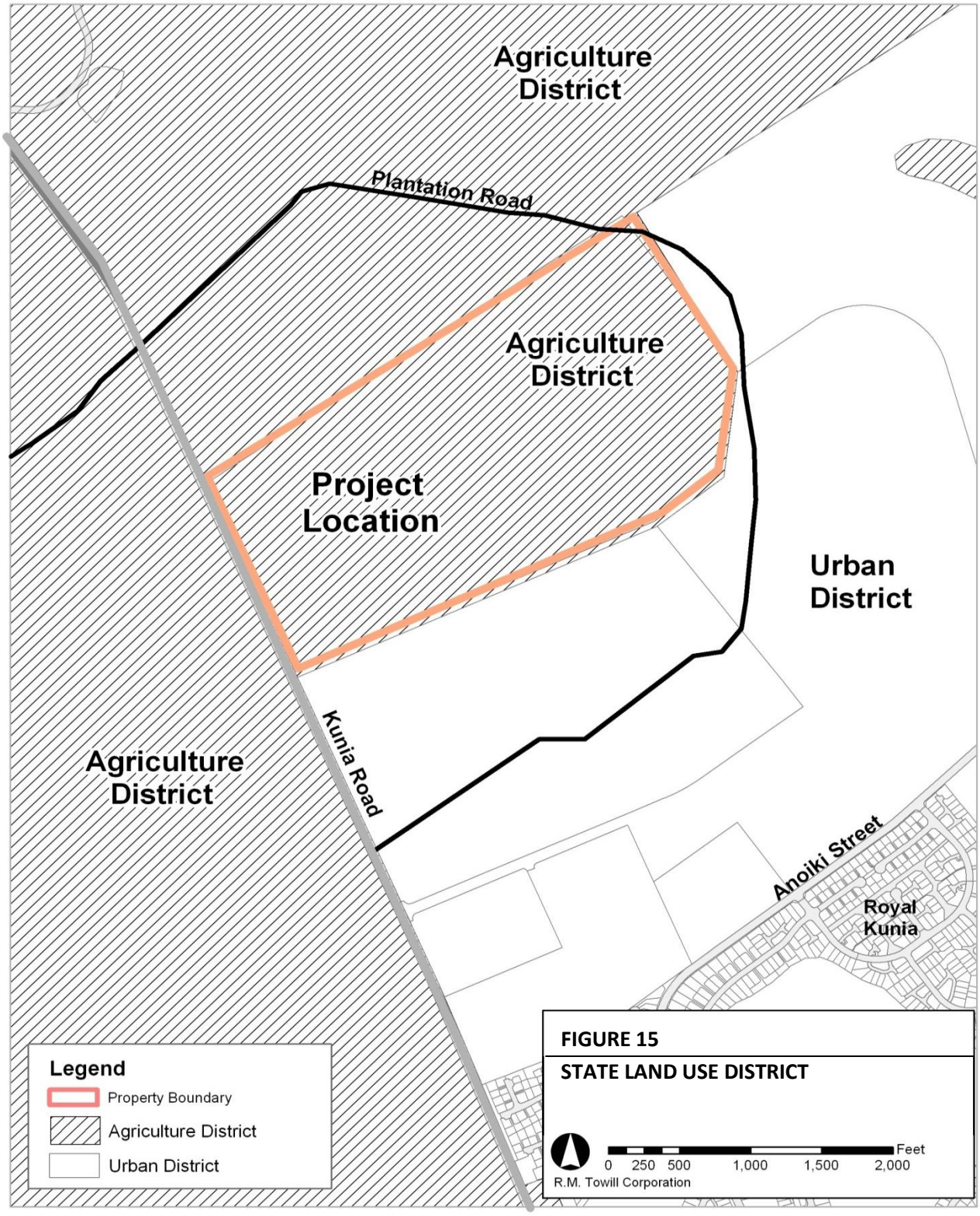
***§205-4.5 Permissible uses within the agricultural districts.***

*(a) Within the agricultural district, all lands with soil classified by the land study bureau's detailed land classification as overall (master) productivity rating **class A or B** shall be restricted to the following permitted uses:*

*(1) **Cultivation of crops**, including crops for bioenergy, flowers, vegetables, foliage, fruits, forage, and timber;*

*(4) **Farm dwellings**, employee housing, farm buildings, or activities or uses related to farming and animal husbandry. "Farm dwelling", as used in this paragraph, means a single-family dwelling located on and used in connection with a farm, **including clusters of single-family farm dwellings permitted within agricultural parks developed by the State**, or where agricultural activity provides income to the family occupying the dwelling;*

Figure 15, State Land Use District



*(7)* ***Public, private, and quasi-public utility lines and roadways****, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and* ***appurtenant small buildings*** *such as booster pumping stations, but not including offices or yards for equipment, material, vehicle storage, repair or maintenance, treatment plants, corporation yards, or other similar structures;*

*(11)* ***Agricultural parks;***

*(b) ...Any deed, lease, agreement of sale, mortgage, or other instrument of conveyance covering any land within the agricultural subdivision shall expressly contain the restriction on uses and the condition, as prescribed in this section that these restrictions and conditions shall be encumbrances running with the land until such time that the land is reclassified to a land use district other than agricultural district*

*(b) The objective for the identification of important agricultural lands is to identify and plan for the maintenance of a strategic agricultural land resource base that* ***can support a diversity of agricultural activities and opportunities that expand agricultural income and job opportunities and increase agricultural self-sufficiency*** *for current and future generations. To achieve this objective, the State shall:*

*(1) Promote agricultural development and land use planning that* ***delineates blocks of productive agricultural land and areas of agricultural activity for protection from the encroachment of nonagricultural uses****; and (2)* ***Establish incentives*** *that promote: (A) agricultural viability;(B) Sustained growth of the agriculture industry; and (C) The long-term agricultural use and protection of these productive agricultural lands.*

***[§205-42] Important agricultural lands; definition and objectives.*** *(a) As used in this part, unless the context otherwise requires, "important agricultural lands" means those lands, identified pursuant to this part, that:*

*(1) Are capable of producing sustained high agricultural yields when treated and managed according to accepted farming methods and technology; (2) Contribute to the State's economic base and produce agricultural commodities for export or local consumption; or (3) Are needed to promote the expansion of agricultural activities and income for the future, even if currently not in production.*

**Discussion:**

The proposed Kunia Agricultural Park will contain only allowed uses within the state agriculture district. In compliance with Chapter 205, Part III, Important Agricultural Lands, lands within the subject parcel are:

- Identified as agriculturally important lands;
- Rated “A” (prime, the highest rating) under Agricultural Lands of Importance to Hawai‘i, or ALISH, rating system. This system was established in 1977 in a collaborative effort

spearheaded by the State Department of Agriculture, U.S. Department of Agriculture and U.S. Department of the Interior Soil Conservation Service [now the Natural Resources Conservation Service]

- Rated "1" (very good, and the highest rating) under the Land Study Bureau (LSB) rating system).

## 6.6 State Agricultural Parks, Chapter 166, HRS

Chapter 166, HRS, Agricultural Parks, gives the HDOA the authority to plan, develop and manage agricultural parks on public lands set aside for that purpose throughout the State of Hawai'i. As such, this project is wholly consistent with Chapter 166, HRS.

*Section 166-4, Park development*, exempts state agricultural parks from "all statutes, ordinances, charter provisions, and rules of any governmental agency relating to planning, zoning, construction standards for subdivisions, development and improvement of land, and the construction of buildings thereon…" However, the park cannot contravene "any safety standards and tariffs approved by the public utilities commission for public utilities" (Section 166-4(2)) and requires the review and approval of the agricultural park by "the legislative body in the county in which the agricultural park is situated shall have approved the agricultural park" (Section 166-4(3)).

*Section 166-4(4)* gives the state the "responsibility of maintaining all roads within the agricultural park if the roads are developed exempt from applicable county ordinances, charter provisions, and rules regarding roads."

**Discussion:**

The intent of this project is to plan and carry out the development of a new agricultural park as part of the statewide system in accordance with HRS, Chapter 166.

## 6.7 Coastal Zone Management

HRS, Chapter 205A, sets forth the state's Coastal Zone Management Program. This project will be consistent with the objectives identified under Section 205A-2. Chapter 205A policies relevant to the project are discussed below.

***Section 205A-2(c)***

***(1) Recreational resources;***

*(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*

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

**Discussion:**

Planned drainage improvements will be designed to control runoff, where feasible, and thus comply with policies protecting the recreational value of coastal waters.

***Section 205A-2(c) - continued***

***(2) Historic resources;***

*(A) Identify and analyze significant archaeological resources;*

*(B) Maximize information retention through preservation of remains and artifacts or salvage operations;*

*(C) Support State goals for protection, restoration, interpretation, and display of historic resources.*

**Discussion:**

The project will comply with policies regarding historic resources since the agricultural project will have no effect on historic or cultural resources.

***(3) Scenic and open space resources***

*(A) Identify valued scenic resources in the coastal zone management area;*

*(B) Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*

*(D) Encourage those developments that are not coast-dependent to locate in inland areas.*

**Discussion:**

The project will comply with policies on scenic and open space resources. This Environmental Assessment has identified existing open space and visual resources and determined that the project will help preserve and sustain those resources by its predominantly agricultural (open space) land use. The residential portion of the site plan has been deliberately clustered into one area, near planned residential uses. This strategy will maintain all field lots exclusively in production use.

***Section 205A-2(c)***

***(4) Coastal ecosystems;***

*(B) Preserve valuable coastal ecosystems of significant biological or economic importance;*

*(C) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs;*

*(D) Promote water quantity and quality planning and management practices which reflect tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate state water quality standards.*

**Discussion:**

The project will comply with coastal ecosystem policies since there are none present on the site or in its immediate vicinity. Drainage improvements will be designed to control runoff, and will not increase peak discharge over existing conditions.

***(5) Economic uses;***

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

*(i) Utilization of presently designated locations is not feasible;*

*(ii) Adverse environmental effects are minimized; and*

*(iii) Important to the State's economy.*

**Discussion:**

The project will not conflict with policies regarding economic use because it is not a coastally-dependent development and is located inland. Further, the development of a new agricultural park supports the continuation of production on specifically-identified important agricultural lands.

***(6) Coastal hazards;***

*(B) Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;*

*(C) Ensure that developments comply with requirements of the Federal Flood Insurance Rate Program; and*

*(D) Prevent coastal flooding from inland projects.*

**Discussion:**

The project will comply with coastal hazard policies because it will not be located in flood designated areas nor be subject to hazards along the coastline. Drainage and other infrastructure improvements will be designed to prevent coastal flooding.

***(7) Managing development;***

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

**Discussion:**

This Environmental Assessment has been prepared under Chapter 343, HRS, and Title 11, Chapter 200 of DOH Hawai'i Administrative Rules which allow for public review and participation. Consequently, the preparation of this Environmental Assessment and disclosure of anticipated effects of the project comply with the policy on managing development.

## 6.8 City and County of Honolulu General Plan

The General Plan of the City and County of Honolulu "is a comprehensive statement of objectives and policies which sets forth the long-range aspirations of O'ahu's residents and the strategies of actions to achieve them. It is the focal point of a comprehensive planning process…" (CCH, 2006). The current plan, approved in 2006, is a statement of long-range social, economic, environmental, and design objectives and a statement of broad policies which facilitate the attainment of the objectives of the General Plan.

