

# **FINAL ENVIRONMENTAL ASSESSMENT**

## **West Hawai'i Explorations Academy Relocation**

TMK (3<sup>rd</sup>. Div.) 7-3-043:083 (por.)  
North Kona District, Hawai'i Island, State of Hawai'i

December 2011

Prepared for:

Natural Energy Laboratory of Hawai'i Authority (NELHA)  
73-4460 Queen Ka'ahumanu Hwy. #101  
Kailua-Kona HI 96740-2637



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North Kona District, Hawai'i Island, State of Hawai'i

### **APPLICANT:**

West Hawai'i Explorations Academy  
73-4460 Queen Ka'ahumanu Highway, #105  
Kailua-Kona, HI, 96740

### **APPROVING AGENCY:**

Natural Energy Laboratory of Hawai'i Authority (NELHA)  
73-4460 Queen Ka'ahumanu Hwy. #101  
Kailua-Kona, HI 96740-2637

### **CONSULTANT:**

Geometrician Associates LLC  
PO Box 396  
Hilo HI, 96721

### **CLASS OF ACTION:**

Use of State Land  
Use of State Funds

This document is prepared pursuant to:  
The Hawai'i Environmental Policy Act,  
Chapter 343, Hawai'i Revised Statutes (HRS), and  
Title 11, Chapter 200, Hawai'i Department of Health Administrative Rules (HAR)

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**SUMMARY OF THE PROPOSED ACTION,  
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

The West Hawai‘i Explorations Academy (WHEA) proposes to relocate its campus within the Natural Energy Laboratory of Hawai‘i Authority (NELHA) from a shoreline property to a more suitable site away from the Kona International Airport and outside the tsunami evacuation zone. The new site will be in an area of NELHA with access to the seawater that forms the basis of many of the hands-on scientific curriculum at the school. The permanent campus would allow for the eventual expansion from 195 to 300 students in the 7th to the 12th grades. The school will have solar hot water, a 10 kW photovoltaic system, xerophytic landscaping, and many other environmentally advanced features that both reduce energy use and serve for education in high technology, energy and environmental engineering, including alternative wastewater treatment technologies. Impacts include grading of the pahoehoe surface and associated minor impacts on sedimentation, dust, noise, and visual quality, all of which will be temporary and mitigated as feasible. No archaeological sites are present on or near the site. A few individuals of the relatively rare plant *maiapilo*, the designated school flower, are present on and surrounding the site. These plants will be salvaged as practical and *maiapilo* plants will be used for landscaping.

## **PART 1: PROJECT DESCRIPTION, LOCATION AND ENVIRONMENTAL ASSESSMENT PROCESS**

### **1.1 Project Location and Property Ownership**

The project location is a 5.083-acre area in Kona under the control of the Natural Energy Laboratory of Hawai'i Authority (NELHA, an agency of the State of Hawai'i, near Keahole Point on the Island of Hawai'i (see Figures 1-3 for maps and photos of area). Following a recently approved consolidation and resubdivision action, the site consists of most of TMK 7-3-043:083 outside of two areas reserved for road widening and a pipeline.

### **1.2 Purpose and Need**

The West Hawai'i Explorations Academy (WHEA) is a successfully operating public charter school that has been open since 1993 for students from the 7<sup>th</sup> through the 12<sup>th</sup> grade. The current temporary site (see Figure 1) has the advantage of being near the shoreline at NELHA, but this also places it near the tsunami zone. Furthermore, its already noise levels are due to increase with modifications and expansions to runways at Kona International Airport. The new site (see Figure 1) would lack these disadvantages and still be within an area with access to the seawater that forms the basis of many of the hands-on scientific curriculum at the school.

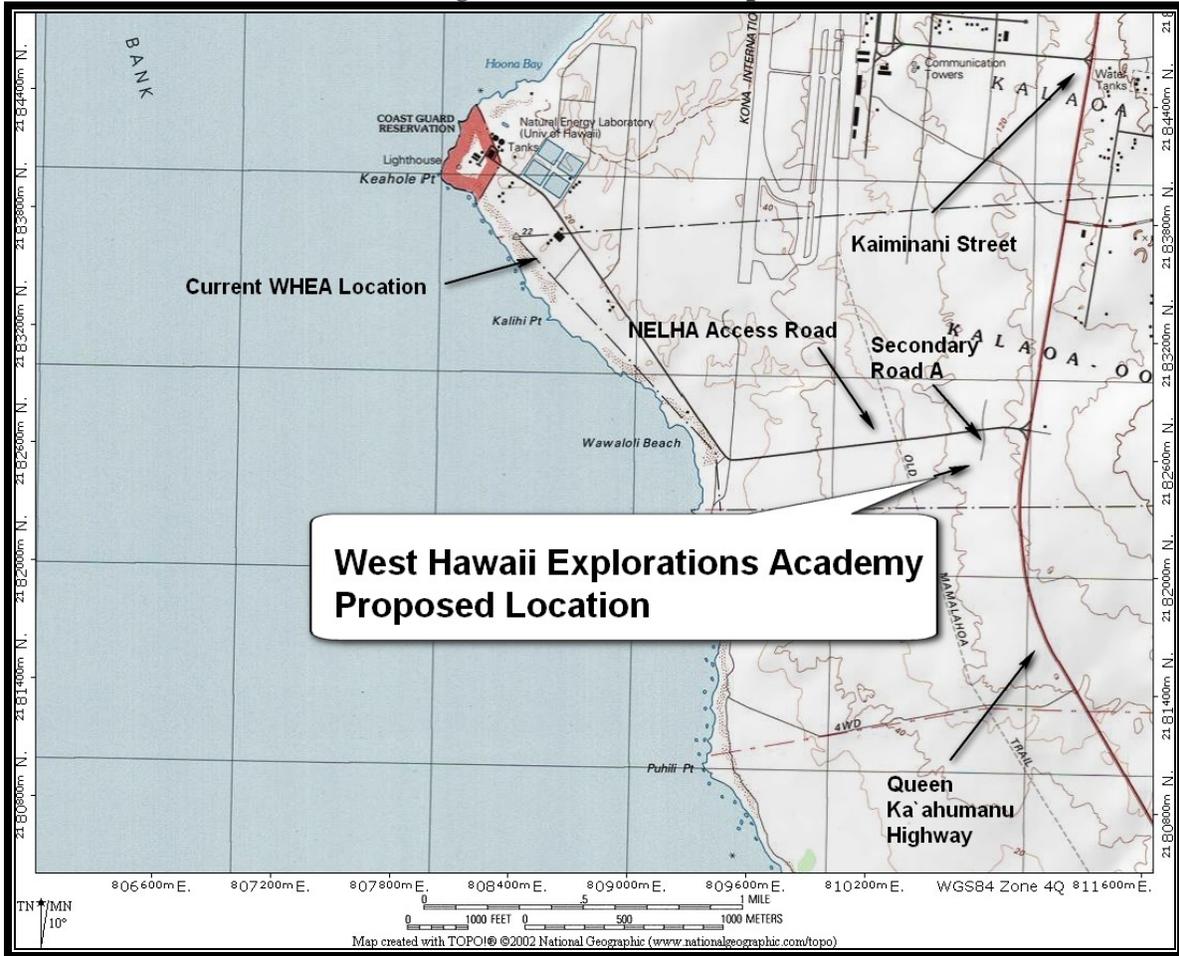
### **1.3 Project Description**

The project would relocate the WHEA campus from its temporary shoreline site about a mile away and build a permanent campus with facilities that would allow for an eventual expansion from 195 to 300 students. The planned campus, which is depicted in Figure 4, would include the following elements:

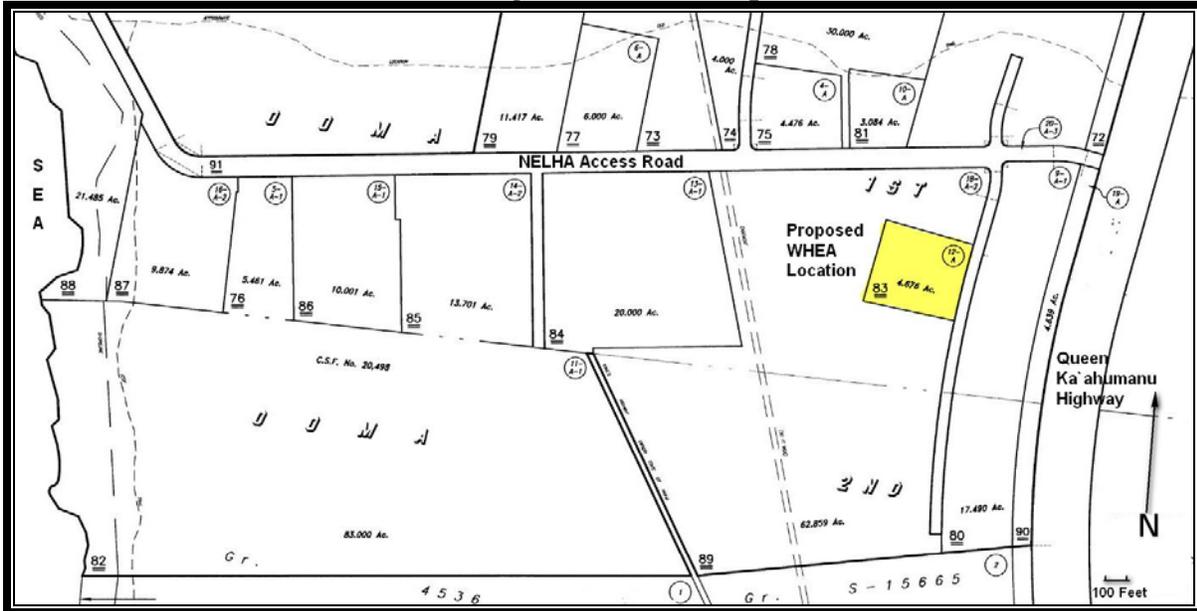
- Administration building
- High school village and a middle school village with a total of 9 classroom buildings
- Outdoor amphitheater
- Multi-purpose room and kitchen and servery building
- Laboratories
- STEM (Science, Technology, Math and Engineering) learning center/shop
- Covered outdoor spaces and other facilities for agriculture, aquaculture, and marine science student projects, and courts for tennis and basketball

A number of the facilities in the school are being designed for LEED Silver Certification. An unusual feature will be the opportunity to use cold deep seawater for air conditioning, condensate irrigation and science education. The school will have solar hot water, an initial 10 kW photovoltaic system, an emphasis on xerophytic vegetation, and many other environmentally advanced features that both reduce energy use and serve for education in high technology, energy and environmental engineering, including alternative wastewater treatment technologies.