The most relevant portion of the General Plan is Section II, Economic Activity, Objective C, *"To maintain the viability of agriculture on O'ahu."* The following includes specific policies under this objective.

*Objective C, Policy 1*
*Assist the agricultural industry to ensure the continuation of agriculture as an important source of income and employment.*

**Discussion:**

The project is intended to boost the diversified agricultural industry as a source of income and employment by expanding the supply of agricultural land.

*Objective C, Policy 2*
*Support agricultural diversification in all agricultural uses on O'ahu.*

**Discussion:**

The project is aimed specifically at providing land for diversified agricultural crops.

*Objective C, Policy 4*
*Provide sufficient agricultural land in 'Ewa, Central O'ahu, and the North Shore to encourage the continuation of sugar and pineapple as viable industries.*

**Discussion:**

Located in the area described, this project encourages diversified agriculture on lands previously dedicated to now-defunct sugar cane production and rapidly disappearing pineapple crops. Since the demise of sugar cane and precipitous decline of pineapple on O'ahu, specifically in the Kunia region, diversified agriculture has emerged as the "viable industry" in the agricultural sector.

*Objective C, Policy 6*
*Encourage the more intensive use of productive agricultural land.*

**Discussion:**

Approximately 83% of the available land on the property (124 out of 150 acres) will be dedicated to agricultural production. Rather than setting aside land within the field parcels for residential use, the site plan calls for clustering residential units into a separate area to dedicate all agricultural lots to crop infrastructure and production.

*Objective C, Policy 7*
*Encourage the use of more efficient production practices by agriculture, including the efficient use of water.*

**Discussion:**

The HDOA will assist all agricultural lessees in the latest and most effective production techniques.

*Objective C, Policy 8*
*Encourage the more efficient use of non-potable water for agricultural use.*

**Discussion:**

The HDOA will apply for an allocation from the Waiāhole Irrigation System for agricultural non-potable water. This is a cost-effective approach because of existing Waiāhole Irrigation System infrastructure close to the project location and in active use by the current lessee.

## 6.9 Central O‘ahu *Sustainable* Communities Plan

The purpose of the development plans and sustainable community plans prepared by the City and County of Honolulu, Department of Planning and Permitting, is to implement the General Plan in specific geographic areas. The Central O‘ahu Sustainable Communities Plan area encompasses the upland plateau between the Wai‘anae and the Ko'olau Mountain Ranges. The area includes the towns of Waipahu, Mililani, and Wahiawa and their surrounding communities (CCH, 2003).

The provisions of the *Central O‘ahu Sustainable Communities Plan* are not regulatory but are meant to provide a coherent vision to guide resource protection and land use in Central O‘ahu. However, the plan does provide guidance for development in Central O‘ahu, public investment in infrastructure, zoning and other regulatory procedures, and the preparation of the CCH’s annual capital improvement program budget.

The most recently-approved *Central O‘ahu Sustainable Communities Plan* is contained in Revised Ordinances of Honolulu (ROH), Chapter 24, Article 5 and became effective in February 2003. It is the intent of the plan to:

> *… provide a guide for orderly and coordinated public and private sector development in the Central O‘ahu sustainable communities plan area in a manner that is consistent with applicable general plan provisions, including the designation of Central Oahu as an urban fringe area which is to be developed to relieve development pressures in the remaining urban-fringe and rural areas and to meet housing needs not readily provided in the primary urban center (ROH, Section 24-5.2(b))*

The General Plan also calls for maintaining the viability of agriculture on O‘ahu and specifically states that "sufficient agricultural land" should be provided "in ‘Ewa, Central O‘ahu, and the North Shore…" The *Central O‘ahu Sustainable Communities Plan* promotes diversified agriculture and pineapple on 10,350 acres of prime and unique agricultural lands along Kunia Road [including the property for the proposed Kunia Agricultural Park], north of Wahiawa, surrounding Mililani, and on the Waipi‘o Peninsula. This supports General Plan policies to support agricultural diversification in all agricultural areas (CCH, 2003). The plan’s Urban Growth Boundary excludes the agricultural lands within the parcel.

**Discussion:**

The proposed Kunia Agricultural Park is consistent with the Central O‘ahu Sustainable Communities Plan because it promotes diversified agriculture and perpetuates agricultural use of identified important agricultural lands of O‘ahu.

## 6.10 County Zoning

Land uses within the CCH jurisdiction are regulated under ROH, Chapter 21, Land Use Ordinance or LUO. The purpose of the LUO, as stated in section 21.1.20, is to:

> *… regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the O'ahu general plan and development plans, and to promote and protect the public health, safety and welfare."*

The zoning of the parcel is AG-1, Restricted Agriculture. See **Figure 16**.

According to the LUO, Section 21-3.50(a):

*The intent of the AG-1 restricted agriculture district is to conserve and protect important agricultural lands for the performance of agricultural functions by permitting only those uses which perpetuate the retention of these lands in the production of food, feed, forage, fiber crops and horticultural plants. Only accessory agribusiness activities which meet the above intent shall be permitted in this district.*

According to Section 21-3.5(c), AG-1 lands are to include:

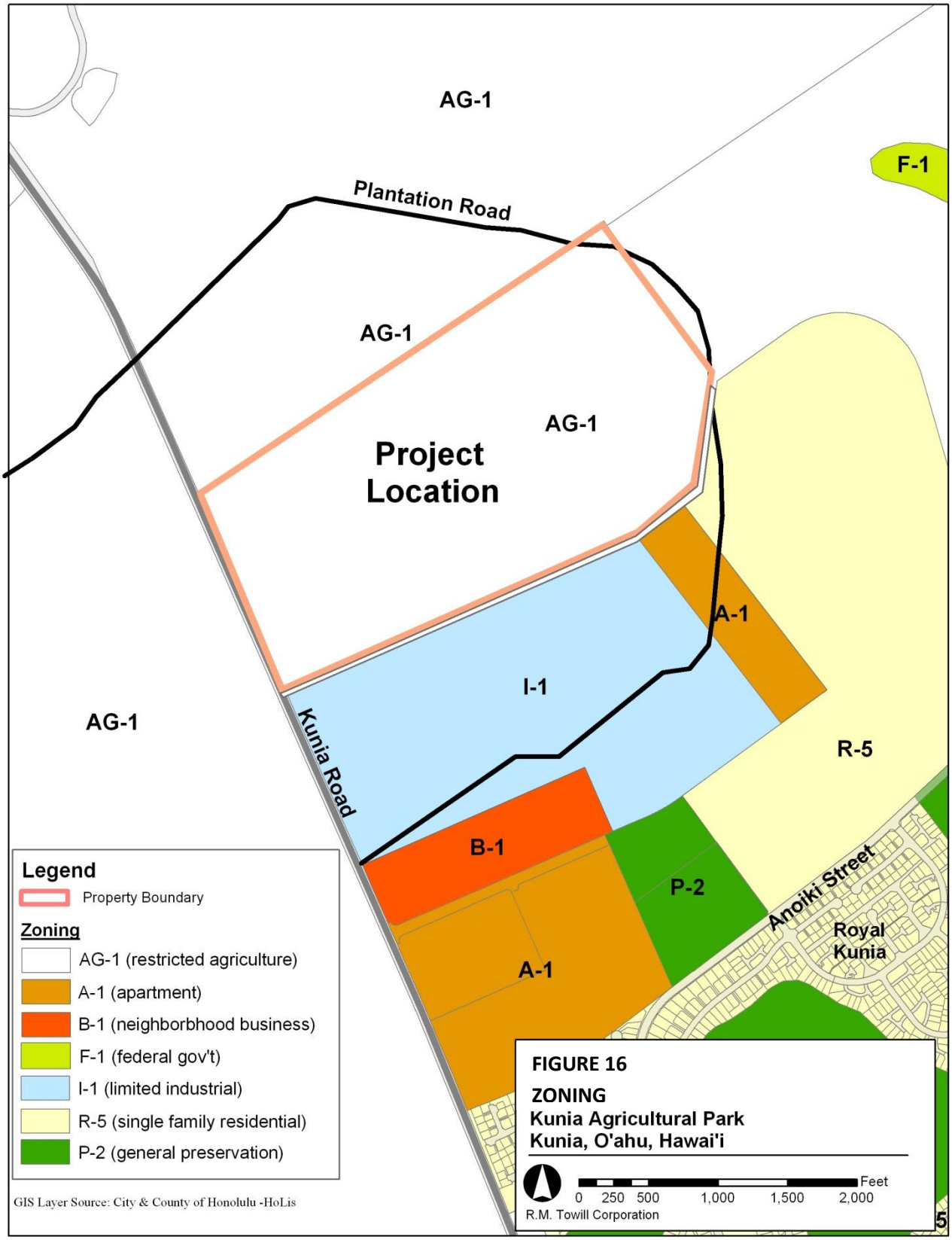
- Lands in the state agricultural district
- Lands designated agricultural by adopted city land use policies
- Lands which are predominantly classified as prime or unique under the agricultural lands of importance to the state of Hawai'i system
- Lands where a substantial number of parcels are more than five acres in size.

**Discussion:**

The intended use of the property for diversified agriculture is consistent with the parcel's AG-1 zoning. HRS, Section 166-4, [Agricultural] Park Development, exempts state agricultural parks from "all statutes, ordinances, charter provisions, and rules of any governmental agency relating to planning, **zoning**, construction standards for subdivisions, development and improvement of land, and the construction of buildings thereon…" The Board of Agriculture may opt to be exempt from county regulations as listed above in development of the state agricultural park. However, HDOA may decide to build to CCH standards so that HDOA has the ability to turn the roads over to the CCH at some point in the future.

In the case of Kunia Agricultural Park, that county is the City and County of Honolulu and the "legislative body" is the Department of Planning and Permitting. However, the agricultural park requires the review and approval of the agricultural park by "the legislative body in the county in which the agricultural park is situated shall have approved the agricultural park" (Section 166-4(3)).

Figure 16, Zoning



# 7.0 Permits and Approvals That May Be Required

## 7.1 Federal - none

## 7.2 State of Hawai‘i

**Community Noise Control – State Department of Health (DOH)**

A Noise Permit is required from the DOH for construction activities that exceed noise levels established by the Community Noise Code; and will be required for construction outside of normal daylight hours.

**Wastewater Systems – DOH**

Review of wastewater plans by DOH is required where connection to municipal service is anticipated, or if individual wastewater systems (IWS) are utilized for the agricultural residence lots. The current plan calls for connection to CCH sewer facilities for farm dwellings.

**National Pollutant Discharge Elimination System Permit (NPDES) – DOH**

NPDES permits are required by the State Department of Health for the management and control of construction stormwater and hydrotesting discharges. The DOH-CWB *Guidelines for Notice of Intent, Form C, Section 1-b-vii* , states, "*Areas which are cleared, graded, and/or excavated for the sole purpose of growing crops are considered to be agricultural and are therefore not included in the disturbed area quantity. This exemption does not extend to the construction of buildings and roads of agricultural or agriculture-related operations that disturb one (1) acre or more."*

**Roadway Access – Hawai‘i Department of Transportation (HDOT)**

The project requires an agreement with the HDOT pertaining to parcel access to Kunia Road, a State of Hawai‘i highway facility.

## 7.3 City and County of Honolulu

**Agricultural Park Master Plan Review and Approval**

*HRS, Section 166-4, Park development*, requires that "the legislative body in the county in which the agricultural park is situated shall have approved the agricultural park" (166-4(3)).

## 7.4 Utility Companies

Plan review by local utility companies will be undertaken as required and appropriate.

## 7.5 Other Approvals: Agricultural Water Allocation

The feasibility of the proposed Kunia Agricultural Park, as currently planned, depends on the HDOA's successful application for agricultural water from the Waiāhole Irrigation System from the DLNR Commission on Water Resource Management.

# 8.0 Agencies, Organizations and Individuals Consulted

The following individuals and organizations were contacted during preparation of this Draft Environmental Assessment and/or will receive copies for review and comment.

## 8.1 Federal Government

Natural Resource Conservation Service
U.S. Fish & Wildlife Service

## 8.2 State of Hawai‘i

Department of Business, Economic Development & Tourism, Office of Planning
Department of Education
Department of Health
Department of Land and Natural Resources
- Commission on Water Resource Management
- Land Division
- State Historic Preservation Division

Department of Transportation, Highways Division
Office of Environmental Quality Control
Office of Hawaiian Affairs
Waipahu Public Library
Kapolei Public Library

## 8.3 City and County of Honolulu

Honolulu Board of Water Supply
Fire Department
Department of Planning and Permitting
Police Department
Department of Environmental Services
Department of Parks and Recreation

## 8.4 Elected Officials

Hawai‘i State Legislature

Senator Donovan Dela Cruz
Senator Clayton Hee
Senator Michelle Kidani
Representative Rida Cabanilla
Representative Lauren Kealohilani Cheape
Representative Ty Cullen
Representative Richard Lee Fale
Representative Aaron Ling Johanson
Representative Marcus Oshiro
City and County of Honolulu
Office of the Mayor
Councilmember Breene Harimoto
Councilmember Joey Manahan
Councilmember Earnest Martin
Councilmember Ron Menor

## 8.5 Others

O‘ahu Neighborhood Boards

Richard Poirier, Chair, No. 25 Mililani/Waipio /Melemanu
Michael Lyons, Chair, No. 27 North Shore
William Clark, Chair, No. 20 Aiea
Rito Saniatan, Chair, No. 22 Waipahu
Kimo Pickard, Chair, No. 21, Pearl City

Alec Sou (Aloun Farms)
Larry Jefts (Waikele Farms, Inc.)
Monsanto Company
Pioneer Hi-Bred

# 9.0 Significance Determination

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

The proposed project:

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

The proposed project will not cause any irrevocable loss of natural or cultural resources. The site plan continues the present land use with the addition of 24 clustered farm dwellings. View corridors will be preserved as a result of the predominantly open-space land use.

As previously noted, no adverse effects to archaeological or historical sites will result from planned improvements. Should any archaeologically or historically significant artifacts, or other indicators of previous on-site activity be uncovered during the construction phase, their treatment will be conducted in strict compliance with the requirements of the Department of Land and natural Resources.

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

The proposed Kunia Agricultural Park will not result in curtailment of potential land uses on the project site with the exception of the land designated for farm dwelling lots. Benefits include preservation of important agricultural lands for diversified agricultural use and preservation of open space and viewplanes. The residential component of this project will occupy a very small amount of space within the larger landscape, leaving the field lots for dedicated agricultural production.

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

The proposed Kunia Agricultural Park is consistent with the Environmental Policies established in HRS, Chapter 344, and the National Environmental Policy Act (NEPA).

*4. Substantially affects the economic or social welfare of the community or state;*

The proposed project will provide short term employment opportunities during construction and increase the supply of public agricultural lots available to small-scale farmers under diversified agricultural leases with the HDOA. The project supports State policies to preserve important agricultural lands, support diversified agriculture and promote the expansion of the state agricultural park program.

*5. Substantially affects public health;*

During construction, there will be minor impacts to air quality and noise levels. After completion of the construction work, these will be insignificant or undetectable. The positive aspects of the proposed project in the areas of economic and social benefits of the community are greater than the "No Action" alternative.

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

Impacts on public facilities will not be an issue and the project will not significantly change the area's population or demographic make-up.

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

The proposed Kunia Agricultural Park will not substantially degrade the environment either by its construction or by its use.

*8. Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger action;*

The Kunia Agricultural Park does not commit resources or energy for a larger action. The land use is consistent with agricultural uses on adjoining parcels.

*9. Substantially effects any rare, threatened or endangered species or it's habitat;*

No rare, threatened or endangered plant or animal species or their habitat will be affected by the project.

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

All measures will be taken during construction to prevent runoff from entering the ocean or streams. Application of pesticides and herbicides on diversified agricultural crops will be restricted based on wind conditions.

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

The project is not in an environmentally sensitive area such as a tsunami zone, beach or erosion-prone area, geologically hazardous land, estuary, freshwater or coastal area. Potential effects related to erosion will be mitigated by the implementation of construction BMPs in compliance with HAR 11-54 Water Quality Standards and HAR, 11-55 Water Pollution Control. General Best Management Practices (BMPs) are described in **Section 3.4 – Drainage**. Long-term impacts related to coastal areas will be mitigated by the effective drainage facilities within the project.

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

The views into or out of the project corridor will not be affected by the path. Open space will be preserved through the predominant land use of diversified agriculture and the clustering of farm dwelling lots together in one location.

13. Requires substantial energy consumption;

The construction of the state agricultural park will not require substantial consumption of energy or resources. Agricultural operations following construction will require energy for lighting, irrigation systems, equipment, and communication. Demand for electrical energy will be primarily from the relatively low number of farm dwelling households (24) to be resident on the property.

# 10.0 Findings

In accordance with the provisions set forth in HRS, Chapter 343, and the significance criteria in HAR, 11-200-12, this assessment has preliminarily determined that the project will have no significant adverse impact to water quality, air quality, existing utilities, noise levels, social welfare, archaeological sites, or wildlife habitat. Anticipated effects will be temporary and will not adversely impact the environmental quality of the area. Impacts that have been identified will be mitigated. Based on analysis and review of the above factors, it has been preliminarily determined that an Environmental Impact Statement (EIS) will not be required, and it is anticipated that a Finding of No Significant Impact (FONSI) should be issued for this project.

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# Appendix A

## *Agronomic Assessment of TMK (1) 9-4-002:080*

By Development Strategies, LLC and Lee Ingamells, Agronomist Ph.D.
August 2009

# AGRONOMIC ASSESSMENT

# OF TMK PARCEL 9-4-002:080


## ABSTRACT

This preliminary assessment of the 150-acre TMK parcel 8-4-002:080 is based on the Soil Survey (1972, USDA), knowledge of previous sugarcane production on and around the Parcel by Oahu Sugar, a general understanding of the agricultural industry along Kunia Road, and a site visit on 05 Aug 2009.

Farming in this area of Oahu is markedly “corporate” with large operations run by both seed companies such as Syngenta and major growers of Oahu’s produce (identified herein). The Parcel shares all the major soil features that make the Kunia plateau highly productive under irrigation.

Approximately 70% of the Parcel is presently farmed. An idle Southern area has similar farm potential. An unfarmed gully in the Southern part of the Parcel needs to be addressed for its recoverable soil.

While a pending assessment will identify potential crops, optimal use of the Parcel should be refined in conjunction with an overall conservation plan for the Southern Kunia plateau to the East of Kunia Road. This expertise is available to all farms upon registration as a “Cooperator” in the local Soil and Water Conservation District, which would be a condition to proceeding with this recommendation (discussed herein).


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## LOCATION AND SOIL SURVEY

Kunia encompasses a large productive plateau that has been the subject of preservation efforts for its agricultural value. Parcel 8-4-002:080 at the Southeast portion of the Kunia plateau comprises 150 acres and is located on the Southern perimeter of the greater agricultural area. The Parcel is located on the East side of Kunia Road, two miles North of H-1. Agricultural operations that are presently nearest to the Parcel include the corporate seed farms of Pioneer, Monsanto, and Syngenta, the test-plot fields of the Hawaii Agricultural Research Center, and the cash-crop farms of Alec Sou (Aloun Farms) and Larry Jefts.

Soils contribute significantly to the productive potential of the Kunia fields. These soils are typically very deep, well drained, highly weathered, geographically homogenous, uniformly well structured, easily tilled to practical depths, accommodating of grading for conservation planning, trafficable, and responsive to amendments (organic and chemical). They are also friendly to drip irrigation designs and irrigation schedules.

Under cultivation by Oahu Sugar, the fields in the Southern portion of Kunia consistently produced among the highest sugar yields in the State. Irrigation was an essential part of that productivity and continues today as, perhaps, the single-most defining productivity factor for all growers. Both Waiahole Ditch water and well water were used by Oahu Sugar on the Southern Kunia fields to achieve maximum production.

The Soil Survey shows the composition of the Parcel to be about 10% Wahiawa silty clay (Northwest corner), 80% Lahaina silty clay, and 10% sloping Molokai silty clay loam that forms a gully running from the center of the Parcel to the South boundary (Figure 1).

The Soil Survey (1972 USDA) rated the Wahiawa, Lahaina, and Molokai soil series among the State's most highly productive soils. Although rock-free soils are truly rare, even among Wahiawa and Lahaina soil series, relatively few stones, rocks and boulders in much of the Kunia plateau makes its soils that much easier to cultivate, compared to the soils of similarly large open-field areas.

Observations during the site visit of 05-Aug 2009 support the descriptions above and support the classification of the Parcel among the surrounding agricultural units. No obvious limitations were observed to distinguish the Parcel as potentially less productive than surrounding agricultural parcels. Observations regarding the opportunities and limitations to agriculture on the Parcel are discussed below.

## AG CLASSIFICATION AND PRODUCTIVITY RATING

The Wahiawa and Lahaina soils on the Parcel were classified “1” (Prime Agricultural Land) in the Agricultural Lands of Importance to the State of Hawaii, although the limited productivity of the gully was recognized with a lesser classification of “3” (Figure 2). The Land Study Bureau assigned the entire Parcel its highest productivity rating of “A” (on a scale of A to E; Figure 3). Figures 2 and 3 show the continuity of agricultural value among the surrounding parcels, which share the same classification and rating.

## ACCESS

The Parcel is not accessible directly from Kunia Road, but from the so-called “Plantation Road” (Figure 4) and via graded (dirt) field roads within the site. The field roads are graded to follow the perimeter of planted areas (Figure 5). Plantation Road is paved and circumnavigates the North, East, and South perimeters of the Parcel. In places, Plantation Road is as far as 1,000 feet from the Parcel to the North, but briefly intersects the Eastern boundary of the Parcel (Figures 1 to 3). North of the Parcel, Plantation Road is well maintained and forms a major crossing with Kunia Road. This crossing is utilized extensively by Syngenta located on the West of Kunia Road and by the cash crop operations located on the East of Kunia Road. Seed farms also access various leased plots on the East side of Kunia Road via this intersection.

The East and South portions of Plantation Road are less well maintained. Field roads to the East, some within the parcel, accommodate various farm vehicles and farm equipment. There is no agricultural activity to the South of the Parcel, where the idle land that will comprise the future Royal Kunia II Project is overgrown and difficult to discern (Figure 6).

## PRESENT CONDITION AND USAGE

The Northwest half (about 50%) of the Parcel is presently cultivated by Larry Jefts (Figure 7), who also farms much of the Robinson Estate land to the North of the Parcel. Observations of standing corn during the visit of 05 Aug 2009 suggest that 20 to 30% (in the Northeast end) of the Parcel is under cultivation for seed production. The remaining 20 to 30% of the Parcel along its Southern boundary is idle and overgrown with various weeds that are now desiccated from an absence of rainfall (Figure 8).