**Figure 1 Location Map**



**Figure 2 TMK Map**



**Figure 3**  
**Project Site Photos**

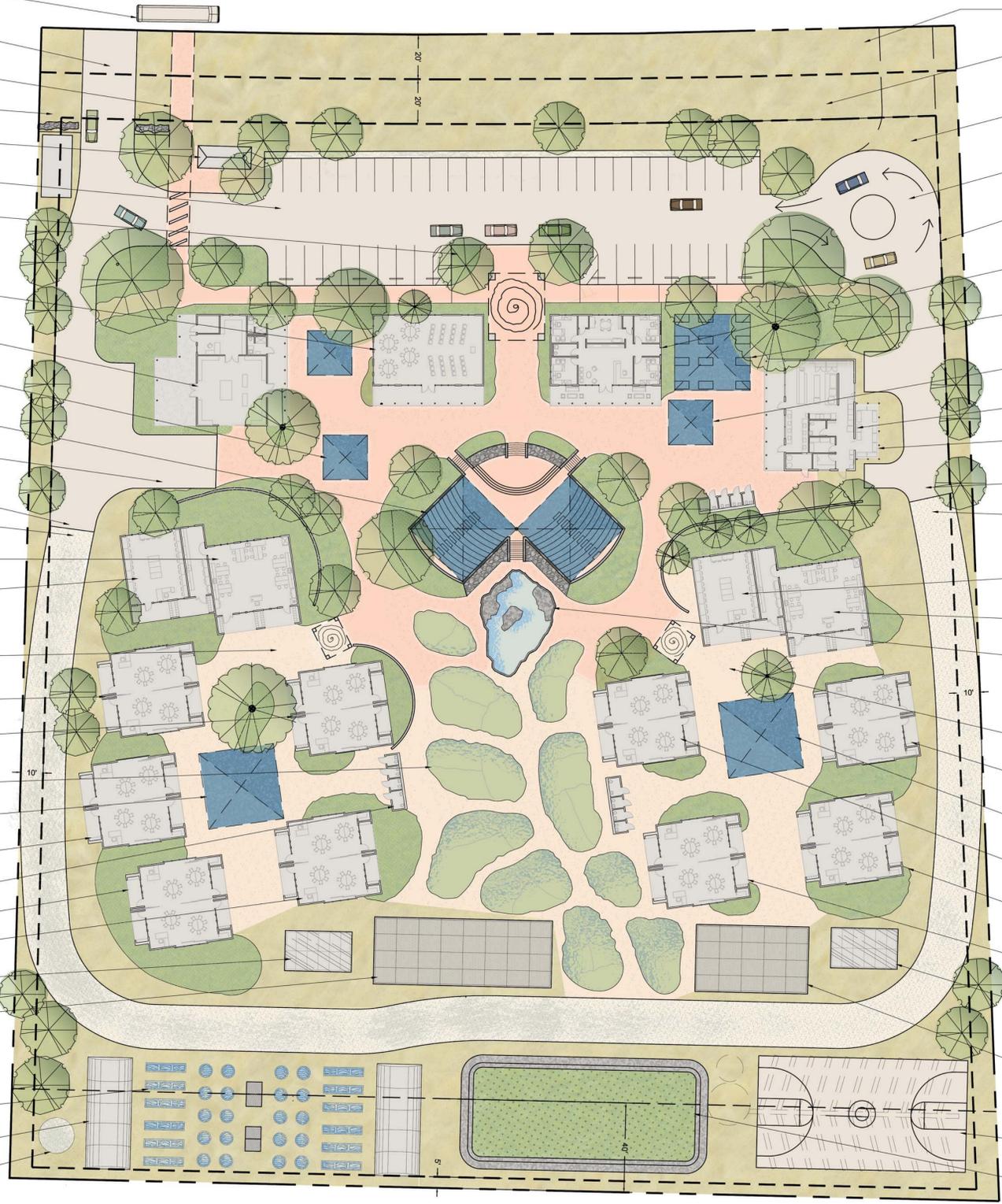


▲ *Mauka* north end of project site

▼ *Mauka* south end of project site

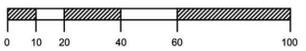


BUS DROP-OFF & PICK UP  
 ENTRY  
 SEAWATER CORRIDOR  
 UTILITY CORRIDOR  
 WAITING AREA  
 PARKING  
 PICK-UP AND DROP-OFF  
 MULTI-PURPOSE / CLASSROOM  
 STEM CLASSROOM AND SHOP  
 HALAU  
 COVERED 350 SEAT AMPHITHEATRE  
 LOADING  
 PAVED ROADWAY  
 FIRE LANE  
 WET LAB  
 COMPUTER LAB  
 HIGH SCHOOL VILLAGE  
 CLASS 1  
 CLASS 2  
 STUDENT PROJECTS  
 34' X 34' TENT  
 CLASS 3  
 REST ROOMS  
 CLASS 4  
 CLASS 5  
 GREENHOUSE  
 SHADECLOTH STRUCTURE  
 AQUACULTURE  
 QUONSET TENT  
 SALTWATER DRY WELL



FUTURE FRONTAGE ROAD  
 FUTURE SEAWATER CORRIDOR  
 FUTURE DRIVEWAY  
 TURNABOUT  
 YARD SETBACK  
 ADMINISTRATION  
 34' X 34' TENT FOR COVERED DINING  
 HALAU TENT  
 KITCHEN / MICROWAVE SERVERY  
 FUTURE WALK-IN FREEZERS  
 PAVED ROADWAY  
 FIRE LANE  
 COMPUTER LAB  
 WET LAB  
 SHARK/REEF TANK  
 MIDDLE SCHOOL VILLAGE  
 CLASS 2  
 34' X 34' TENT  
 CLASS 1  
 CLASS 3  
 CLASS 4  
 GREENHOUSE  
 SHADECLOTH STRUCTURE  
 PLAYCOURT  
 BIOLOGICAL WASTE TREATMENT

**1** SITE PLAN  
 G0.03 1" = 30'-0"



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 ARCHITECTURE / INTERIOR ARCHITECTURE / RESEARCH  
 733 BISHOP ST., SUITE 2620 HONOLULU, HI 96813-4016  
 TEL 808.533.8860 FAX 808.539.3749 www.ferrarochoi.com

SEAL  
 EXPIRATION OF LICENSE  
 SIGNATURE  
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND  
 CONSTRUCTION OF THE PROJECT WILL BE UNDER MY OBSERVATION  
 (SEC. 11155, DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS)

**WEST HAWAII  
 EXPLORATIONS  
 ACADEMY**  
 HOST Park, Kailua-Kona, Hawaii

SHEET TITLE:  
**SITE PLAN -  
 OVERALL**

PROJECT:	1261.000	REVISIONS:	
DRAWN:	KC		△
DATE:	4/22/2011		△
SHEET	<b>G0.03</b>		△
OF SHEETS			△

The target date for relocation of the school is currently August of 2013. Phase I of the project, which would accommodate the existing enrollment, is estimated to cost \$10 to 15 million. The second phase of the project would allow expanded enrollment to 300 students and add \$3 to 4 million.

#### **1.4 Environmental Assessment Process**

##### *NELHA Background*

By Act 236 of the Hawai‘i Revised Statutes, 1974, the State of Hawai‘i established the Natural Energy Laboratory of Hawai‘i (NELH) on 322 acres at Keahole Point on the Island of Hawai‘i. The physical characteristics of the site were considered uniquely suited for several significant State and federal energy programs. NELH was mandated to provide a support facility for research on the ocean thermal energy conversion (OTEC) process and its related technologies. The success of these programs was envisioned as highly significant for the intensive, long-term development of energy source alternatives to fossil fuels.

In 1979, a barge dubbed “Mini-OTEC,” anchored offshore of Keahole Point, demonstrated the world’s first production of net electrical power via closed-cycle OTEC. A year later, the NELH facilities that draw deep seawater from 2,000 feet and surface seawater from the 45-foot depth were constructed at Keahole Point. By 1984 it had become apparent that the seawater being pumped up for OTEC research could also be channeled into many other profitable uses. New legislation in 1984 legalized commercialization on State property, allowing NELH to host new tenant business ventures. In 1985, the State Legislature created the Hawaii Ocean Science and Technology (HOST) Park on an adjacent 548 acres at Keahole in anticipation of expansion needs of NELH’s growing businesses. In 1990, HOST Park and NELH were melded into one agency, the NELH Authority (NELHA), attached to the Hawai‘i State Department of Business, Economic Development & Tourism. In 1998-99, the Legislature expanded the activities allowed at NELHA to include other business activities that could enhance economic development and generate additional revenues to support the growing park. Today, NELHA is “landlord” to nearly 40 enterprises that generate about \$50 million per year in total economic impact, including tax revenues, as well as more than 390 jobs, construction activity and high value product exports. Three pipeline systems constantly pump deep and surface seawater to shore, including the world’s deepest pipeline at 3,000 feet.

The cumulative impacts of long-term operation and expansion of NELHA operations were evaluated in four previously accepted environmental impact statements (EISs):

- Research Corporation of the University of Hawai‘i (RCUH). 1976. *Environmental Impact Statement for the Natural Energy Laboratory of Hawaii at Keahole Point, Hawaii (Phase I)*. Prep. by R.M. Towill Corp. for RCUH.
- Hawai‘i State High Technology Development Corporation (HTCD). 1985. *Final Environmental Impact Statement, Development Plan for the Hawaii Ocean Science and Technology Park and Expansion of the Natural Energy Laboratory of Hawaii, Keahole, North Kona, Hawaii*.

- Natural Energy Laboratory of Hawai‘i. 1987. *Final Environmental Impact Statement, Alternative Methods of Seawater Return Flow Disposal, Keahole, North Kona, Hawaii.*
- Natural Energy Laboratory of Hawai‘i. 1992. *Final Environmental Impact Statement, Development of Land Exchange Parcel, Natural Energy Laboratory of Hawaii.* Prep. by GK & Associates for NELHA.

In addition, the following EIS addressed the impacts of land development and proposed aquaculture uses on an adjacent 83-acre parcel obtained by NELHA in a 1986 land exchange:

- Hawai‘i County Planning Department. 1986. *Final Environmental Impact Statement, ‘O‘oma II, North Kona, Hawaii.* Prepared for Hawai‘i County Planning Department and Kahala Capital Corporation by Helber, Hastert, Van Horn & Kimura.

As discussed in Section 3.6.4, the project is clearly of a type authorized by HRS Chapter 227D, which stated: “The purpose of the natural energy laboratory of Hawaii authority shall be to facilitate research, development, and commercialization of natural energy resources and ocean-related research, technology, and industry in Hawaii.” However, an Environmental Assessment (EA) is being conducted because the West Hawai‘i Explorations Academy involves a use of State land of a type not explicitly evaluated in the previous EIS documents for NELHA and because of expected use of State Grant in Aid and CIP funds.

#### *Environmental Assessment Process*

This EA process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations, Title 11, Chapter 200, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact process in the State of Hawai‘i. According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria.

Part 4 of this document states the finding (anticipated in the Draft EA) that no significant impacts are expected to occur; Part 5 lists each criterion and presents the findings by NELHA, the approving agency. In the EA process, if the approving agency determines after considering comments to the Draft EA that no significant impacts would likely occur, then the agency issues a Finding of No Significant Impact (FONSI), and the action is permitted to occur. If the agency concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) is prepared.

## 1.5 Public Involvement and Agency Coordination

The following agencies and organizations were consulted in development of the environmental assessment:

### Federal:

Federal Aviation Administration

### State:

Department of Land and Natural Resources  
Department of Health, Safe Drinking Water and Clean Water Branches  
Department of Transportation  
Office of Hawaiian Affairs, Honolulu and West Hawai'i

### County:

Civil Defense Agency                      County Council  
Department of Environmental Management  
Fire Department                              Planning Department  
Department of Water Supply

### Private:

Kona Hawaiian Civic Club  
Kona-Kohala Chamber of Commerce  
Kona Outdoor Circle  
Sierra Club  
Janice Palma-Glennie  
Keahole Point Associates

Copies of communications received during early consultation are contained in Appendix 1a and relevant aspects of reply letters are discussed in the text of the EA. Appendix 1b contains written comments on the Draft EA and the responses to these comments. Various places in the EA have been modified to reflect input received in the comment letters; additional or modified non-procedural text is denoted by double underlines, as in this paragraph.

## **PART 2: ALTERNATIVES**

### **2.1 Proposed Project**

The action under consideration is described in Sections 1.1 to 1.3, above.

### **2.2 No Action**

Under the No Action Alternative, the school would not relocate and would likely have to close when noise levels from the airport expansion became unbearable.

### **2.3 Alternate Sites**

As discussed in Section 1.3 and illustrated in Figure 1, the current temporary site has the advantage of being near the shoreline at NELHA, but it is thus also near the tsunami zone. In addition, the already high noise levels are due to increase with modifications and expansions to runways at Kona International Airport. The new site was chosen by NELHA and offered to WHEA as the most suitable location in terms of NELHA's Master Plan. There are potentially other sites in Kona that might be appropriate for a charter school, but the location within this area of NELHA offers ideal access to the seawater that forms the basis of many of the hands-on scientific curriculum at the school. At this time, school officials have been unable to identify any other feasible and desirable sites within or outside of NELHA, and therefore none are carried forward for detailed analysis in this EA.

## **PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES**

### *Basic Geographic Setting*

The NELHA property that will be leased is referred to throughout this EA as the *project site*. The term *project area* is used to describe the general environs in this part of Kona.