Although virtually the entire Parcel is technically endowed with deep soil, the true tillable area is reduced by graded roads and pushed-up berms. Berms are commonly used in open-field farming to serve as barriers to traffic and/or runoff. They are often designed in conjunction with soil and water conservation programs. A major berm separates the idle, Southern 20% of the Parcel from the large field cultivated by Larry Jefts in the Northwestern 50% of the Parcel. The berm extends from Kunia Road through the center of the Parcel to the Northeast in serpentine fashion, and is viewable in GoogleEarth.com (Figure 9). This major berm does not extend into or affect the remaining 30% of the Parcel to the Northeast.

The overgrowth on the idle Southern portion of the Parcel indicates the fertility of the native soil. Such a fallow is undoubtedly improving the soil condition for future farming.

The gully appears not to have been farmed by Oahu Sugar and drains to the South and toward the old airstrip used by the plantation. Information from Oahu Sugar would be helpful to determine whether the gully was incorporated into a conservation or water management plan and if it was used for drainage, or if it was used in other ways. The volume of good soil within the gully should be regarded as a resource to enhance the agricultural potential of the Parcel, and might be transported out of the gully if the gully were to be deemed "not farmable." Whether the gully itself is farmable could be determined by conservation planning, as discussed below.

## TOPOGRAPHY AND DRAINAGE

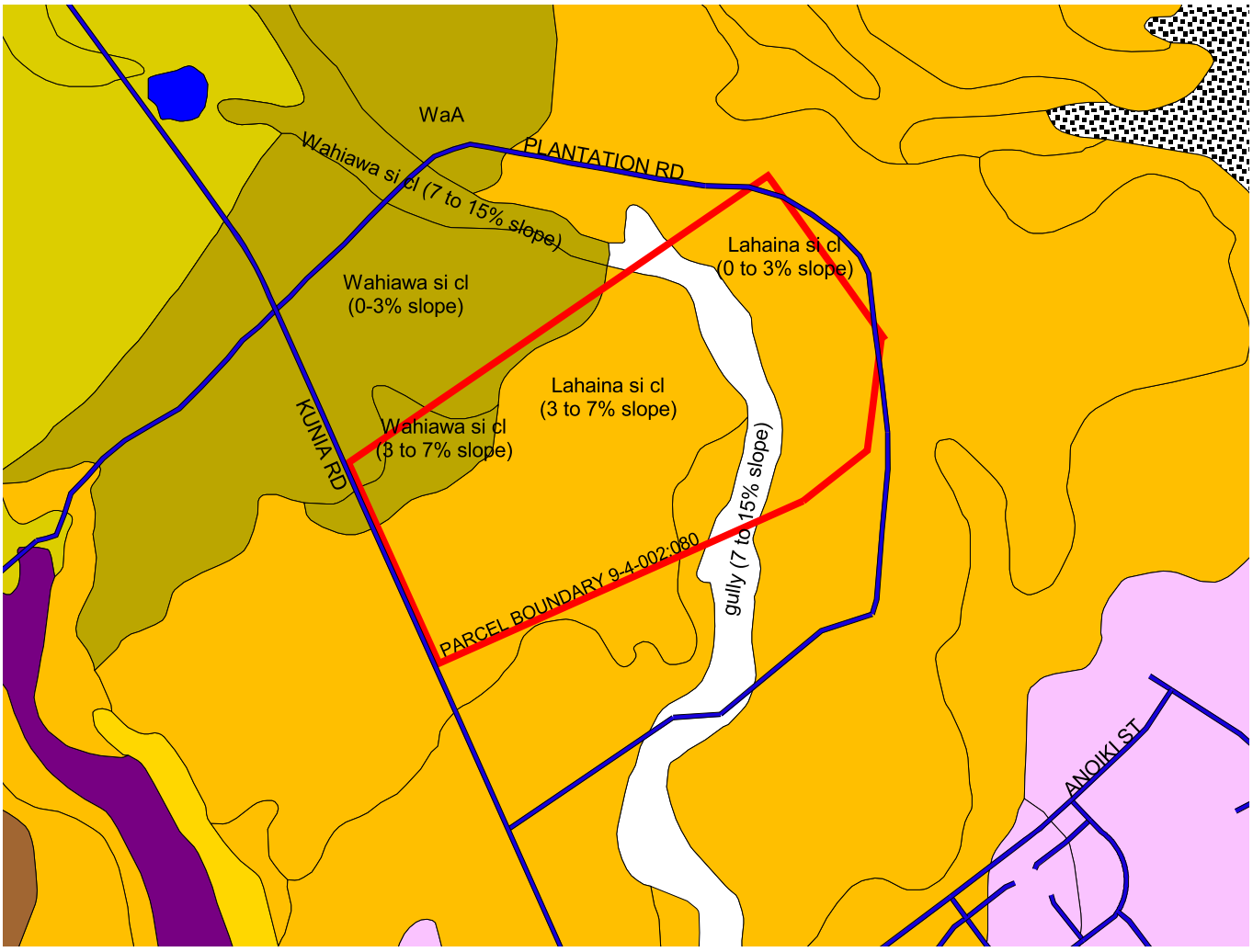
As shown in the Soil Survey (Figure 1), the Western 70% of the Parcel with its 3 to 7% slope is divided from the Eastern 20% with its 0 to 3% slope by a soil-rich gully of 7 to 15% slope. Natural drainage is into the Parcel from the North, and exits into the non-agricultural developments to the South, which is consistent with the North-to-South slope of the Kunia plateau. The farming activities on and around the Parcel all appear to have conservation plans in place to divert drainage water into the fields and thus capture potential runoff and increase stored soil moisture.

Since the Parcel sits at the lowest elevation on Kunia's agricultural plateau, conservation planning is crucial both to water conservation during normal rainfall and to runoff protection during the rare high rainfall events. A conservation plan for the Parcel should consider the operations to the North. It is recommended that a conservation plan be prepared by the Natural Resources Conservation Service (NRCS). The expertise and recommendations of NRCS will help to refine optimal utilization of the Parcel for agriculture. To initiate conservation planning by NRCS, the owner (DOA) must be a registered "Cooperator" in the West Oahu Soil and Water Conservation District (SWCD).

## DIAGNOSING SOIL FERTILITY

Since the use of the Parcel has diversified since sugarcane was grown, an updated soil sampling effort should be planned to provide future tenants with a diagnostic description of soil fertility. Soil sampling should be done at the start of construction to provide a current characterization of soil fertility that will support amendment recommendations for the cultivation of different crops in various portions of the Parcel.

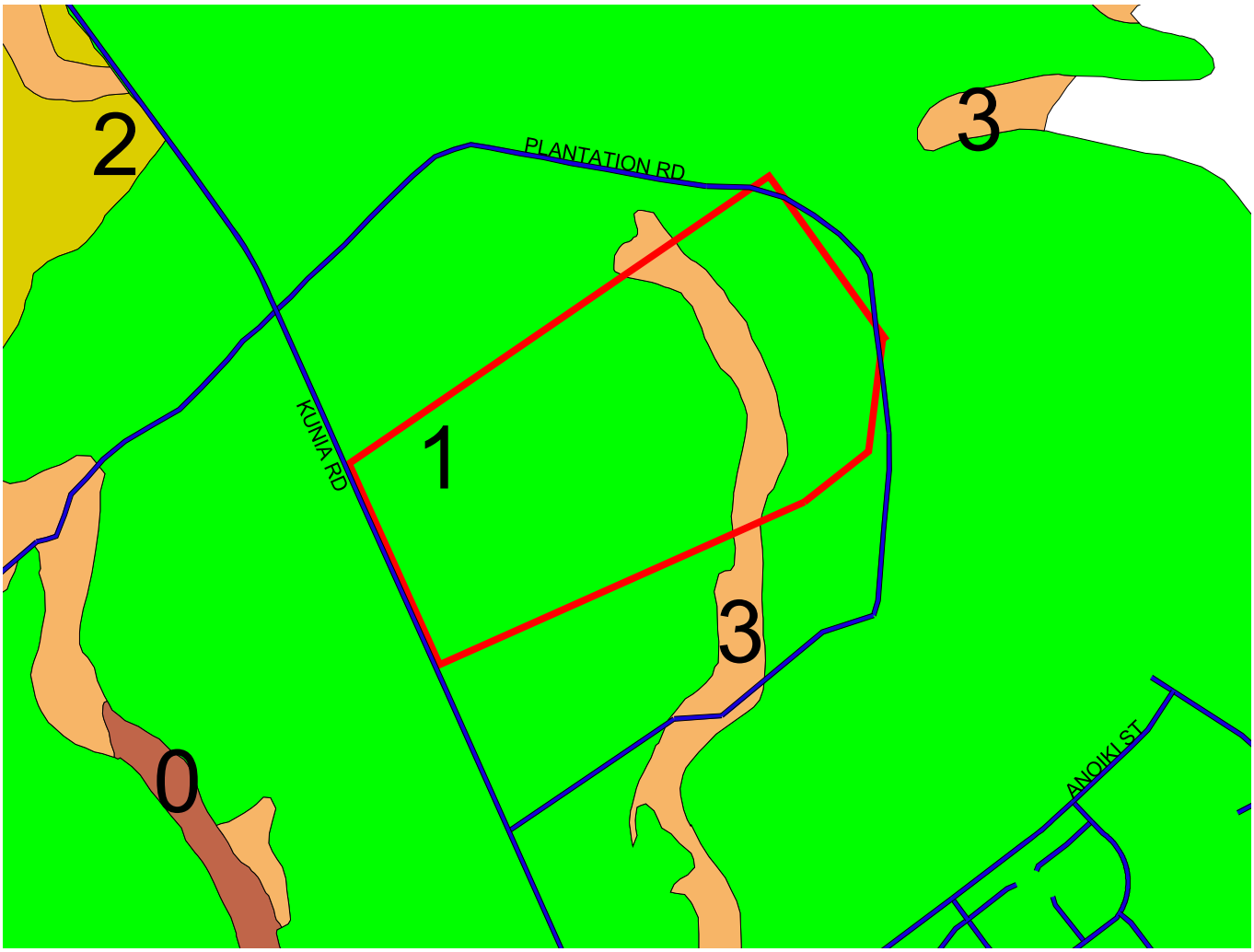
# Figure 1
# Soil Survey (1972 USDA)
# 150-Acre Parcel 9-4-002:080 Boundary in Red