After a recently approved consolidation and resubdivision process, the site consists of most of TMK 7-3-043:083 outside of two areas reserved for road widening and a pipeline. It is located *makai* of the NELHA Gateway Center and south of the main NELHA Access Road (see Figures 1-3). All adjacent land is contained within NELHA and dedicated to research, development, and commercialization of natural energy resources and ocean-related research, technology, and industry in Hawai‘i. Approximately 4,000 feet to the northwest is the nearest runway of the Kona International Airport, and Queen Ka‘ahumanu Highway is present 600 feet *mauka*.

### **3.1 Physical Environment**

#### **3.1.1 Climate, Geology, Soils and Geologic Hazards**

##### *Environmental Setting*

The climate in the area is warm and arid, with an average annual rainfall of about 20 inches (UH Hilo-Geography 1998:57). Geologically, the site is located at the foot of Hualālai volcano, and the surface consists of barely weathered pahoehoe basalt lava flows dated from 1,500 to 3,000 years ago (Wolfe and Morris 1996). In the dry climate, soil has not yet had time to form (U.S. Soil Conservation Service 1973).

The relatively flat and stable project site is not subject to subsidence nor landslides or other forms of mass wasting. The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of North Kona is Zone 4, on a scale of ascending risk from 9 to 1 (Heliker 1990:23). The hazard risk is based on the fact that Hualālai has steep slopes and is the third most historically active volcano on the island. Volcanic hazard Zone 4 areas have about 5 percent of their land area covered by lava or ash flows since the year 1800 and less than 15 percent of their land area covered by lava in the past 750 years. They are at lower risk than Zone 3 areas because the frequency of Hualālai eruptions is lower than those of Kilauea and Mauna Loa.

In terms of seismic risk, the entire Island of Hawai‘i is rated Zone 4 Seismic Hazard (*Uniform Building Code, 1997 Edition*, Figure 16-2). Zone 4 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 15, 2006, demonstrated.

### *Impacts and Mitigation Measures*

In general, geologic conditions impose no constraints on the project site that would make the proposed school relocation within NELHA imprudent, as demonstrated by the deep commitment to ocean technology-related infrastructure represented by the NELHA development. Facility design will meet all appropriate seismic standards. School officials are trained in evacuation procedures in the event of a volcanic emergency.

#### **3.1.2 Flood Zones and Drainage**

##### *Existing Environment*

As illustrated in Figure 1, the project site is about 0.9 miles from the ocean at an elevation of about 100 feet above sea level, well outside the area affected by coastal flooding. The Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) 1551660683 (9/16/1988) shows that the project site is in Flood Zone X, outside the 100-year area of coastal flooding (see Figure 4a for interpretation of Flood Zone boundary relative to development site). Maps printed by the Pacific Tsunami Warning Center and the Hawai'i County Civil Defense Agency show the parcel outside the area that should be evacuated during a tsunami warning, unlike the current school location (<http://www5.hawaii.gov/tsunami/maps.asp>). No known areas of local (non-stream or ocean related) flooding are present at the project site.

##### *Impacts and Mitigation Measures*

The project does not involve construction within a flood zone. The project would be required to follow County regulations and policies related to flooding and drainage, among them Chapter 27 of the Hawai'i County Code. Chapter 27 requires the difference between pre-development and post-development runoff to be contained onsite, limiting impacts.

In response to early consultation (see Appendix 1a) Quince Mento, Director of Hawai'i County Civil Defense, stated that WHEA should have plans for relocating students and faculty during a tsunami event, as roadblocks will be established at the intersection of Queen Ka'ahumanu Highway and the NELHA Access Road. Although not subject to tsunami and not within the tsunami evacuation zone, the school would follow normal operating procedures during tsunami. The National Weather Service of the National Oceanic and Atmospheric Administration operates the Pacific Tsunami Warning Center and Alaska Tsunami Warning Center, which monitors sudden earth movements throughout the Pacific Basin. Tsunamis generated from earth movements on the Pacific Rim, including South America, Japan, California and Alaska, would allow for warning times between 4 and 15 hours, sufficient time for evacuation of NELHA. Sudden movement along faults close to Hawai'i are unpredictable, allowing only minutes or perhaps an hour of warning time, and evacuation would be more problematic.

### 3.1.3 Water Features and Water Quality

#### *Existing Environment*

Aside from the Pacific Ocean, the project site is not near perennial surface water bodies. According to maps from the U.S. Fish and Wildlife Service confirmed by field inspection, no wetlands are present (<http://www.fws.gov/wetlands/Data/Mapper.html>). The nearest mapped wetlands are approximately 2.5 miles south at Kaloko-Honokohau National Historical Park.

The waters off Kona are classified by the State as class AA. Hawai'i Administrative Rules (HAR) 11-54-03(c)(1) states that class AA waters are:

“high quality waters are those in which water quality is expected to exceed that necessary to support oceanographic research, propagation of aquatic communities and wildlife, compatible recreation and aesthetic enjoyment. It is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected.”

Coastal water quality in urban Kona, which lacks the heavy industry, history of intensive agriculture, or other factors that lead to contamination, is generally good (U.S. EPA 2000). However, the Natural Resources Defense Council has reported exceedances (<http://www.nrdc.org/water/oceans/ttw/ttw2008.pdf>) of bacteria in water quality at certain beaches, which local water quality scientists attribute mainly to wastewater (*Hawai'i Tribune Herald*: 8/6/08, p. 1).

Another source of water pollution is runoff from developed properties, which can carry chemicals, sediments and nutrients, even if they not located directly on the coast. Although not a chronic problem, periodic acute episodes have occurred in some construction sites. Proper implementation and enforcement of construction BMPs are important to safeguard water quality. After construction, reducing contamination relies on confining runoff, particularly “first-flush” runoff, which contains most of the contaminants, to drainage structures that capture and retain many of the pollutants, especially sediments.

In terms of groundwater, U.S. EPA and Department of Water Supply Annual Water Quality Reports for wells and water systems indicate no health-based or monitoring violations in at least the past 10 years (<http://oaspub.epa.gov/enviro/>). Although some chemical contamination has been found in a few, levels have been below maximum EPA-acceptable limits.

#### *Impacts and Mitigation Measures*

Initially, domestic wastewater would be treated through a septic system in conformance with Department of Health regulations. Conceptual plans allocate space on the site for future additional treatment with constructed wetlands and disinfection to allow wastewater re-use (see Figure 4). This wetlands would take effluent in a bypass from the septic tank and route it to

either a storage tank for underground irrigation or to the leach field for disposal or a treatment tank for treatment to R-1 quality so that the effluent could be used for serial irrigation. All treatment would occur per Department of Health regulations and would be subject to NELHA overview to ensure compliance with NELHA standards and policies.

The WHEA seawater disposal trench will be included in the NELHA Tenant Effluent Monitoring Program. The seawater introduced into the discharge basin will be professionally tested according to NELHA protocol to ensure that it meets standards for such disposal. All effluent for NELHA tenants is tested based on State water quality standards contained in Title 11, Chapter 62, Hawai'i Administrative Rules. Testing is done for four analytes: total suspended solids, biological oxygen demand, total nitrogen, and total phosphorus. Testing will be performed by the NELHA Water Quality Lab quarterly for the first year. The goal is to ensure that effluent meets water quality standards and does not degrade the groundwater or marine waters.

The entire site is planned for grading. The project will be required to conform to Chapter 10 of the Hawai'i County Code, which requires projects that disturb the ground to prevent erosion and sedimentation and obtain grubbing/grading permits from the County Department of Public Works. Because the project may disturb an acre or more than one acre of soil, a National Pollutant Discharge Elimination System (NPDES) permit must be obtained by the contractor before the project commences. This permit requires the completion of a Storm Water Pollution Prevention Plan (SWPPP). In order to properly manage storm water runoff, the SWPPP will describe the emplacement of a number of best management practices (BMPs) for the project. These BMPs may include, but will not be limited to, the following:

- Minimization of soil loss and erosion by revegetation and stabilization of slopes and disturbed areas of soil, possibly using hydromulch, geotextiles, or binding substances, as soon as possible after working;
- Minimization of sediment loss by emplacement of structural controls possibly including silt fences, gravel bags, sediment ponds, check dams, and other barriers in order to retard and prevent the loss of sediment from the site;
- Minimizing disturbance of soil during periods of heavy rain;
- Phasing of the project in order to disturb a minimum necessary area of soil at a particular time;
- Application of protective covers to soil and material stockpiles;
- Construction and use of a stabilized construction vehicle entrance, with designated vehicle wash area that discharges to a sediment pond;
- Washing of vehicles in the designated wash area before they egress the project site;
- Use of drip pans beneath vehicles not in use in order to trap vehicle fluids;
- Routine maintenance of BMPs by adequately trained personnel; and
- Clean-up of significant leaks or spills and disposal at an approved site, if they occur.

### 3.1.4 Flora, Fauna and Ecosystems

#### *Existing Environment*

The project site is entirely contained on lightly vegetated pahoehoe lava, as shown in photos in Figure 3. An inspection in May 2011 by Dr. Ron Terry found the vegetation to be typical of that found by other studies on coastal Kona lava flows (Geometrician Associates 2006), consisting of the species listed in Table 1 below. The most abundant species are the non-native fountain grass (*Pennisetum setaceum*) along with the common indigenous herb 'uhaloa (*Waltheria indica*). A notable feature on this site and many other locations at and near NELHA is the rare native shrub *maiapilo* (*Capparis sandwichiana*).

No threatened or endangered plant species were present or would be expected on the project site. Although moderately common in the shoreline from Keahole Point through O'oma to the south, *maiapilo* is considered a species of concern by the U.S. Fish and Wildlife Service and is often listed among rare plants in Hawai'i. Even if this status does not provide official legal protection, the U.S. Fish and Wildlife Service and the Hawai'i Department of Land and Natural Resources are interested in its protection.

**Table 1. Plant Species Detected on Project Site**

Scientific Name	Family	Common Name	Life Form	Status*
<i>Acacia farnesiana</i>	Fabaceae	Klu	Shrub	A
<i>Capparis sandwichiana</i>	Capparaceae	Maiapilo	Shrub	E
<i>Chamaecrista nictitans</i>	Fabaceae	Partridge pea	Herb	A
<i>Chloris barbata</i>	Poaceae	Swollen fingergrass	Grass	A
<i>Dodonaea viscosa</i>	Sapindaceae	'A'ali'i	Shrub	I
<i>Lantana camara</i>	Verbenaceae	Lantana	Shrub	A
<i>Morinda citrifolia</i>	Rubiaceae	Noni	Shrub	A
<i>Pennisetum setaceum</i>	Poaceae	Fountain grass	Grass	A
<i>Rhynchelytrum repens</i>	Poaceae	Natal red-top	Grass	A
<i>Schinus terebinthifolius</i>	Anacardiaceae	Christmas berry	Shrub	A
<i>Sida fallax</i>	Malvaceae	'Ilima	Shrub	I
<i>Sida rhombifolia</i>	Malvaceae	Sida	Shrub	A
<i>Tridax procumbens</i>	Asteraceae	Coat buttons	Herb	A
<i>Waltheria indica</i>	Sterculiaceae	'Uhaloa	Shrub	I

\* A = alien, E = endemic, I = indigenous

No birds were observed during reconnaissance of the site, which contains very little habitat or food attractive to birds. Nevertheless, common non-native birds such as Common Myna (*Acridotheres tristis*) and Spotted Dove (*Streptopelia chinensis*) may occasionally be found on the site on occasion. No threatened or endangered birds would likely be present on the site.

Although not detected during this survey it is possible that small numbers of the endangered endemic Hawaiian Petrel (*Pterodroma sandwichensis*), or *ua'u*, and the threatened Newell's

Shearwater (*Puffinus auricularis newelli*), or 'a'o, over-fly the project site between the months of May and November. To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell's Shearwaters and external lights and man-made structures, all projects in Hawai'i should ensure that any external lighting be shielded, in keeping with Hawai'i County Code § 14 – 50 *et seq.* which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

No mammals were observed on the property. With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), which might forage in the general area but would not roost on the project site because of the lack of appropriate trees, all terrestrial mammals currently found on the Island of Hawai'i are alien species, and most are ubiquitous. Wild cats (*Felis catus*), small Indian mongooses (*Herpestes a. auropunctatus*), and some species of rats and mice, such as roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), Polynesian rats (*Rattus exulans hawaiiensis*), and European house mice (*Mus musculus domesticus*), probably make occasional use of the project site, as they are common in Kona.

#### *Impacts and Mitigation Measures*

No substantial adverse effects to flora and fauna will occur. The rare maiapilo plants, which are distinct and easily identifiable, will be salvaged where possible, but as most of the site will be graded, only a few may be able to be preserved in situ. However, the maiapilo plant is the designated school plant and has special meaning for the school, and it will be incorporated along with other Hawaiian plants in the facility landscaping.

The project will not involve any unshielded lighting for either construction or operation, in conformance with Hawai'i County Code § 14 – 50 *et seq.*, which will avoid impacts to listed seabirds.

Factors that impair urban Kona's coastal water quality and potentially affect threatened or endangered marine species are wastewater, chemical contaminants from industrial and commercial uses, and polluted runoff from streets and parking lots. As there are no surface streams in the project area and runoff directly into the ocean is generally not observed, the typical pathway of pollutants is via groundwater, where it is partially remediated through the natural process of slow infiltration through soil and rock.

The facility would not increase runoff from the project site into the ocean and would treat all wastewater in conformance with strict permit requirements in order to avoid pollution. No marked effect to water quality or other marine conditions is expected to occur as a result of the project, and no adverse effect of any sort to any species of marine life is expected.

### 3.1.5 Noise

#### *Environmental Setting*

Noise on the project site is moderate to high based on its location about 4,500 feet from the nearest runway of Kona International Airport (KOA). Aside from the airport, there is currently no substantial noise at the site. Other sources of noise include Queen Ka‘ahumanu Highway (State Highway 19), located about 600 feet east, the NELHA Access Road, and nearby ocean technology and other land uses.

The noise descriptor used to assess environmental noise by many federal and State of Hawai‘i agencies, including Department of Housing and Urban Development (HUD), the Federal Aviation Administration (FAA) and the Hawai‘i Department of Transportation (DOT), is the Day-Night Average Sound Level (DNL). DNL is a representation of the average noise during a typical day of the year. DNL levels of 55 or less are typical of quiet rural or suburban areas. DNL exposure levels of 55 to 65 are typical of urbanized areas with medium to high levels of activity and street traffic. DNL exposure levels above 65 are representative of dense urban sites and areas near large highways or airports.

Various agencies have different standards of noise compatibility. HUD standards are as follows<sup>1</sup>:

- **Acceptable.** (DNL not exceeding 65 decibels) The noise exposure may be of some concern but common building constructions will make the indoor environment acceptable and the outdoor environment will be reasonably pleasant for recreation and play.
- **Normally Unacceptable.** (DNL above 65 but not exceeding 75 decibels) The noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building constructions may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.
- **Unacceptable.** (DNL above 75 decibels). The noise exposure at the site is so severe that the construction cost to make the indoor noise environment acceptable may be prohibitive and the outdoor environment would still be unacceptable.

DOT Airports is currently completing its ~~federally required~~ 14 CFR Part 150 Noise Compatibility Program (NCP) update for KOA, a voluntary program that was approved by the Federal Aviation Administration on May 31, 2011. A draft report dated June 2009 is available at: (<http://www.kona-airport.com/downloads/KOA%20150%20chpt%207.pdf>).

Table 3 of the NCP provides recommendations for local land use compatibility with DNL sound levels. Its standards consider noise levels above 60 DNL generally incompatible with residential land uses without noise level reduction measures that reduce interior noise levels to 45 DNL or less. Commercial and government uses, as well as government services and office buildings

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<sup>1</sup> U.S. Department of Housing and Urban Development’s (HUD) *Noise Assessment Guidelines* (NAG), ; web-based *Day/Night Noise Level Assessment Tool* (V.1), HUD Office of Environment and Energy. Env. Planning Div..

-serving the public, are considered compatible with noise levels that exceed 65 DNL only if noise reduction measures are incorporated into areas of the facility in which the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

The 14 CFR Part 150 NCP for KOA also includes aircraft noise contour maps for current conditions (2008) as well as projections for the year 2013 and “long-range” (date undefined). These maps were developed using operational forecasts, existing aircraft flight tracks for the existing runway, and assumed flight tracks for a proposed new runway. Potential noise impacts from additional military operations at KOA were also investigated. Several relevant maps are duplicated in full in Appendix 3 of this EA. Under all scenarios, noise at the project site is modeled to be between 55 and 60 DNL, in other words, well within the acceptable range.

The updated 14 CFR Part 150 NCP for KOA includes measures to abate aircraft noise through pilot education, controlling land development, monitoring the impacts of noise on non-compatible land uses, and implementing and updating the program. As part of the program, DOT seeks to foster coordination between DOT Airports Division, Hawai‘i County, and the State Land Use Commission regarding development, land reclassifications, and rezoning proposals near the airport so that DOT Airports Division can have the opportunity to comment on projects and their potential impact on compatible land use development.

#### *Impacts and Mitigation Measures*

Construction would involve grading, compressors, vehicle and equipment engine operation. These activities may generate noise exceeding 95 decibels at times, potentially impacting nearby noise sensitive receptors at the NELHA Gateway Center. In cases where construction noise is expected to exceed the State Department of Health (DOH) “maximum permissible” property-line noise levels, builders must obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH reviews the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers. WHEA and/or its construction contractor will consult with DOH to determine if a permit will be required and what, if any, noise reduction measures are necessary. WHEA will also coordinate with NELHA to minimize inconvenience to activities occurring at the NELHA Gateway Center.

Operationally, the facility would generate the moderate levels of noise found in public schools with active programs. No noise impacts upon current uses or future uses are expected.

WHEA has considered DOT Airports land use compatibility criteria in its evaluation of the appropriateness of the site. It should be noted that the current WHEA site has noise levels of around 65 DNL, which in the long term may rise. Airport noise at the new location should not be a major impact.

Through the EA process, WHEA is coordinating with DOT-Airports Division and the Hawai‘i County Planning Department to obtain recommendations on the compatibility of the land use and recommendations for measures that might mitigate noise further than those already planned.

### **3.1.6 Air Quality**

#### *Environmental Setting*

Air quality in Hawai‘i is generally good, below criteria levels for most pollutants in most locations at almost all times. While there are no State DOH air monitoring stations in the immediate vicinity of the proposed WHEA facility, air quality in this relatively remote area can be considered to be in compliance with the State’s ambient air quality standards. The nearest DOH monitoring station is at Kealakekua, approximately 15 miles south of Keahole Point. Kealakekua is a more populated area with more motor vehicle traffic but has consistently demonstrated compliance with ambient standards over the years. Air pollution in West Hawai‘i is mainly derived from volcanic emissions of sulfur dioxide, which convert into particulate sulfate and produce a volcanic aerosol haze (vog) that persistently blankets North and South Kona.

#### *Impacts and Mitigation Measures*

Operationally, the project should not have any substantial air quality impacts. The proposed action will not measurably affect air quality except minimally during grubbing, grading and construction. In order to minimize impacts from dust, WHEA and/or its contractor will consult with the Department of Health (DOH) and, if required, will prepare a dust control plan compliant with provisions of Hawai‘i Administrative Rules, Chapter 11-60.1, “Air Pollution Control,” and Section 11-60.1-33, “Fugitive Dust.”

### **3.1.7 Scenic Resources**

#### *Environmental Setting*

The general area around NELHA is a utilitarian landscape devoted to industrial, science and technology and aquaculture uses (see Figure 3). No sites considered significant for their scenic character in the Hawai‘i County General Plan are present nearby. The closest such sites are approximately three miles south at Kaloko Pond and five miles north at Makalawena Beach. While the area is designated for ocean-related industrial operations, a land use where scenic considerations are not paramount, the shoreline areas are scenic and used for public recreation. The project site is located almost a mile from the shoreline in a non-scenic area.

#### *Impacts and Mitigation Measures*

The project will not detract from the scenic values of the area, which are focused on the coast rather than the project site. However, the project facilities are being designed to have visual interest as well be functional for the school (see Site Plan in Figure 4).

### **3.1.8 Hazardous Substances, Toxic Waste and Hazardous Conditions**

#### *Existing Environment*

No systematic assessment of the project site was conducted to determine if hazardous materials, toxic substances or other hazardous conditions are or may have once been present on the site. Reconnaissance of the very open site during topographic, botanical and design surveys did not reveal evidence of such conditions, nor have there been reports of such conditions. Because there is no evidence that the project site has been previously used or developed for any purpose, the potential for use or storage of regulated or hazardous chemicals onsite is low. Based on this, there does not appear at this time to be any outstanding concern related to these issues. If evidence of suspicious materials or conditions appears during excavation or other construction, WHEA may undertake a systematic assessment of the area in question to determine if further evaluation and remediation are required.

#### *Impacts and Mitigation Measure*

The use of the project site for a school does not involve large or reportable quantities of hazardous materials or toxic substances. Small quantities of cleaning and agricultural chemicals will be present. They are relatively low hazard and will not be used or stored in quantities sufficient to trigger government monitoring or reporting.

## **3.2 Socioeconomic and Cultural**

### **3.2.1 Socioeconomic Characteristics and Land Use Compatibility**

The project will serve the public students and parents of Kona and will not involve any effects on population or other socioeconomic factors. The only social consideration has to do with land use compatibility.

As discussed in Section 3.6.2, the project appears to be completely conformant with all land use designations. In relation to the compatibility with other aspects of airport operations, the Federal Aviation Administration (FAA), which must consider the safety of airport operations and users adjacent to the airport, was consulted during early consultation. The FAA noted that airport noise may be an issue, and recommended consultation of Hawai'i DOT noise studies for the airport. As discussed in Section 3.1.6, the school is outside the area with high and unacceptable noise levels. Furthermore, consultation of maps and communications from the FAA indicate that the property is outside the current and future proposed runway protection zone. From current data, it would appear that the project, as with development that lies immediately adjacent, is compatible with airport operations, and that construction of the operation of the school will not pose a hazard to the airport, staff, or the general public. WHEA obtained the FAA Form 7460-1 approval on October 4, 2011, which rendered the determination that the facility does not pose a hazard to aviation.

### 3.2.2 Archaeological Resources

#### *Existing Resources, Impacts and Mitigation*

An archaeological assessment of the project site was performed by Rechtman Consulting. The report is attached in full in Appendix 2 and is summarized in this section.

As a result of an earlier archaeological study of NELHA (Barrera 1985), four sites (SIHP Site 10151, 10152, 10153, and 10158) had been recorded in the general vicinity; no sites were recorded on the project site itself (see Figure 5). Site 10151 was a cluster of three marine shells; Sites 10152 and 10153 were stone cairns; and Site 10158 was a *pāhoehoe* excavation. Rechtman Consulting, LLC also conducted a field inspection (Rechtman 2010) for the nearby Goodfellow Bros. reservoir site and found the area to be void of archaeological resources. On December 13, 2010, Robert B. Rechtman, Ph.D. and J. David Nelson, B.A. conducted a thorough surface examination of the project site. Ground visibility was excellent throughout within only light vegetation of fountain grass and *noni*. The ground surface consists of undulating fractured pahoehoe across most of the lot with the remainder having been completely graded in the past. No archaeological resources were observed and the likelihood of encountering subsurface resources is extremely remote. Based on these negative findings, the archaeologist requested by letter of December 14, 2010, that the State Historic Preservation Division (SHPD) issue a written determination of “no historic properties affected” in accordance with HAR 13§13-284-5(b)1. ~~To date, no response has been received.~~ By letter of July 27, 2011, SHPD concurred with this finding (see Appendix 1b). In the unlikely event that archaeological resources are encountered during subsurface development activities within the current study area, work in the immediate area of the discovery will be halted and SHPD will be contacted.