2000 0 2000 4000 Feet

N
W E
S

# Figure 2
# ALISH Classification




2000 0 2000 4000 Feet

N
W E
S

# Figure 3
# Land Study Bureau Rating

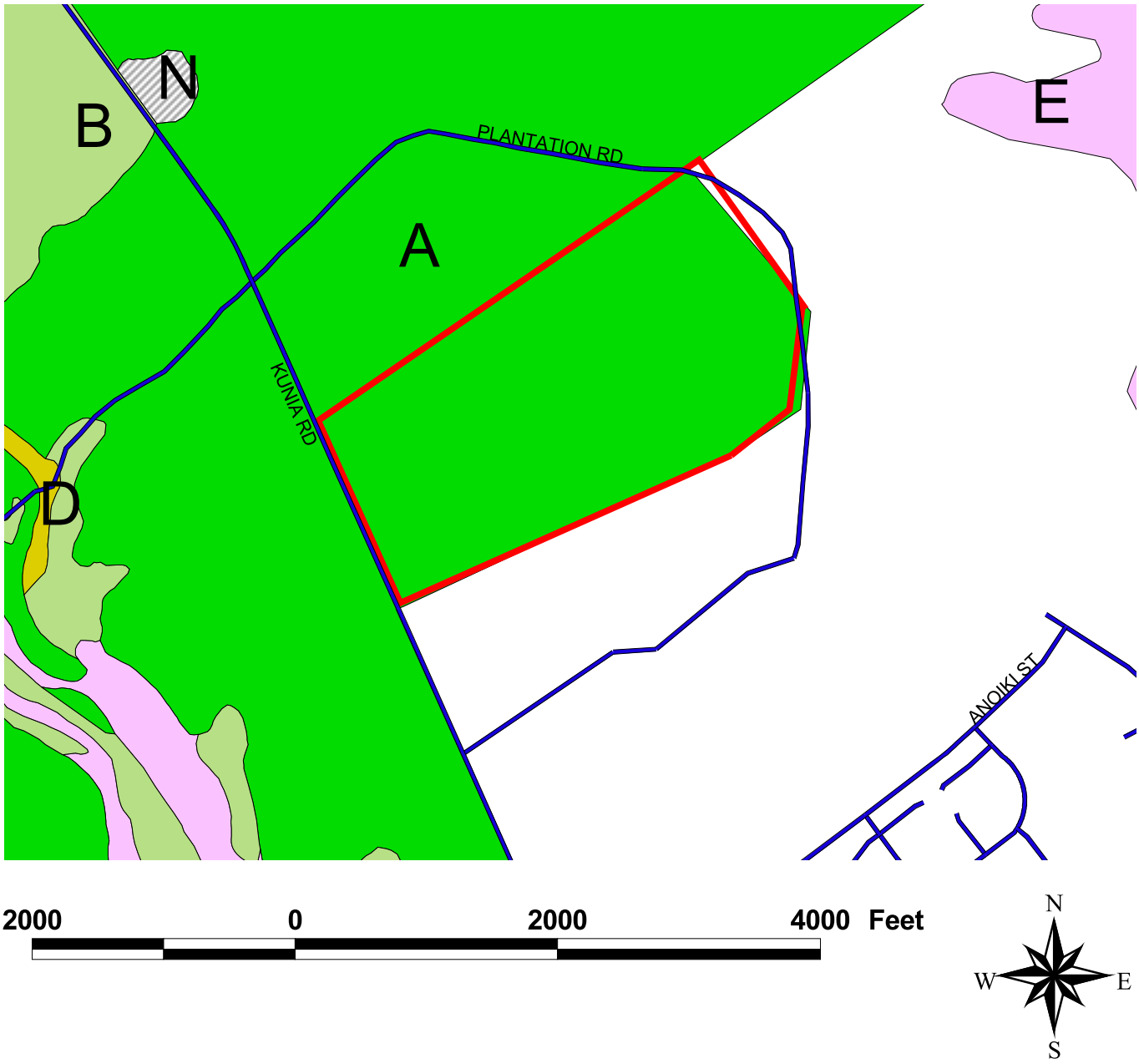


FIGURE 4

LOOKING WEST ALONG “PLANTATION ROAD” 1,000 FT NORTH OF PARCEL

The paved “Plantation Road” crosses Kunia road about 1,000 feet to the North of the Parcel. This road also provides access to Syngenta, one of three major seed companies cultivating large acreages on the West side of Kunia Road, and to a large portion of Larry Jefts’ operations to the North of the Parcel.

FIGURE 5

FIELD ROAD

The corn shown above is presumably seed corn grown by Syngenta in the Eastern portion of the Parcel. Field roads define the perimeter of fields or plots. Portable irrigation pipe, shown on the side of this field road, brings “allocated” water from distant locations.

FIGURE 6

IDLE LAND TO THE SOUTH

South of the Parcel at the intersection of Plantation Road and Kunia Road.

View to the North about 1,000 feet from the Parcel.

FIGURE 7

LARRY JEFTS' MELON FIELD

Larry Jefts' field is presently between crops and the fallow soil bears the marks of harvesting and harrowing. Larry Jefts practices crop rotation and long fallowing between crops. The recent absence of rainfall keeps this particular field weed free and it is a truly clean fallow. Picture shows evidence of harvesting, harrowing, and that the previous crop was melons.

FIGURE 8

IDLE LAND UNDER DESICCATED COVER

This view to the South is from the summit of the berm dividing Larry Jeft's melon field from the idle Southern portion of the Parcel.

FIGURE 9

BERM DIVIDES CULTIVATED FROM IDLE


The berm separating Larry Jefts' field to the Northwest from the idle land to the South serpentines through the Parcel. Modifications to the gully are apparent at the Eastern end of the berm.

# Appendix B

***Assessment: Non-Potable Water for Irrigation***
***Kunia Agricultural Park TMK (1) 9-4-002:080***

By Development Strategies, LLC
December 2009

# ASSESSMENT

# NON-POTABLE WATER FOR IRRIGATION

## Kunia Agricultural Park
## TMK: (1) 9-4-002:080

Prepared for:

RM Towill Corporation
2024 North King Street, Suite 200
Honolulu, Hawaii 96819-3456

Prepared by:

Development Strategies, LLC
3465 Waialae Avenue, Suite 260
Honolulu, Hawaii 96816

December 2009

# Introduction

On the Island of Oahu, the subdivision of land is subject to the provision of Chapter 22, Revised Ordinances of Honolulu ("ROH"). Chapter 22, ROH, is implemented by the Subdivision Rules and Regulations of the City & County of Honolulu ("Subdivision Rules"). In addition to general provisions relating to the consolidation and subdivision of land, Section 1-115 of the Subdivision Rules stipulates special conditions pertaining to the subdivision of agricultural land. Among these, Section 1-115(a) provides that the subdivision of ag land be subject to a source of non-potable water to support agricultural activities:

> Verification by the Honolulu Board of Water Supply as to the availability of sufficient agricultural quality water to support agricultural use of all lots proposed for subdivision, whether such water is to be supplied by the Board or other water supplier.

RM Towill Corporation ("RMT") provided communications from the Department of Agriculture ("DOA") of the State of Hawaii (State") indicating that the source of non-potable water for the Kunia Agricultural Park ("Ag Park") would be the Waiahole Ditch System ("Waiahole Ditch"). Subsequent discussion with both RMT and DOA confirmed the intent to apply to the State Commission on Water Resource Management ("CWRM") for an allocation of water from the Waiahole Ditch for the Ag Park.

The Waiahole Ditch was constructed in the early 1900s to tap water collected in natural dikes in the Koolau Mountain Range and import the water to support the cultivation of sugarcane in Kunia and Ewa. In recent times, however, importing water from Windward Oahu has been subject to ongoing litigation initiated by farmers in Waiahole and Waikane, since the tapping of dike water reduces the flow of streams and groundwater. A partial settlement reached in the ongoing litigation limits withdrawals of water from the Waiahole Ditch for agricultural operations in Central and West Oahu to 2,500 gallons/acre/day.

# Sources of Water for Crop Irrigation

Due to the legal issues surrounding the use of water from the Waiahole Ditch, several resources were interviewed to assess potential sources of ag water for irrigation of the Ag Park and to confirm the availability of water from the Waiahole Ditch. Findings from these interviews are summarized below:

## Kunia Wells

In selling their agricultural lands in Kunia, the Estate of James Campbell ("Estate") made provisions to service the fields located to the west of Kunia Road with water from three agricultural wells located in proximity to Kunia Village in Central Oahu ("Kunia Wells"). To assure the long-term availability of ag water, the Estate also formed a private water company made up of the various landowners in the service area to assume ownership, management and maintenance of the Kunia Wells and the related water distribution system.

Two issues that impact the ability to secure water from the Kunia Wells for the Ag Park are:

1. The Ag Park is outside of the service area for the ag wells; and
2. Groundwater from sources in Central Oahu has been shown to contain trace contaminates due to the previous use of pesticides in the area for the cultivation of pineapple.

Based on the foregoing, the Kunia Wells do not appear to be an alternative source of non-potable water for the Ag Park.

## Potable Water

The Honolulu Board of Water Supply ("BWS") has potable wells, storage tanks and transmission facilities on the Kunia plateau. A major transmission main is located in the right-of-way for Kunia Road which runs along the western border of the Ag Park. However, BWS prioritizes the use of potable water for domestic service and typically does not approve allocations for agricultural activities, particularly where there are non-potable water sources available within reasonable proximity.



An additional consideration is that potable water is relatively expensive for irrigation use. At the bulk rates for agriculture, the cost of BWS water ranges from $1.33 to $2.66 per 1,000 gallons. From the perspective on economic viability, potable water is too costly for the irrigation of diversified crops by small farmers. Given the foregoing, BWS water is not a viable source for the Ag Park.

Waiahole Ditch

Information received from several sources indicates that the Waiahole Ditch is the most viable source of non-potable water for the Ag Park from the standpoint of proximity and cost. However, recognition must be given to the fact that any application for water from the Waiahole Ditch will be subject to a challenge by the Waiahole-Waikane farmers. At this point, allocations from the partial settlement on the Waiahole Ditch litigation have been made to the various parcels and parties involved in the legal proceedings. The Ag Park was not a party to the settlement.

The Decision and Order ("D&O") covering the partial settlement (one of several issued over the years) also sets-aside an unallocated reserve of 1.5 million gallons/day to support unidentified, future agricultural requirements. The application for a Water Use Permit by Fat Law's Farms is for approximately 1.2 million gallons per day based upon 329 acres in cultivation. The case for Fat Law's Farms is likely to be impacted by the fact that Parcel 8 is included in the service area for the Kunia Wells. CWRM has held several hearings on the application, with the final hearing scheduled for December 18, 2009. The CRWM staff anticipates taking a recommendation to the Commission in early 2010.

Recapture of Unused Allocations

The CWRM staff has indicated that they are currently stepping up monitoring and review of previously issued Water Use Permits. There are several indications of consistent under utilization of the allocated water (i.e., possible over allocation), which may lead to recapture of the unused portion that might become a resource for reallocation to active use.

## Considerations for service from Waiahole Ditch

There are several unresolved issues relating to the fact that the reservoir for the Waiahole Ditch is located about ¼-mile north (up-gradient) from the Ag Park site. The intervening land is owned by the Robinson Estate and the ability of the DOA to eventually convey water over/under/across the Robinson property needs to be perfected. In this regard, the following items need to be addressed:

Lack of Easement – No easement exists across the Robinson land between the reservoir and the boundary of the project site. In the past, there was a single landowner and a single lessee (Oahu Sugar Company), so no easement was designated. Today, however, fee ownership is held by different entities and there is no assurance that the Robinson Estate will not eventually sell off all, or portions of, their landholdings in Kunia. Accordingly, negotiations for a waterline easement should be initiated between the parties, so that the necessary cadastral and legal documentation can be put in place. Since the developer of

the Royal Kunia II master planned community is responsible for the delivery of the off-site infrastructure for the Ag Park, coordination with Stanford Carr Development ("SCD") will also be required to set the alignment of the easement.