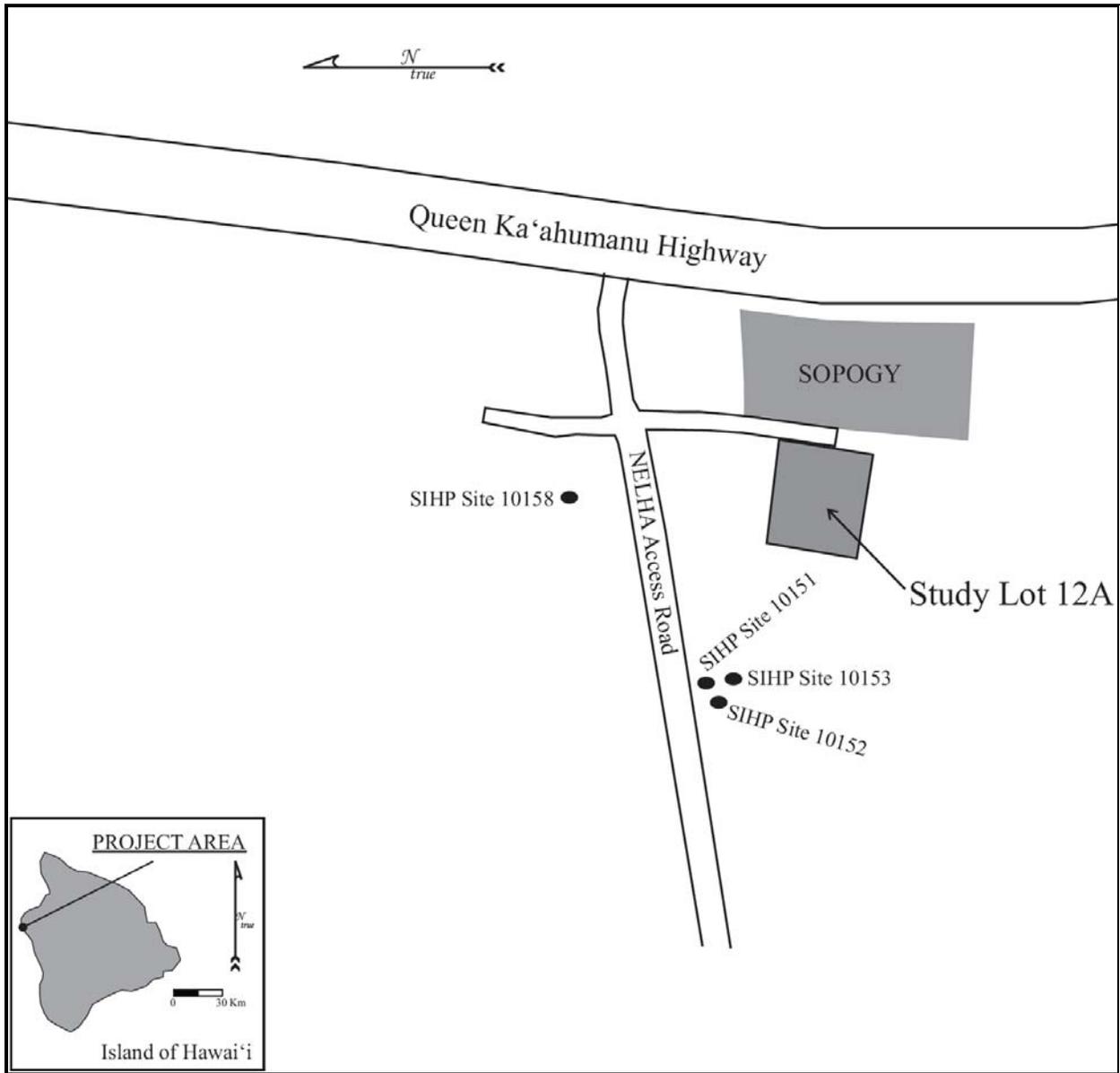
### 3.2.3 Cultural Practices and Sites

The cultural impact assessment contained in this section is based partially on other research performed by the EA author in the Kekaha region of Kona, and also on a document by Hawaiian cultural consultant Lani Kamau Yamasaki prepared as part of a WHEA stakeholder charette from 2011, entitled *The Spirit, Sense and Place of Hawaiian Culture*, which is contained in Appendix 4.

#### *Cultural-Historical Background*

According to the model developed by Kirch (1985), the Settlement or Colonization period of Hawai‘i was between A.D. 300-600, with colonists possibly from the southern Marquesas Islands. Early Hawaiian farmers developed new subsistence strategies during this period, adapting familiar patterns and traditional tools for use in their new environment. Order was kept through adherence to their ancient and ingrained philosophy of life and through the principle of genealogical seniority. Hawaiians brought from their homeland a variety of Polynesian customs including the major gods of Kane, Ku and Lono; the kapu system of law and order; *pu‘uhonua* or places of refuge or asylum; the *‘aumakua* concept of a family or ancestral spirit and the concept of *mana*.

**Figure 5 Archaeological Sites in Vicinity**



The Development Period, which lasted from A.D. 600-1100, brought changes that included an evolution of traditional tools as well as some distinctly Hawaiian inventions. The evolution of the adze was an example of the former, while the latter included the two-piece fishhook and the octopus-lure breadloaf sinker. Another invention was the *lei niho palaoa*, an item worn by those of high rank and symbolized a trend toward greater status differentiation.

The Expansion Period from A.D. 1100 to 1650 saw an increase in social stratification and major socioeconomic changes. It also was a time of expansive settlement, with the development of the most favorable windward areas as well as more marginal areas on the island's leeward side. This was the time of the greatest population growth, as large irrigated field systems were developed and expanded into more arid areas. *Loko* or fishpond aquaculture also flourished during this period, excellent examples of which are contained three miles south of Keahole Point at Kaloko. The second major migration to Hawai'i also occurred during the Expansion Period, with the settlers for this expansion coming from Tahiti in the Society Islands.

The concept of the *ahupua'a* was established in Hawai'i during the 15<sup>th</sup> century, adding a new component to what was already a well-stratified society. *Ahupua'a* were usually wedge or pie-shaped, encompassing all of the eco-zones from the mountains to the sea and extending several hundred yards beyond the shoreline, assuring a diverse subsistence resource base. This land unit became the equivalent of a local community with its own social, economic and political significance.

*Ahupua'a* were ruled by *ali'i 'ai ahupua'a* or lesser chiefs and managed by a *konohiki*. *Ali'i* and *maka'ainana*, or commoners, were not confined to the boundaries of *ahupua'a* as resources were shared when a need was identified. *Ahupua'a* were further divided into smaller sections such as *'ili*, *mo'o'aina*, *pauku'aina*, *kihapai*, *koale*, *hakuone* and *kuakua*. The chiefs of these land units have their allegiance to a territorial chief or *mo'i* (often translated as king).

An increase in war marked the Proto-Historic Period (A.D. 1650-1795), both locally and between islands. Hawai'i's history took a sharp turn on January 18, 1778 with the arrival of British Capt. James Cook in the islands. On a return trip to Hawai'i 10 months later, with the Maui turmoil still raging, Kamehameha visited Cook aboard his ship the *Resolution* off the east coast of Maui and helped Cook navigate his way to Hawai'i Island. Cook exchanged gifts with Kalaniopu'u at Kealakekua Bay the following January, and Cook left Hawai'i in February. However, Cook's ship then sustained damage to a mast in a severe storm off Kohala and returned to Kealakekua, setting the stage for his death on the shores of the bay.

The following year, in 1780, Kalaniopu'u designated his son, Kiwalao, to be his successor, and granted Kamehameha guardianship of the war god Kuka'ilimoku. When it appeared Kiwalao was not honoring his land claims, Kamehameha usurped Kiwalao's authority with a sacrificial ritual and retreated to his district of Kohala where he farmed the land, growing taro and sweet potatoes. Civil war broke out when Kalaniopu'u died in 1782 and Kiwalao was killed. The wars between Maui and Hawai'i Island would continue until 1795.

Two American vessels visited Hawaiian waters in 1790. The crew of one of the ships, the *Eleanor*, massacred more than 100 Hawaiians at Olowalu on Maui, and then sailed to Hawai‘i Island, where one of its crew, John Young, went ashore, where he was detained by Kamehameha. The other vessel, the *Fair American*, was captured off the western coast of Hawai‘i and its entire crew – with the exception of Isaac Davis – was killed. Kamehameha did not take part but kept the *Fair American* as part of his fleet. Young eventually made his way to Hawai‘i Island where he became governor, living at Kawaihae.

By 1796, Kamehameha had conquered every island kingdom except Kauai, but it wasn't until 1810, after Kaumuali‘i of Kauai pledged his allegiance to Kamehameha, that all of the Hawaiian Islands were unified under a single ruler. Subsequently there was a continuation of the trend toward intensification of agriculture, *ali‘i*-controlled aquaculture, settling of upland areas and development of traditional oral history. However, the western influence was being felt in the introduction of trade for profit and a market-system economy. By 1810, the sandalwood trade established by Europeans and Americans twenty years earlier was flourishing. That contributed to the breakdown of the traditional subsistence system, as farmers and fishermen were required to toil at logging, which resulted in food shortages and a decline in population.

Following the death of Kamehameha I in 1819, the relaxing of customary *kapu* took place. But with the introduction of Christianity shortly thereafter, his successor, Kamehameha II, renounced the traditional religion and ordered that *heiau* structures either be destroyed or left to deteriorate. The family worship of *‘aumakua* images was allowed to continue. The Protestant missionaries who arrived from Boston in 1820 soon were rewarded with land and government positions as many of the *ali‘i* were eager to assimilate western-style dress and culture. But at the same time, the continuing sandalwood trade was becoming a heavier burden on commoners. The rampant sandalwood trade resulted in the first Hawaiian national debt, as promissory notes and levies granted by American traders were enforced by American warships. The assimilation of Western ways continued with the short-lived whaling industry to the production of sugarcane, which was more lucrative but carried a heavy environmental price.

The *Mahele ‘Aina* that took place in 1848 placed all land in Hawai‘i into three categories: Crown Lands, Government Lands and Konohiki Lands. Ownership rights were “subject to the rights of the native tenants,” or those individuals who lived on the land and worked it for their subsistence and for their chiefs. This land tenure change, while useful for promoting a western-style economy, led to alienation of many Hawaiians from the land and disrupted the older subsistence economy and culture. By the late 19<sup>th</sup> century, Hawai‘i was no longer an independent kingdom, having been annexed by the United States as part of its imperial expansion in the Pacific.

The next significant change was the development of tourism and the growing influence of the military, leading to urbanization and modernization in a multi-ethnic society that had been created by the immigration of sugar cane laborers. For rural areas of Hawai‘i such as Kona, the first half of the 20th century years saw less urbanization and instead was dominated by agriculture, cattle ranching, and the initial phases of tourism. Just as native Hawaiian cultural practices became severely threatened by encroaching land use and loss of the language and culture, the native Hawaiian renaissance from the 1970s onward re-energized the culture.

## *Kalaoa and Kekaha*

The project site is located in the *ahupua'a* of Kalaoa in the district of North Kona. The cultural context of Kalaoa owes much to its place within northernmost portion of North Kona, called “Kekaha”, a term used to describe an arid coastal region. Native residents of the region affectionately referred to their home as Kekaha-wai-‘ole o nā Kona (“Waterless Kekaha of the Kona district”), or simply as the *‘āina kaha*. Kepā Maly conducted a study of the lands of Honokōhau in 2000. His report is an excellent source of cultural information for all lands in Kekaha. The study used both archival-historical research and oral history interviews with descendants of the native Hawaiian families and others who were known to be familiar with the natural and cultural landscape and history of land use in Honokōhau and the Kekaha region.

Kona was apparently first settled along the sheltered and watered bays in the region extending south from Kailua. As population increased, people began establishing permanent settlements in arid Kekaha. Kona, like other large districts on Hawai‘i, was divided into *‘okana* or *kalana* (ancient regions). In the region now known as Kona ‘Akau (North Kona), there are several *kalana*. The southern portion of North Kona was known as “Kona kai ‘ōpua” (interpretively translated by Maly as “Kona of the distant horizon clouds above the ocean”), and included the area extending from Lanihau (the present-day vicinity of Kailua Town) to Pu‘uohau. The inhabitants of Kekaha developed unique relationships of harmony with their delicate environment, scarce in fresh water but rich in marine resources. They built extensive fishponds at ‘Aimakapā and ‘Ai‘ōpio, practiced salt making in various locations, carefully nurtured *mauka* agricultural field systems, and gathered diverse forest and mountain resources. A number of *wahi pana* or storied places associated with history and legend are present, and there are also *heiau* and other features that have vital functions in symbolizing and enabling the relationship among the Hawaiian people, resources, and spiritual activities.

As with many other regions of rural Hawaii, the cumulative effects of cultural change, market economies, the attractions of larger towns such as Honolulu and Lahaina and the wider world, and the scourge of Western diseases served to depopulate Kekaha. By the time of the *Māhele*, Kalaoa was divided into five *ahupua'a*, Kalaoa 1st through 5th. All five of the Kalaoa *ahupua'a* were retained as Government lands. No *kuleana* (plots claimed by commoners or *maka ‘ainana* for residence or farming) were claimed in the Keahole Point area.

In 1924 J.W.H.I. Kihe wrote that about 1870 there were many inhabitants and several schools at Kiholo, Makalawena, Kalaoa and Kaloko, but that “those families are all gone, and the land is quiet.” A survey by archaeologist John Reinecke for Bishop Museum also found the shoreline along Kekaha had historically been a desirable place to live when fishing was a mainstay of the region. However, by the time Reinecke carried out his survey in 1930, the population along the coast from Kailua to Kawaihae had dwindled to less than 75. He also found a paucity of archaeological sites, which he attributed to several factors, including destruction by man, cattle, and storms that swept over the low-lying coast. Cattle ranching, which began in the mid-1800s, changed traditional agricultural practices and necessitated construction of rock walls to control the movement of livestock. Even the arid district of Kekaha was heavily grazed.

At least two trails of regional importance passed through the lands of Kalaoa including the *alaloa*, parts of which were later modified beginning in the 1840s into what is now known as the *Alanui Aupuni* (Government Road) or Mamalahoa Trail or King's Highway. The trail crossed the *makai* lands to link royal centers and coastal communities and remained in use in some form through the 1970s. Remnants of the trail are present about 1,000 feet *makai* of the WHEA project site (see Figure 1). It was not until the Queen Ka'ahumanu Highway was opened in the early 1970s that travel for the general public was possible across the shoreward plains of much of Kekaha.

Twentieth century trends in Kona paralleled those in other districts of Hawai'i, but its rural nature insulated it to some degree from severe change at first. Cattle ranching and coffee farming remained important. Tourism developed only slowly in Kona, with the first major hotel, the Kona Inn, not being built until 1928. Starting in the 1960s, the area between Kailua-Kona and Keauhou became increasingly dedicated to resort residential land use, while Kekaha for many decades had only one hotel, the Kona Village. Despite this, Kekaha became intimately involved in tourism with the development of the Kona International Airport (to replace the small airport just north of Kailua) along with construction of the Queen Ka'ahumanu Highway, which provided a *makai* link between the resort areas of Kona and Kohala.

As the 20<sup>th</sup> century wore on, the isolated beaches of Kekaha that were formerly enjoyed only by Hawaiian families and ranchers (whose members frequently overlapped) were converted to easily accessible public parks and the "backyards" of hotels and resort residential housing. Nevertheless, even in this somewhat challenging and transformed environment, native Hawaiians continue their cultural practices, in the form of fishing, gathering, and ceremonial uses. The importance of perpetuating access for these practices and the rights of native Hawaiians to continue them have been affirmed in several Hawai'i Supreme Court decisions involving land use in Kona.

#### *Cultural Resources and Practices Related to West Hawai'i Explorations Academy*

West Hawai'i Explorations Academy's situation on Hawaiian ceded lands in the *pāhoehoe* fields within the *ahupua'a* of Kalaoa, in the arid land known as Kekaha, informs its school philosophy. *Mauka* of WHEA lies the *Wao Akua*, realm of the gods and home to O'oma's fragile native forest. Sheltered from trade winds by Mauna Loa, Mauna Kea and Hualalai nearby, Keahole Point, otherwise known as Ka-Lae-O-Keahole (Fisherman's Point), is known for the strong sea breeze from the south named *Eka* and its strong ocean current. Neighboring "landmarks" include Wawaloli Beach and Pine Trees – a popular surf spot. The blossom of the native *maiapilo* is WHEA's school flower, chosen for its grace, beauty, strength, adaptability, and resilience to thrive in harsh conditions.

Those participating in a charette for WHEA in February 2010 (see Appendix 4) expressed that the school reflects the *maiapilo* in myriad ways. This theme of reflection was repeated throughout the charrette and alludes to the relationship between the school, its objectives, educational framework and approach to learning, and the Hawaiian values, ideals and observed structures inherent in the total environmental and social context the school resides within.

Hawaiian culture has a central place in WHEA life. This is especially relevant within the school's place-based, project-based curriculum, as noted through the values and belief systems expressed and demonstrated by students, their parents, faculty, spouses of faculty, grandparents of students, *kupuna* or elders, board members and other key stakeholders throughout the charrette. In a regularly practiced and integrated way, these Hawaiian values and practices such as *aloha*, *'ohana*, *lokahi*, *kuhao*, *laulima*, *kokua*, *ho'okipa*, *na'auao*, *malama aina*, *aloha kai*<sup>2</sup> have allowed WHEA to flourish under seemingly adverse conditions, and like the *maiapilo*, go beyond mere survival to ultimately thrive interdependently within its chosen environment with grace and robustness.

In the view of charette participants, as detailed in Appendix 4, WHEA exemplifies Hawaiian values and principles best through their actions. They stated that the economy valued by Hawaiians in words and actions are demonstrated in the planning, design and building of the school's new campus, including the selection of building materials, which will be derived as much as possible from materials of the Hawaiian 'aina that are sustainably harvested or produced. WHEA also strives to follow the basic elements of indigenous community-based economic development, focusing on creating sustained abundance, self-sufficiency and wellness through *malama 'aina* – caring for the land and sea in an enlightened way. *Malama 'aina* embraces in many ways the core values and principles expressed by WHEA that are associated with indigenous economic development including environmental balance, cultural integrity, spirituality, vision, personal efficacy, responsibilities and consequences, vibrant initiatives, social respect, political and civic participation, control of assets, kinship, productivity, skills, health and wellness, trade and exchange, and income.

WHEA's new master plan and campus design are based upon the values, principles, beliefs and some of the traditional ecological knowledge and practices associated with life within an *ahupua'a*. This is reflected in their project-based curriculum, e.g., food gardens, medicinal gardens, *he'e* or squid tank, *mano* or shark tank, and *opihiki* tank. By definition, the *ahupua'a* is a land division usually extending from the uplands to the sea, so called because the boundary was marked by an *ahu* (alter) of stones surmounted by an image of a *pua'a* (pig). The *pua'a* represents *Lono*, the Hawaiian god of agriculture, fertility and healing. *Lono* is manifest at WHEA in his various *kino lau* or forms such as the *kukui* tree (representing the earth) and the *humuhumunukunukuapuaa* (representing the sea), illustrating the school's belief, "As above, so below." This Hawaiian belief is also found throughout many ancient world civilizations and reflects WHEA's recognition of the relationship between the earth, the sea and the sky.

Stakeholders in the charette identified five Hawaiian values and principles exemplified through the *ahupua'a* model as key to implement within WHEA's new master plan and campus design: 1) sustained and renewable resources; 2) self-sufficiency; 3) interdependence; 4) reciprocity; and 5) resilience. These values and principles were recognized as vital to insure WHEA's overall

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<sup>2</sup> *aloha* (love, charity), *'ohana* (family), *lokahi* (unity), *kuhao* (self-reliance), *laulima* (cooperation), *kokua* (service, help), *ho'okipa* (hospitality), *na'auao* (learned, enlightened), *aloha kai* (love and care for the sea).

well-being, productivity, longevity and positive orientation towards the future, including upholding their *kuleana* throughout the ahupua‘a, Hawai‘i Island, Hawai‘i Nei and their global community. In essence, these five values and principles can be described as *lokahi*. Within the traditional *ahupua‘a* system, employing the spiritual values and practices associated with *malama ‘aina* and *lokahi* were essential in traditional resource management practices to maintain a healthy ecological balance within the ‘*aina* – which includes the land, sea and sky. In turn, the *ahupua‘a* supplied all of the everyday household needs required in creating a vibrant social and economic environment for communities to thrive in an on-going closed sustainable system. By emulating the *ahupua‘a model*, WHEA feels they will eventually achieve self-sufficiency. Additional information on WHEA’s culturally-based philosophy and guiding principles can be found in Appendix 4.

### *Impacts and Mitigation Measures*

The valued natural, cultural and historical resources still present in Kekaha, including Kalaoa and the project site, will be honored and utilized by the West Hawai‘i Explorations Academy, which represents a significant cultural benefit. No adverse impacts have been identified. No caves, springs, *pu‘u*, gathering resources, archaeological sites, burial sites for *‘iwi kupuna* or other features that might be adversely affected are present on or near the project site. The rare plant *maiapilo* (*Capparis sandwichiana*), used in traditional Hawaiian medicine, is present in and surrounding the project site. Construction will salvage plants to the extent feasible and will incorporate existing individuals and/or plant *maiapilo* and other native Hawaiian plants in the facility landscaping. Continued traditional use of wild *maiapilo* can occur through plants surrounding the project site.

The Office of Hawaiian Affairs in Honolulu and West Hawai‘i and the Kona Hawaiian Civic Club were consulted by letter on October 26, 2010, to determine whether they had any information or comments concerning resources or practices. Response letters to date have not indicated any specific resources or practices. The Office of Hawaiian Affairs was supplied a copy of the Draft EA for its comment on these findings, and to date has not commented.

## **3.3 Infrastructure**

### **3.3.1 Utilities and Public Services**

#### *Existing Facilities and Services,*

Electrical power to WHEA facility would be supplied by Hawai‘i Electric Light Company (HELCO via a line on the NELHA Access Road. Telephone and data service are available from both Oceanic Cable and Hawaiian Telephone. No sanitary sewer system or other wastewater treatment is available on or near the project site. Potable water service is available via at the existing 8-inch water line along the NELHA Access Road. The existing average daily consumption at the present campus is 3,500 gpd. WHEA proposes to install a similar size 1 ½” meter at the new campus and expects a similar demand during the first phase. At full build out the school’s engineers estimate the average daily demands including irrigation at 6,650 gpd.

WHEA is working with DWS to determine any requirements necessary for school expansion (see Appendix 1b for letters).

Fire, police and emergency management services are readily available in this part of Kona. A police substation is located in Kealakehe, about five road miles away. A fire station is located on Palani Road, approximately seven miles away by road, and there is also a fire station at Kona International Airport, just north of NELHA. EMT services are provided by the Hawai'i County Fire Department. Acute care services are available at Kona Hospital, 15 miles to the south.

### *Impacts and Mitigation Measures*

Electricity and telephone/data service will be installed in underground lines via a trench from Secondary Road A. NELHA-supplied cold seawater will be provided via underground water lines installed from the NELHA Access Road. Potable water will be supplied from the existing 8-inch line. The system supplies adequate fire flow for the school.

An Individual Wastewater System (IWS) will be installed for human wastewater. As discussed above in Section 3.1.3 in the context of wastewater, conceptual plans allocate space on the site for future additional treatment with constructed wetlands and disinfection to allow wastewater re-use. Solid waste from the facility will be dealt with through the existing proactive school recycling policy. Disposal of residual waste will be by a commercial refuse company. Solid waste generated during construction will be dealt with appropriately. A solid waste management plan is in development for review by the County Department of Environmental Management.