Off-Site Water Transmission Main – The Agribusiness Development Corporation ("ADC"), the successor to the Campbell Estate in regard to management of the Waiahole Ditch, indicates that an old Oahu Sugar pipeline extends from the reservoir to the Ag Park site. The main previously supplied water to the site and other parcels located further down-gradient for the cultivation of sugar cane.

The existing pipeline is dilapidated and in poor condition. ADC recommends that a new main be constructed rather than attempting to rehab the existing pipe. In addition, the new main should be dedicated exclusively to servicing the Ag Park. ADC has other growers that currently jointly use other old pipelines extending out from the reservoir. However, this arrangement causes continual issues in terms of: a) maintaining the continuity of water service due to withdrawals by up-stream users and 2) the difficult in fixing responsibility for repairs to the distribution system.

With respect to the need to move forward on the ability to deliver water to the site, a cursory discussion with SCD indicated that the master plan for a PDH Permit (Planned Development Housing) for Royal Kunia II had been undergoing review by the City's Department of Planning & Permitting and just received City approval. The approved master plan revises a portion of the layout previously submitted and Park Engineering is in the process of revising the utility master plans to reflect the modified layout. Once the updated utility master plans have been completed, copies of the new master plan will be submitted to DOA for review.

The updated utility master plans will indicate the off-site utility connections to be provided for the Ag Park. Note, however, that SCD indicated minimal progress has been made with respect to the off-site improvements for non-potable water for the Ag Park and the potential for Royal Kunia II to use water from the Waiahole Ditch to irrigate landscaping.

Water Users Coop – ADC indicates that at such time as DOA secures an allocation for the Ag Park, they would work to bring DOA on board a member of the Kunia Water Users Coop (the Waiahole Ditch). ADC highly recommends that DOA, as the master lessor, be the user of record for the coop as this would provide the Ag Park with water at a very favorable rate. As a member of the coop, DOA would also have a seat on the governing board. Within the Ag Park, DOA could administer reallocations of water to individual lessees and billings for water consumption by individual farms would be handled as part of day-to-day operations.

# Irrigation Water Projection

Discussions with the CWRM staff in regard to the 2,500 gallons/acre/day limitation on water withdrawal from the Waiahole Ditch confirmed that this would be monitored on the basis of a moving annual average, as this takes into account the seasonality of rainfall. In addition, staff also indicated that the 2,500 gallons/acre/day is viewed as a guideline - an application for a Water Use Permit would be reviewed within the larger context of a pan evaporation analysis. In addition to precipitation, this would factor in the net acres to be cultivated, specific crops and method of irrigation. Data submitted by the applicant would be compared with data generated by a computer model developed for CWRM by the College of Tropical Agriculture and Human Resources at the University of Hawaii at Manoa ("CATHR").

In discussing the projection of water demand for the irrigation of crops, staff indicated that the pan evaporation data provided by Fat Law's Farms for Parcel 8 was consistent with the results from the CATHR model. While the eventual mix of crops, net average to be cultivated and methods of irrigation are not precisely known at this very early stage of the Ag Park, the analysis attached as Exhibit A is based upon the pan evaporation (R-74)/rainfall (R-76) data and methodology used by AgTech Hawaii for Fat Law's Farms.

In preparing the analysis, an average Crop Factor of 0.95 was used based on the mix of crops proposed for Fat Law's Farms. The average Crop Factor was calculated based upon a straight average and a weighted average incorporating estimates of the cultivatable area. An average 0.95 crop factor was consistent for both computations. The adjustment for irrigation method assumed a combination of drip and micro-sprinkler, which produced an average efficiency of 85%. Based on the foregoing *assumptions*, a preliminary estimate of water demand is a 12 month average of 3,700 gallons/acre/day or 422,000 gallons/day based on 114 net acres in cultivation.

It is recognized that further adjustments will be required as the cultivatable area and crop mix are refined. However, the attached water demand projection provides a reasonable estimate at this preliminary point in time.

## Conclusion

The foregoing assessment indicates that the Kunia Wells are not viable as a source of water for the irrigation of the Ag Park based upon location of the site outside of the service area for the private water company. While the BWS has a potable water main that runs along the western border of the project site, domestic use is a priority for potable water and the BWS bulk agricultural rates are too expensive to support small scale, diversified agriculture.

Conclusion: The Waiahole Ditch is the only viable source of agricultural water for the Ag Park. At the same time, the availability of water from this source is subject to addressing the following items:

1. Securing a Water Use Permit from CWRM;
2. Obtaining necessary easements from the Robinson Estate; and
3. Arranging for timely construction of the off-site non-potable water main from the reservoir to the project site.

Of the foregoing, the legal issues that surround securing a water allocation appear to be the most daunting and time consuming. However, the foregoing items are attainable and the project is at a stage that provides time for all three issues to be resolved in tandem.

# Appendix C

***Traffic Assessment Report***
***Kunia Agricultural Park***
By Julian Ng Incorporated
November 2012

# Traffic Assessment Report
# Kunia Agricultural Park

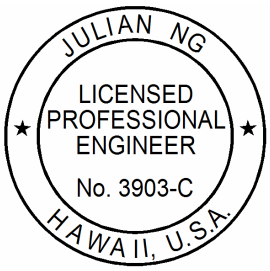
## Waipahu, Oahu, Hawaii

**Prepared for:**

**State of Hawaii**
**Department of Agriculture**

**and**

**R. M. Towill Corporation**




THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

Signature

Expiration Date: 4/30/2014

**Prepared by:**

**Julian Ng Incorporated**
**P.O. Box 816**
**Kaneohe, HI 96744**

**November 2012**

**Traffic Assessment Report**
**Kunia Agricultural Park**
**Waipahu, Oahu, Hawaii**

## Table of Contents

**Traffic Assessment Report**
**Kunia Agricultural Park**
**Waipahu, Oahu, Hawaii**

**November 2012**

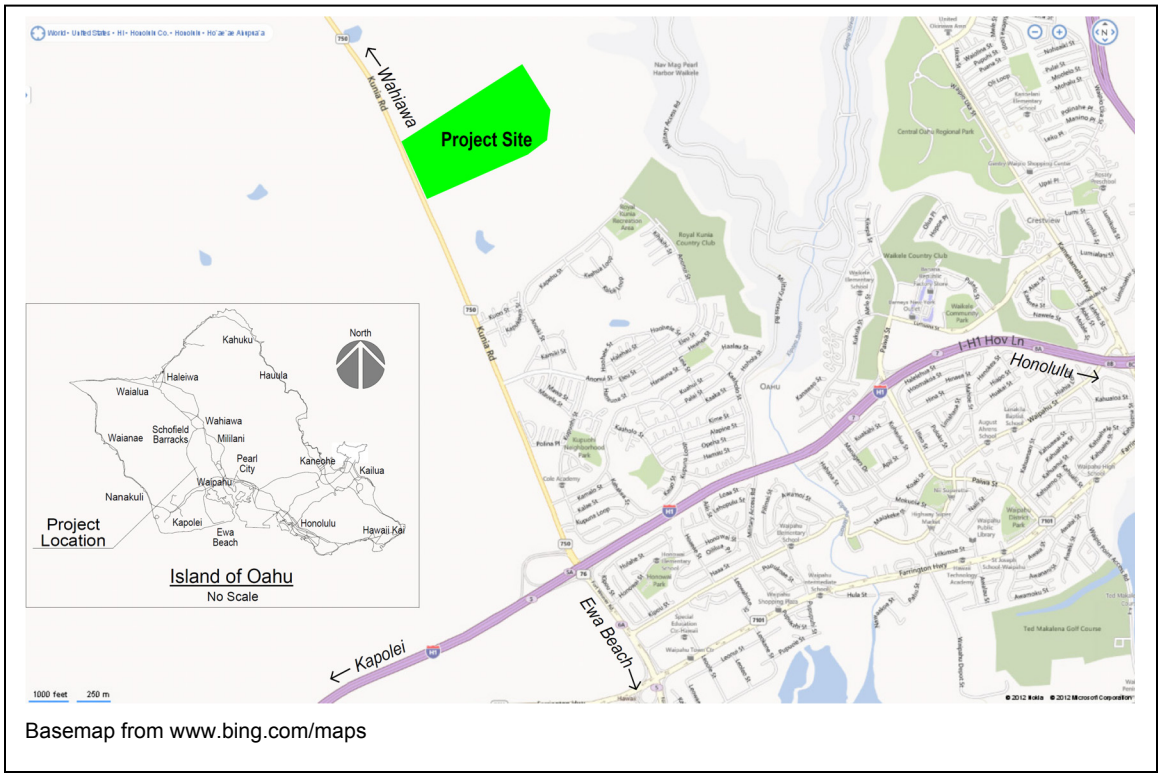
## Summary

This traffic assessment report was prepared to identify the potential impacts of an agricultural park that includes cluster homes planned on a(n approximately) 150-acre parcel north of the Royal Kunia development site in Waipahu, Oahu (identified by Tax Map Key 9-4-002:080). The project traffic has been assumed to all use a new access road that connects directly to Kunia Road, an existing two-lane State highway that connects Waipahu with Wahiawa in Central Oahu. Traffic generated by the proposed project would increase the existing traffic volumes on Kunia Road by 0.4% in the AM Peak Hour and 2.5% in the PM Peak Hour, under worst-case assumptions that all of the project traffic will be destined for or originate from areas to the south. Distribution of traffic both north and south would reduce the traffic impact.

Analyses of the intersection created by the site access road were used to determine the need for auxiliary lanes on Kunia Road. The analyses found that, while a southbound left turn lane is not warranted, a median refuge lane for left turns onto Kunia Road will mitigate very long delays for that movement and should be part of the intersection improvements.

## Introduction

The State of Hawaii Department of Agriculture is preparing plans to create an agricultural subdivision on a site located adjacent to the Royal Kunia residential subdivision north of Waipahu. The site fronts on Kunia Road, a two-lane arterial highway under the jurisdiction of the State of Hawaii Department of Transportation Highways Division, but but there is currently no direct access to Kunia Road. Figure 1 shows the project location.




Basemap from www.bing.com/maps

**Figure 1 – Location Map**

Current agricultural use of the site is served by a plantation road that loops around the site intersects with Kunia Road at unsignalized intersections located approximately 1,100 feet north of, and 1,400 feet south of, the project boundaries.

## Background Information

Traffic studies for development projects are generally performed to determine traffic impacts and identify necessary roadway improvements to support the proposed action. The study would typically consider the weekday peak hours, when traffic on the adjacent roadways are the highest. The analyses will include existing conditions, projected future conditions without the project (if there is reason to believe that traffic volumes will increase), and future conditions with the project. Some projects may have higher traffic impacts at other times, and in those cases, traffic conditions in additional peak hours would be considered.

Several criteria to determine when a traffic study should be conducted have been suggested. The Institute of Transportation Engineers, an international professional association, has suggested a threshold of 100 added vehicle trips in a peak hour as the basis for conducting a traffic study "in lieu of another locally preferred guideline."[1]

The State of Hawaii Department of Transportation developed a proposed guideline[2] for Traffic Impact Reports (TIRs) that states that if "the TIR does not meet the trigger (minimum) for completing the analysis, it is in everyone's best interest to scale the effort appropriately before resources are wasted." It further states that actions

> *that generate relatively low number of trips, and are not expected to significantly increase or alter traffic generation or distribution may be documented with a Traffic Impact Assessment (TIA) memorandum. The memorandum would include a description of the project, the surrounding transportation system including any potential impacts, and also include some analyses regarding trips generated by the project. ... Developments consisting of 100 or fewer trips during an hour and/or 500 or fewer daily trips, should prepare a Traffic Impact Assessment memorandum.*

Adoption of the proposed guideline has not yet occurred, and in the interim, the Highways Division has indicated that a 3% increase in peak hour traffic volumes would be considered significant and would require a traffic study. As described in the following sections, the proposed project will generate fewer than 100 hourly trips and this report is intended to meet the guidelines for a traffic assessment.