### **3.3.2 Traffic**

#### *Introduction*

As explained in the *2000 Highway Capacity Manual* (Institute of Transportation Engineers 2000), the concept of level-of-service (LOS) is often used to describe the quality of traffic flow. There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. LOS D is typically considered acceptable for peak hour conditions in urban areas. LOS is usually applied to peak hour traffic, which is the “worst-case” scenario.

NELHA commissioned a traffic study (PB Americas 2011) that included analysis of the performance of the NELHA intersections with Queen Ka‘ahumanu Highway. This analysis was within the context of expanded operations at NELHA and a widened Queen Ka‘ahumanu Highway that would have limited access beginning in about 2015 at the current NELHA Access Road, along with a new intersection at Kaiminani Street that would provide full movements into NELHA (see Fig. 1 for intersection locations and App. 5 for detailed diagrams of intersections).

The traffic study considered traffic associated with existing and future cultural/educational facilities at NELHA (such as WHEA) in the traffic projections. The study concluded that the

Queen Ka‘ahumanu Highway intersections serving NELHA, including the intersections of Queen Ka‘ahumanu Highway with the NELHA Access Road and the current and future configurations of Kaiminani Street, would operate at Level of Service D or better in 2015, the minimum acceptable level. Future regional roadway improvements associated with nearby land uses would likely improve circulation, but the overall growth in traffic would keep LOS at nearly the same levels for NELHA intersections.

Research conducted for this EA included analysis of the principal internal intersection in NELHA that could possibly be affected by the school relocation: NELHA Access Road with Secondary Road A (see Figure 1). In order to quantify and describe the traffic-related characteristics and determine if traffic operations on the NELHA Access Road would be impacted, Phillip Rowell Associates prepared a Traffic Impact Assessment (TIAR). The full report is contained in Appendix 5 and summarized below.

### *Existing and Proposed Facilities*

The project site is located on a road currently referred to as Secondary Road A, which intersects the NELHA Access Road, which in turn intersects Queen Ka‘ahumanu Highway (see Figure 1). This provides the only access to the relocated school site. Currently, all traffic movements at the intersection of the NELHA Access Road and Queen Ka‘ahumanu Highway are allowed.

As mentioned above, the State Department of Transportation has a project to widen Queen Ka‘ahumanu Highway that is scheduled for completion in 2015. When complete, the intersection of the NELHA Access Road and Queen Ka‘ahumanu Highway will be limited to right turns into and right turns out of the NELHA Access Road. Left turns in and out will be required to utilize a reconstructed four-way intersection to the north at Kaiminani Street, which is illustrated in Attachment B of Appendix 5. Therefore, traffic to the school from the south on Queen Ka‘ahumanu Highway or away from the school towards the north from the NELHA Access Road will use the intersection of Queen Ka‘ahumanu Highway at Kaiminani Drive.

### *Impacts and Mitigation*

Under the assumptions listed above, the intersection of Secondary Road A and the NELHA Access Road was analyzed in the TIAR. The TIAR undertook a number of procedural steps, including estimating the number of peak hour trips that the school would generate according to methodology and data from the Institute of Transportation Engineers (“Trip Generation Handbook,” 1998; “Trip Generation,” 2003). The morning peak hour of project-generated traffic typically coincides with the peak hour of the adjacent street. The afternoon peak hour of the project is around 2:30 PM, which is earlier than the afternoon peak hour of the street. As shown, the school would generate 141 trips during the morning peak hour, 86 inbound and 55 outbound. During the afternoon peak hour, it would generate 87 inbound and 33 outbound trips, for a total of 120 trips.

Existing peak hour traffic volumes for the intersection of Queen Ka‘ahumanu Highway at Kaiminani Drive and Queen Ka‘ahumanu Highway at the NELHA Access Road were obtained

from the NELHA traffic study (PB Americas 2011) (See Attachment C of Appendix 5). Existing traffic operating conditions of the study intersections were determined using the methodology described in the *2000 Highway Capacity Manual* (Institute of Transportation Engineers 2000). This included analysis of level-of-service (LOS). Appendix 5 contains tables and maps that display these volumes and levels-of-service for each intersection.

The next step was to estimate the background traffic (future traffic conditions without the proposed project) at the year 2015. The estimated 2015 background traffic projections for 2015 were obtained from the NELHA traffic study. These projections include background growth, traffic generated by future development and roadway improvement projects, including estimated traffic generated by future NELHA development. The results are shown in Appendix 5.

The project-related traffic was then superimposed on background traffic volumes. The traffic impacts of the project were assessed by analyzing the future levels-of-service with and without project-generated traffic. The purpose of this analysis was to identify potential operational deficiencies in the project area and to quantify changes in the intersection levels-of-service as a result of project generated traffic.

The principal conclusions of the traffic impact assessment were that all internal roadways at NELHA carrying school traffic would operate at acceptable levels-of-service. The level-of-service analysis determined that the traffic movements of the intersection of the NELHA Access Road at Secondary Road A would operate at LOS A, which implies minimal delays and good operating conditions. An assessment of the need for a separate left turn lane for vehicles turning left into the project from the NELHA Access Road determined that established guidelines for the need are not satisfied for either morning or afternoon peak hour conditions, and that a separate left-turn lane is not required. As all controlled traffic movements would operate at LOS A, no specific mitigation for effects to traffic operation is recommended.

Additional details concerning traffic and roadways may be found in Appendix 5.

### **3.4 Secondary and Cumulative Impacts**

The proposed project is minor and does not appear to have the potential to involve any secondary impacts, such as population changes or effects on public facilities.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts. The adverse effects of the project are very limited in severity, nature and geographic scale. At the current time there appear to be very few roadway, utility or development projects being undertaken in the NELHA area that would combine in such a way as to produce adverse cumulative effects related to the construction phase, such as dust, water quality, or traffic congestion.

Approval for the proposed multiple-use O‘oma Beachside Village, which lies directly to the south and for which a number of studies were prepared during 2008-2010, has been denied by the State Land Use Commission and the project does not appear likely to proceed. Various

projects to expand and improve the Kona International Airport are likely to occur over the next few years, but none would interact in any substantial way with the school (see discussion on the special case of noise in 3.1.5, above). Further improvement to the Queen Ka‘ahumanu Highway (State Highway 19) will also be undertaken over the next 10 years, but again, these would not interact in any substantial way with the proposed facility other than traffic, which is considered above in Section 3.3.2. Additional facilities at NELHA are also anticipated, including the construction of a Monk Seal Rehabilitation Facility, but even if several projects occur at once, the relatively minor scale of the projects and the spacing of lots within NELHA would prevent adverse affects from accumulating.

### **3.5 Required Permits and Approvals**

The project requires granting the following permits and approvals, which are listed by responsible agency:

- County of Hawai‘i, Department of Public Works, Building Division Approval and Building Permit
- County of Hawai‘i, Department of Public Works, Engineering Division, Grading Permit
- County of Hawai‘i, Planning Department Plan Approval (obtained)
- County of Hawai‘i, Special Management Area Permit (obtained through prior approval)
- State Department of Health, National Pollutant Discharge Elimination System Permit
- State Department of Health, Individual Wastewater System Approval
- State Historic Preservation Division, Chapter 6e Historic Sites Clearance (obtained)
- Federal Aviation Administration, Aeronautical Study Clearance (obtained)

### **3.6 Consistency with Government Plans and Policies**

#### **3.6.1 Hawai‘i State Plan and Hawai‘i State Land Use Law**

Adopted in 1978 and last revised in 1991 (Hawai‘i Revised Statutes, Chapter 226, as amended), the Plan establishes a set of themes, goals, objectives and policies that are meant to guide the State’s long-run growth and development activities. The three themes that express the basic purpose of the *Hawai‘i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. The proposed facility would improve community well-being by providing a location for an successful public charter school.

Chapter 205 Hawai‘i Revised Statutes classifies all land in the State of Hawai‘i into one of four land use categories – Urban, Rural, Agricultural, or Conservation – and determines permissible uses in each district. The project site is in the State Land Use Urban District. The proposed use is consistent with intended uses for this land use district.

### 3.6.2 Hawai'i County Zoning, General Plan and Special Management Area

The project site is zoned MG-3a, General Industrial. The project site is also within the Special Management Area of the Hawai'i Coastal Zone. According to a letter from the Hawai'i County Planning Department in response to early consultation (see Appendix 1a), the project would require a Special Management Area Permit. Per a letter of June 16, 2004, which allowed the original establishment of WHEA within NELHA (see end of Appendix 1a), the Planning Director has previously determined that the project was consistent with its designated zoning. Furthermore, the Director determined that the school was previously permitted through uses approved in Special Management Area Permit No. 239.

The *General Plan* for the County of Hawai'i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The plan was adopted by ordinance in 1989 and revised in 2005 (Hawai'i County Planning Department). The *General Plan* itself is organized into thirteen functional elements. In general, the proposed project would be consistent with the goals, policies and objectives, standards, and principles for several functional areas. This section addresses the consistency of the proposed action with relevant policies of the County.

#### **Environmental Quality Goals:**

- Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
- Maintain and, if feasible, improve the existing environmental quality of the island.
- Control pollution.

#### **Environmental Quality Policies:**

- Take positive action to further maintain the quality of the environment.

**Discussion:** The school would incorporate measures to prevent pollution and promote conservation and has as part of its mission environmental education and stewardship.

#### **Historic Sites Goals:**

- Protect and enhance the sites, buildings and objects of significant historical and cultural importance to Hawai'i. Access to significant historic sites, buildings and objects of public interest should be made available.

**Discussion:** No archaeological sites are present on the property and none will be affected.

### **Natural Beauty Goals:**

- Protect scenic vistas and view planes from becoming obstructed. Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

### **Natural Beauty Policies:**

- Increase public pedestrian access opportunities to scenic places and vistas.

**Discussion:** The proposed facility would not degrade the scenic environment of the area or inhibit public pedestrian access.

### **Land Use Goals:**

- Designate and allocate land uses in appropriate proportions and mix and in keeping with the social, cultural, and physical environments of the County.
- Protect and preserve forest, water, natural and scientific reserves and open areas.

### **Land Use Standards**

- The designated land uses will be delineated on the General Plan Land Use Pattern Allocation Guide Map. The broad-brush boundaries indicated are graphic expressions of the General Plan policies, particularly those relating to land uses. They are long-range guides to general location and will be subject to: a) existing zoning; and b) State Land Use District. Similarly, the acreages allocated represent alternatives for the various levels of economic activity and supporting functions, such as resort, residential, commercial and industrial activities. Land required for community and governmental services and programs as well as new towns and resort centers may be accommodated within the allocated acreages.

**Discussion:** The *Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) and Facilities Map* components of the *General Plan* are graphic representations of the Plan's goals, policies, and standards as well as of the physical relationship between land uses. They also establish the basic urban and non-urban form for areas and the planned public and cultural facilities, public utilities and safety features, and transportation corridors. The project site is classified as Industrial in the LUPAG. As discussed above in this section, the school has been found to be consistent with this designation. The proposed facility would be conveniently located with respect to utilities, public services and access.

### **3.6.3 Kona Community Development Plan**

The Kona Community Development Plan (CDP) encompasses the judicial district of North and South Kona, and was developed under the framework of the February 2005 County of Hawai'i General Plan. Community Development Plans are intended to translate broad General Plan

Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for community input into land-use, delivery of government services and any other matters relating to the planning area.