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1 Institute of Transportation Engineers, *Transportation Impact Analyses for Site Development,* Washington, D.C., 2005. Table 2-1

2 State of Hawaii Department of Transportation, Highways Division. *Best Practices for Traffic Impact Reports,* May 2011 (not yet adopted).

Traffic engineers use the "Level of Service" concept to describe traffic operating conditions. Six Levels of Service ranging from "A" representing free flow and very little delay to "F" describing congested over-capacity conditions and very long delays. Levels of Service for intersections are based on average delays per vehicle, which are computed from capacities and other operating characteristics, using the methods described in the *Highway Capacity Manual*[3]. The table below summarizes the criteria for Levels of Service

| Average Delay (seconds per vehicle) Unsignalized Intersections | General Description of Delay | Level of Service (LOS) |
|---|---|---|
| ≤ 10 | Little or no delay | A |
| > 10 and ≤ 15 | Short traffic delays | B |
| > 15 and ≤ 25 | Average traffic delays | C |
| > 25 and ≤ 35 | Long traffic delays | D |
| > 35 and ≤ 50 | Very long traffic delays | E |
| > 50 | Very long traffic delays | F |

For peak hour conditions, Level of Service D or better are considered acceptable.

[3] Transportation Research Board, National Research Council, *Highway Capacity Manual,* Washington, D.C. 2000.

**Existing Traffic Conditions**

Kunia Road is an arterial roadway designated Route 750 under the jurisdiction of the State of Hawaii Department of Transportation. The highway connects Waipahu to the south with Wahiawa to the north, paralleling other State highways located to the east (Kamehameha Highway and Interstate Route H-2). Kunia Road south of the project site has been widened as part of the residential developments in the abutting Village Park and Royal Kunia subdivisions, but along the project frontage, is the primary roadway a two-lane undivided highway. Posted speed limit on the widened portion to the south is 35 miles per hour and in most of the two-lane portion, the posted speed limit is 45 miles per hour.

The State of Hawaii Department of Transportation conducts a traffic counting program and publishes summaries of the count data. The latest available data for the count station on Kunia Road opposite Waiahole reservoir (approximately 0.5 mile north of the project site) is from a 48-hour machine count taken October 13-14, 2009. A total volume of 30,510 vehicles was counted over the two weekdays for an average two-way volume of 15,255 vehicles per day. Peak hours (highest total volumes) were recorded 6:30 AM to 7:30 AM ("AM Peak Hour") and 3:30 PM to 4:30 PM ("PM Peak Hour"). Summaries of data for the two most recent counts by direction of travel are shown in Table 1.

**Table 1 – Traffic Counts on Kunia Road**

| Volumes on Kunia Road | First day | | Second day | |
|---|---|---|---|---|
| | southbound | northbound | southbound | northbound |
| Feb. 28-March 1, 2007 | 6,572 | 6,971 | 1,518* | 7,025** |
| AM Peak Hour | 370 | 1,049 | 339 | 1,117 |
| PM Peak Hour | 812 | 402 | 0* | 381 |
| October 13-14, 2009 | 7,377 | 7,575 | 7,735 | 7,823 |
| AM Peak Hour | 382 | 1,012 | 374 | 1,013 |
| PM Peak Hour | 890 | 427 | 897 | 501 |

Source: State of Hawaii Department of Transportation, Highways Division. *Traffic Survey Data*.

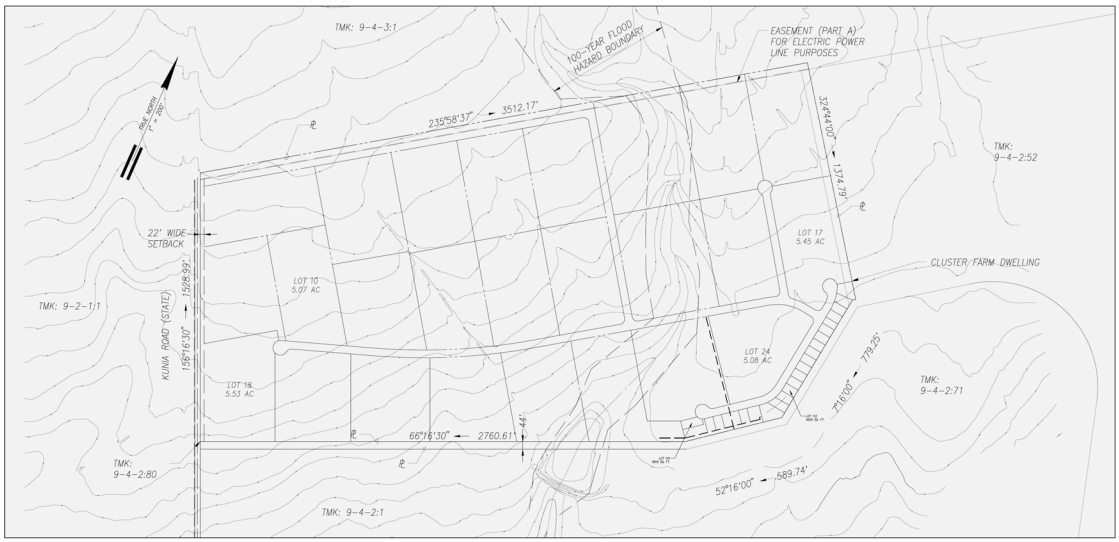
* apparent tube malfunction occurred about 10:15 AM March 1, 2007

** last 15-minute period (11:45PM-midnight) not included in 2007 report

There is no public bus service along Kunia Road fronting the project site. The nearest local bus service is provided by Route 434, which travels on Kupuna Loop in the Village Park (approximately 2½ miles from the site). Express buses operate limited service during weekday commute times and are routed on Anonui Street in Royal Kunia, approximately 2 miles fro the site).

## Project Traffic Generation and Impact

The proposed project is an agricultural subdivision to create up to 26 small (approximately 5-acre) lots to lease to tenant farmers for diversified agriculture. Each agricultural lot lease will also include use of one dwelling unit that will be located in a residential cluster within the project site. A preliminary site plan is shown as Figure 2.




Source: R. M. Towill Corporation

**Figure 2 – Preliminary Site Plan**

Project traffic has been estimated using trip rates from the current version of *Trip Generation Manual,* published by the Institute of Transportation Engineers, a widely-used and accepted reference manual. The rates are based on surveys of existing properties with similar land uses and represent vehicular trips at a site driveway.

The dwellings will be used by lessees who will work within the project site, but there will also be traffic generated by other family members, and these trips are accounted for by applying rates for detached dwellings to the 26 homes that are proposed within the site. Because trip rates for agricultural use are not listed in the manual, rates for a similar use were applied to obtain estimates of the upper range of the traffic that could be generated by the agricultural use. The rates for Nursery (Wholesale) {Land Use category 590} were used; this land use is described as follows:

> *A wholesale nursery is a free-standing building with an outside storage area for planting or landscape stock. The nurseries surveyed primarily serve contractors and suppliers. Some have large greenhouses and offer landscaping services.* [4]

[4] Institute of Transportation Engineers, *Trip Generation Manual, 9th Edition,* Washington, D.C. 2012. p. 1531

The home-to-work trip by the principal lessees (and the reverse) would occur within the project site, between the housing area and the agricultural lot. These internal trips, counted both at the origin and destination, are deducted from the total "driveway" trips to derive estimates of the net traffic generated by the entire site. Table 2 shows the trip rates and summarizes the trip generation computations.

**Table 2 – Project Traffic Generation**

| | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| **Trip rates applied (Source: ITE, *Trip Generation Manual, 9th Edition)*** | **Trip rate** | **% enter** | **Trip rate** | **% enter** |
| Dwelling trip factors (per unit) | 0.75 | 25% | 1.00 | 63% |
| Nursery trip factors (per acre) | 0.26 | n.a. | 0.45 | n.a. |
| **Project traffic generated (vehicles per hour)** | **enter** | **exit** | **enter** | **exit** |
| 26 dwelling units ("project impact"*) | 5 | 15 | 16 | 10 |
| Internal to site (1/3 of peak direction) | 0 | (5) | (5) | 0 |
| 140 acres, agricultural use | 33 | 4 | 6 | 57 |
| Internal to site (from above) | (5) | 0 | 0 | (5) |
| **Net traffic generated – for use in evaluating proposed connection** | **33** | **14** | **17** | **62** |

* See text below for discussion

The net project impact would be due to the traffic generated by the additional 26 dwelling units in the area; the acreage that will be in agricultural use is already in agricultural use. However, for the purpose of analyzing the new highway connection, the new agricultural use is assumed to generate some off-site traffic during peak hours (e.g., due to material deliveries, employees that live off-site, or service calls).

As shown in Table 2, the project is not expected to have significant traffic impacts, as the added traffic to the highway (20 vehicles per hour in the AM Peak Hour and 26 vehicles per hour in the PM Peak Hour) will be less than 100 vehicles per hour (further, the project impacts are expected both north and south of the site, thereby splitting the added traffic). The impacts to traffic volumes are 1.4% of the existing AM Peak Hour volume and 1.9% of the existing PM Peak Hour volumes, which are less than the 3% of existing traffic criteria for significant impact to traffic conditions.

**Conditions at Proposed Connection to Kunia Road**

The agricultural activities at the proposed project will primarily be small farms raising diversified crops. An agricultural study[5] for the project listed possible crops, among them lettuce, ong choi, bitter melon, various herbs, long beans, eggplant, taro, and various fruits. Expected traffic from these activities will consist primarily of small pickup trucks and single-unit trucks, and traffic in and out of the site will include residential traffic. However, larger vehicles may also require access; the intersection should be designed to accommodate vehicles as large as school buses and 30-foot single unit trucks.

Peak Hour traffic conditions at the proposed connection to Kunia Road were evaluated for peak hour volumes that are comprised of the net project traffic making turns in or out of the site access road, and through movements on Kunia Road equal to volumes 15% higher than the average peak hour volumes counted in 2009. This increase would be consistent with future traffic volumes for the year 2024, at an average annual increase in volume of 0.93%.[6]

Figure 4 shows the turning movements at the intersection of the site access road and Kunia Road with an estimated 10% of the net site traffic arriving from or destined to the north. Table 3 shows the results of the intersection analyses for each peak hour.

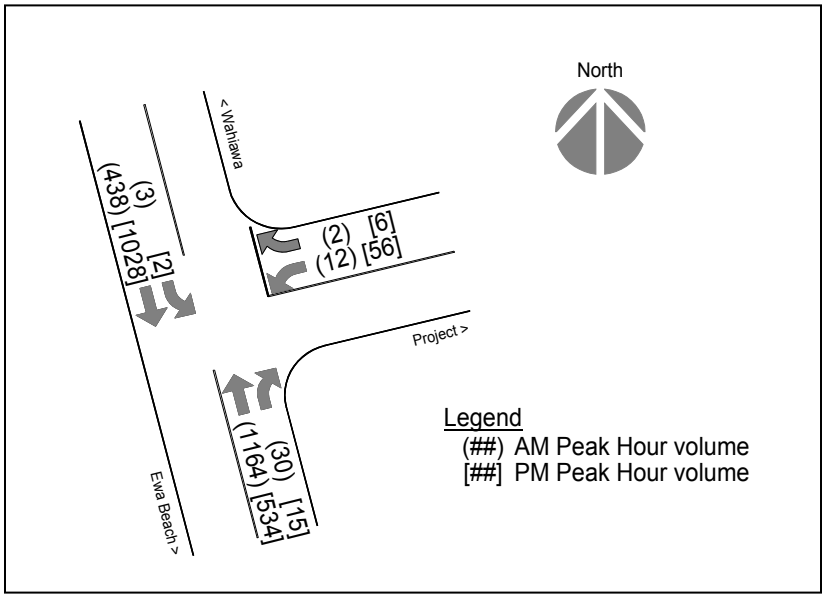



**Figure 4 – 2024 Peak Hour Traffic**

5 Development Strategies, LLC. *Assessment: Non-Potable for Irrigation, Kunia Agricultural Park.*

6 The projected increase in travel demand between 2007 and 2035 across the "Waipahu" screen line (an east-west line located north of the H-1 Freeway, stretching across Kunia Road, Kamehameha Highway, and the H-2 Freeway) would be 29.7%, according to forecasts made in the Oahu Regional Transportation Plan for 2035 {*ORTP 2035 Technical Report,* April 2011. Table 3-12}; an average increase of 0.93% per year would achieve the nearly 30% increase over 28 years.

The higher peak hour volume of 62 vehicles wishing to enter the main road is less than the 75 vehicles per hour that is needed on a minor-street approach to satisfy the one-hour warrant for the installation of traffic signals at the proposed connection. The peak hour volumes also indicate that the minimum volume of 60 vehicles per hour for each of four hours of a typical day that will be needed to satisfy the four-hour warrant, or 53 vehicles per hour for each of eight hours of a typical day, will also not be met. The proposed connection, therefore, will be an unsignalized intersection.

Unsignalized intersections require that traffic approaching on the minor street (in this case, the project access road) stop before entering or crossing the major street (Kunia Road). Stop signs should be installed and adequate sight distance provided to allow for safe entry into the major street traffic stream.

**Table 3 – Results of Unsignalized Intersection Analyses**
**Site Access Road at Kunia Road – 2024 with Project**

| | AM Peak Hour | PM Peak Hour |
|---|---|---|
| **Left Turns from Kunia Road** | | |
| Utilization (volume/capacity) | 0.01 | 0.00 |
| Average Delay per vehicle (seconds) | 12.3 | 8.9 |
| Level of Service | B | A |
| **Shared Lane to undivided Kunia Road** | | |
| Utilization (volume/capacity) | 0.17 | 0.70 |
| Average Delay per vehicle (seconds) | 53.5 | 102.3 |
| Level of Service | F | F |
| **Shared Lane to Kunia Road with median refuge lane** | | |
| Utilization (volume/capacity) | 0.08 | 0.31 |
| Average Delay per vehicle (seconds) | 26.0 | 28.7 |
| Level of Service | D | D |

In addition, the analyses showedthe probability that a southbound through vehicle will not be impeded by (i.e., have to slow or stop behind) a vehicle waiting to make the left turn into the project road are greater than 98.5% in each peak hour. These probabilities compare with the threshold of (less than 98%) that had been proposed as a guideline[7] for considering a separate left turn lane on a two-lane highway with a posted speed limit of 45 miles per hour.

[7] This criteria was proposed in a research paper (M. D. Harmelink, "Volume Warrants for Left-Turn Storage Lanes at Unsignalized Grade Intersections," *Highway Research Record 211*, 1967) that provides the basis for Table 9-23 of *A Policy on Geometric Design of Highways and Streets* 6th Edition, 2011, by American Association of State Highway and Transportation Officials'.

The analyses, however, showed that left turns from the project access road onto an undivided Kunia Road would experience very long delays and have poor level of service. Provision of a refuge lane, which would allow for left turns to be made in two steps, would reduce the delays to acceptable levels. A median left turn refuge area should be provided (an appropriate acceleration distance based on roadway grade and available sight distance would be determined during the design of the intersection).

If a median lane is provided for the refuge lane, it should be extended north to provide a separate left turn lane for southbound traffic, even if such a lane is not warranted by the projected entering traffic volumes. The left turn lane should have a storage length for two vehicles, one of which is a truck, or a minimum storage length of 60 feet (40' + 5' + 15', which allows for 5 feet between the two queued vehicles). Adequate deceleration length should also be provided.

**Conclusions and Recommendations**

The hourly impacts of the proposed Kunia Agricultural Park to traffic volumes on Kunia Road have been estimated to be less than 100 vehicles per hour and less than 3% of existing peak hour volumes. The impact, therefore, is considered not significant.

The project will construct a new roadway for vehicular access. The new intersection formed by the roadway and Kunia Road was evaluated to determine appropriate intersection improvements. Traffic signals will not be warranted due to the low volume of traffic; "Stop" sign control is needed for traffic on the access road before those vehicles enter Kunia Road. The intersection should also be provided with a median refuge lane to minimize delays to, and assist drivers in making the left turns onto Kunia Road.

# APPENDIX

## LEVEL OF SERVICE CALCULATIONS

(4 PAGES OF
TWO-WAY STOP CONTROL SUMMARY SHEETS
FOLLOWS)

# TWO-WAY STOP CONTROL SUMMARY

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | *JN* | Intersection | |
| Agency/Co. | *Julian Ng Incorporated* | Jurisdiction | *HDOT HWY* |
| Date Performed | *12/2/2012* | Analysis Year | *2024* |
| Analysis Time Period | *AM Peak Hour* | | |

| | |
|---|---|
| Project Description | *Kunia Agricultural Park* |
| East/West Street: *Kunia Ag Park* | North/South Street: *Kunia Road (SR750)* |
| Intersection Orientation: *North-South* | Study Period (hrs): *0.25* |

## Vehicle Volumes and Adjustments

| **Major Street** | Northbound | | | Southbound | | |
|---|---|---|---|---|---|---|
| Movement | 1 | 2 | 3 | 4 | 5 | 6 |
| | L | T | R | L | T | R |
| Volume | *0* | *1164* | *30* | *3* | *438* | *0* |
| Peak-Hour Factor, PHF | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* |
| Hourly Flow Rate, HFR | *0* | *1293* | *33* | *3* | *486* | *0* |
| Percent Heavy Vehicles | *0* | -- | -- | *10* | -- | -- |
| Median Type | *Undivided* | | | | | |
| RT Channelized | | | *0* | | | *0* |
| Lanes | *0* | *1* | *0* | *0* | *1* | *0* |
| Configuration | | | *TR* | *LT* | | |
| Upstream Signal | | *0* | | | *0* | |

| **Minor Street** | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|
| Movement | 7 | 8 | 9 | 10 | 11 | 12 |
| | L | T | R | L | T | R |
| Volume | *12* | *0* | *2* | *0* | *0* | *0* |
| Peak-Hour Factor, PHF | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* |
| Hourly Flow Rate, HFR | *13* | *0* | *2* | *0* | *0* | *0* |
| Percent Heavy Vehicles | *10* | *0* | *10* | *0* | *0* | *0* |
| Percent Grade (%) | | *3* | | | *0* | |
| Flared Approach | | *N* | | | *N* | |
| Storage | | *0* | | | *0* | |
| RT Channelized | | | *0* | | | *0* |
| Lanes | *0* | *0* | *0* | *0* | *0* | *0* |
| Configuration | | *LR* | | | | |

## Delay, Queue Length, and Level of Service

| Approach | NB | SB | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|
| Movement | 1 | 4 | 7 | 8 | 9 | 10 | 11 | 12 |
| Lane Configuration | | *LT* | | *LR* | | | | |
| v (vph) | | *3* | | *15* | | | | |
| C (m) (vph) | | *495* | | *89* | | | | |
| v/c | | *0.01* | | *0.17* | | | | |
| 95% queue length | | *0.02* | | *0.57* | | | | |
| Control Delay | | *12.3* | | *53.5* | | | | |
| LOS | | *B* | | *F* | | | | |
| Approach Delay | -- | -- | *53.5* | | | | | |
| Approach LOS | -- | -- | *F* | | | | | |

# TWO-WAY STOP CONTROL SUMMARY

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | *JN* | Intersection | |
| Agency/Co. | *Julian Ng Incorporated* | Jurisdiction | *HDOT HWY* |
| Date Performed | *12/2/2012* | Analysis Year | *2024* |
| Analysis Time Period | *AM Peak Hour* | | |
| Project Description | *Kunia Agricultural Park* | | |
| East/West Street: | *Kunia Ag Park* | North/South Street: | *Kunia Road (SR750)* |
| Intersection Orientation: | *North-South* | Study Period (hrs): | *0.25* |

## Vehicle Volumes and Adjustments

| **Major Street** | Northbound | | | Southbound | | |
|---|---|---|---|---|---|---|
| Movement | 1 | 2 | 3 | 4 | 5 | 6 |
| | L | T | R | L | T | R |
| Volume | *0* | *1164* | *30* | *3* | *438* | *0* |
| Peak-Hour Factor, PHF | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* |
| Hourly Flow Rate, HFR | *0* | *1293* | *33* | *3* | *486* | *0* |
| Percent Heavy Vehicles | *0* | -- | -- | *10* | -- | -- |
| Median Type | *Two Way Left Turn Lane* | | | | | |
| RT Channelized | | | *0* | | | *0* |
| Lanes | *0* | *1* | *0* | *0* | *1* | *0* |
| Configuration | | | *TR* | *LT* | | |
| Upstream Signal | | *0* | | | *0* | |

| **Minor Street** | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|
| Movement | 7 | 8 | 9 | 10 | 11 | 12 |
| | L | T | R | L | T | R |
| Volume | *12* | *0* | *2* | *0* | *0* | *0* |
| Peak-Hour Factor, PHF | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* | *0.90* |
| Hourly Flow Rate, HFR | *13* | *0* | *2* | *0* | *0* | *0* |
| Percent Heavy Vehicles | *10* | *0* | *10* | *0* | *0* | *0* |
| Percent Grade (%) | | *3* | | | *0* | |
| Flared Approach | | *N* | | | *N* | |
| Storage | | *0* | | | *0* | |
| RT Channelized | | | *0* | | | *0* |
| Lanes | *0* | *0* | *0* | *0* | *0* | *0* |
| Configuration | | *LR* | | | | |

## Delay, Queue Length, and Level of Service

| Approach | NB | SB | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|
| Movement | 1 | 4 | 7 | 8 | 9 | 10 | 11 | 12 |
| Lane Configuration | | *LT* | | *LR* | | | | |
| v (vph) | | *3* | | *15* | | | | |
| C (m) (vph) | | *495* | | *186* | | | | |
| v/c | | *0.01* | | *0.08* | | | | |
| 95% queue length | | *0.02* | | *0.26* | | | | |
| Control Delay | | *12.3* | | *26.0* | | | | |
| LOS | | *B* | | *D* | | | | |
| Approach Delay | -- | -- | *26.0* | | | | | |
| Approach LOS | -- | -- | *D* | | | | | |