The General Plan now requires that a Community Development Plan shall be adopted by the County Council as an “ordinance,” giving the CDP the force of law. This is in contrast to plans created over past years, adopted by “resolution” that served only as guidelines or reference documents to decision-makers. The Kona CDP was adopted in September 2008 by the County Council. The version referenced in this Environmental Assessment is at:

[http://www.hcrc.info/community-planning/north-and-south-kona-cdp/cdp-final-drafts/Final%20KCDP\\_Sept%202008\\_text.pdf](http://www.hcrc.info/community-planning/north-and-south-kona-cdp/cdp-final-drafts/Final%20KCDP_Sept%202008_text.pdf)

The Plan has many elements and wide-ranging implications, but there are several major strategies that embody the guiding principles related to the economy, energy, environmental quality, flooding and other natural hazards, historic sites, natural beauty, natural resources and shoreline, housing, public facilities, public utilities, recreation, transportation and land use. The West Hawai‘i Explorations Academy is generally consistent with all aspects of the Kona CDP. It is in keeping with the Plan’s guiding principles in Chapter 3, including particularly item No. 6:

**Provide infrastructure and essential facilities concurrent with growth.**

Through education of Kona’s children in sustainable economic activities, it also conforms with item No. 7:

**Encourage a diverse and vibrant economy emphasizing agriculture and sustainable economies.**

The West Hawai‘i Explorations Academy’s curriculum supports education through the interaction with nature, an aspect of sustainability specifically discussed in the Vision Statement section of the Plan in Item 3.3.2 (2).

Furthermore, Economic Policy 1.3 supports commercial development of the mauka NELHA area by businesses incubated at the NELHA’s research area.

**Action ECON–1.3b: Develop a master plan for the commercial development of the mauka area of NELHA and obtain entitlements (DBEDT, NELHA, 1-2).**

**3.6.4 Consistency with HRS Chapter 227-D**

HRS Chapter 227D states the following:

**“§227D-2 Establishment of the natural energy laboratory of Hawaii authority; purpose.** (a) There is established the natural energy laboratory of Hawaii authority, which shall be a body corporate and politic and an instrumentality and agency of the State. The

authority shall be placed within the department of business, economic development, and tourism for administrative purposes, pursuant to section 26-35. The purpose of the natural energy laboratory of Hawaii authority shall be to facilitate research, development, and commercialization of natural energy resources and ocean-related research, technology, and industry in Hawaii and to engage in retail, commercial, or tourism activities that will financially support that research, development, and commercialization at a research and technology park in Hawaii. Its duties shall include:

- 1) Establishing, managing, and operating facilities that provide sites for:
  - (A) Research and development;
  - (B) Commercial projects and businesses utilizing natural resources, such as ocean water or geothermal energy;
  - (C) Compatible businesses engaged in scientific and technological investigations, or retail, commercial, and tourism activities; and
  - (D) Businesses or educational facilities that support the primary projects and activities...

In that the West Hawai‘i Explorations Academy supports research and development of natural energy resources and ocean-related research, technology, and industry in Hawaii, it is a legal and suitable tenant of NELHA with an existing and approved sub-lease.

#### **PART 4: DETERMINATION**

Based on the findings below, and upon consideration of comments to the Draft EA, the Natural Energy Laboratory of Hawaii Authority has determined that the Proposed Action will not significantly alter the environment, as impacts will be minimal, and has therefore issued a Finding of No Significant Impact (FONSI).

#### **PART 5: FINDINGS AND REASONS**

Chapter 11-200-12, Hawai‘i Administrative Rules, outlines those factors agencies must consider when determining whether an Action has significant effects:

1. *The proposed project will not involve an irrevocable commitment or loss or destruction of any natural or cultural resources.* No valuable natural or cultural resources would be committed or lost. Archaeological sites have been inventoried, and no significant resources are present
2. *The proposed project will not curtail the range of beneficial uses of the environment.* The proposed project expands and in no way curtails beneficial uses of the environment.
3. *The proposed project will not conflict with the State's long-term environmental policies.* The State’s long-term environmental policies are set forth in Chapter 344, HRS. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The project is minor and fulfills aspects of these policies calling for an improved environment. It is thus consistent with all elements of the State’s long-term environmental policies.

4. *The proposed project will not substantially affect the economic or social welfare of the community or State.* The project will not adversely affect the social welfare of the community and will contribute to education and social welfare.
5. *The proposed project does not substantially affect public health in any detrimental way.* The project will not affect public health in any way; wastewater and stormwater will be appropriately treated. Noise has been taken into careful consideration in project siting and design.
6. *The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities.* No adverse secondary effects are expected to result from the project.
7. *The proposed project will not involve a substantial degradation of environmental quality.* The project is minor, and would thus not contribute to environmental degradation.
8. *The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat.* A few individuals of the relatively rare plant *maiapilo* are present on and surrounding the site. *Maiapilo* will be preserved or salvaged where feasible and used or re-introduced for landscaping, along with other native plants.
9. *The proposed project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions.* The project is not related to other activities in the region in such a way as to produce adverse cumulative effects or involve a commitment for larger actions.
10. *The proposed project will not detrimentally affect air or water quality or ambient noise levels.* No adverse effects on air quality or noise would occur. Noise levels on the site are acceptable and far lower than those found on the current site, which is one of the reasons for the relocation.
11. *The project does not affect nor would it likely to be damaged as a result of being located in environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal area.* Although the property is located in an area with volcanic and seismic risk, the entire Island of Hawai‘i shares this risk, and the project is not imprudent to construct. The property is almost a mile from the shoreline and outside any flood zone.
12. *The project will not substantially affect scenic vistas and viewplanes identified in county or state plans or studies.* No scenic vistas and viewplanes identified in the Hawai‘i County General Plan will be adversely affected by the project.
13. *The project will not require substantial energy consumption.* The school will have solar hot water, a 10 kW photovoltaic system, an emphasis on xerophytic vegetation, and many other environmentally advanced features that both reduce energy use and serve for education in high technology, energy and environmental engineering, including alternative wastewater treatment technologies.

## REFERENCES

- Barrera, W. 1985. *Ke-ahole Point, Hawaii: Archaeological Reconnaissance*. Chiniago Inc., Honolulu.
- Gagne, W., and L. Cuddihy. 1990. "Vegetation," pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawai'i*. 2 vols. Honolulu: University of Hawai'i Press.
- Geometrician Associates (Ron Terry, Ph.D. and Patrick J. Hart, Ph.D.). 2006. *Botanical Survey, TMKs 7-3-09:04 and 22, O'oma, North Kona, Island of Hawai'i*. Prepared for PBR Hawaii
- Hawai'i County Planning Department. 2005. *The General Plan, County of Hawai'i*. Hilo.
- Hawai'i State High Technology Development Corporation (HTCD). 1985. *Final Environmental Impact Statement, Development Plan for the Hawaii Ocean Science and Technology Park and Expansion of the Natural Energy Laboratory of Hawaii, Keahole, North Kona, Hawaii*.
- Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawai'i*. Washington: U.S. GPO.
- I'i, J.P. 1959. *Fragments of Hawaiian History*. Honolulu: Bishop Museum Press.
- Kihe, J.W.H.I. 1924. *Ka Hōkū o Hawai'i*.
- Kirch, P. 1985. *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. Honolulu: University of Hawai'i Press.
- Maly, K. 2000. *Nā Honokōhau: Nā Hono I Nā Hau 'Elua (Honokōhau: Bays of the Two Wind-born Dews)* 2 Vols. Hilo: Kumu Pono Associates.
- Natural Energy Laboratory of Hawai'i (NELHA). 1987. *Final Environmental Impact Statement, Alternative Methods of Seawater Return Flow Disposal, Keahole, North Kona, Hawaii*.
- \_\_\_\_\_. 1992. *Final Environmental Impact Statement, Development of Land Exchange Parcel, Natural Energy Laboratory of Hawaii*. Prep. by GK & Associates for NELHA.
- PB Americas. 2011. *Traffic Study, Natural Energy Laboratory of Hawaii Authority*. Honolulu.
- PBR Hawaii. 2009. *O'oma Beachside Village Final Environmental Impact Statement*. Honolulu.
- Rechtman, R. 2010. *Letter Report dated September 3, 2010 submitted to DLNR-SHPD for Lot 11A in the HOST Park at NELHA*. Rechtman Consulting Report RC-0704. Prepared for Goodfellow Bros., Inc.

Reinecke, J. n.d. *Survey of Hawaiian Sites, 1929-1930*. Manuscript in Department of Anthropology, B.P. Bishop Museum, Honolulu.

Research Corporation of the University of Hawai‘i. 1976. *Environmental Impact Statement for the Natural Energy Laboratory of Hawaii at Keahole Point, Hawaii (Phase I)*. Prep. by R.M. Towill Corp. for RCUH.

U.S. Dept. of Commerce, Bureau of the Census. 2011. <http://factfinder.census.gov/>.

U.S. Soil Conservation Service. 1973. *Soil Survey of Island of Hawai‘i, State of Hawai‘i*. Washington: U.S.D.A. Soil Conservation Service.

University of Hawai‘i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai‘i*. 3rd ed. Honolulu: University of Hawai‘i Press.

U.S. Environmental Protection Agency (EPA). 2000. *National Water Quality Inventory Report to Congress*. 2000, EPA. p. 100-101: Chapter 10: “State and Territory Summaries: Hawaii.”

U.S. Fish and Wildlife Service (USFWS). 2011. *USFWS Threatened and Endangered Species System (TESS)*. Washington: GPO. [http://ecos.fws.gov/tess\\_public/StartTESS.do](http://ecos.fws.gov/tess_public/StartTESS.do)

Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai‘i*. USGS Misc. Investigations Series Map i-2524-A. Washington, D.C.: U.S. Geological Survey.

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# **ENVIRONMENTAL ASSESSMENT**

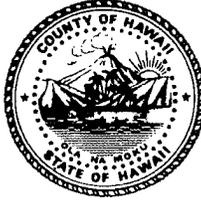
## **West Hawai‘i Explorations Academy Relocation**

### **APPENDIX 1a**

#### **Comments in Response to Pre-Consultation and 2004 Planning Letter**

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William P. Kenoi  
Mayor



BJ Leithead Todd  
Director

Margaret K. Masunaga  
Deputy

## County of Hawai'i

### PLANNING DEPARTMENT

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawai'i 96720  
Phone (808) 961-8288 • Fax (808) 961-8742

May 12, 2011

Mr. Ron Terry  
Geometrician Associates, LLC  
PO Box 396  
Hilo, HI 96721

Dear Mr. Terry:

**SUBJECT: Early Consultation for Draft Environmental Assessment**  
**Project: Relocation/ Expansion of West Hawai'i Explorations Academy (WHEA)**  
**TMK: (3) 7-3-043:083 and 089; North Kona, Hawai'i**

Thank you for your letter dated April 26, 2011 requesting comments from this office regarding the preparation of a Draft Environmental Assessment (DEA). WHEA is proposing the relocation of the WHEA campus and eventual expansion from 195 to 300 students. The campus would include an administration building, a high school village, a middle school village, an outdoor amphitheater, a multi-purpose room, and a kitchen building. The site would also include a number of labs, a STEM learning center/ shop, covered outdoor spaces and other facilities for agriculture, aquaculture, marine science student projects and court sports.

The project site is proposed for a 5.083 acre property within portions of the subject parcels, which is under the control of the Natural Energy Laboratory of Hawai'i Authority (NELHA). The project area is zoned MG-3a (General Industrial - 3 acre minimum lot size). The project site is situated within the State Land Use Urban district and designated as Industrial by the Land Use Pattern Allocation Guide (LUPAG).

The project site is also located entirely within the Special Management Area (SMA). According to Hawai'i Revised Statutes (HRS) Chapter 205A-22 and Planning Commission (PC) Rule 9-4(e) (1) (A) and (E), "development" includes *Placement or erection of any solid material or any gaseous, liquid, solid, or thermal waste and Construction, reconstruction, demolition, or alteration of the size of any structure.* Therefore, the proposed project requires either a Special Management Area Minor Permit or a Special Management Area (Major) Use Permit.

Mr. Ron Terry  
Geometrician Associates, LLC  
May 12, 2011  
Page 2

Please note that Section 25-5-157 of the Hawai'i County Code (Zoning) states that Plan approval shall be required for all new structures and additions to existing structures in the MG district.

We have no further comments to offer, at this time. However, please keep us informed and provide our department with a copy of the Draft Environmental Assessment for our review and comment.

If you have any questions or if you need further assistance, please feel free to contact Bethany Morrison of this office at 961-8138.

Sincerely,



 BJ LEITHEAD TODD  
Planning Director

BJM:cs  
P:\wpwin60\Bethany\EA-EIS Review\consultdrafteaWHEA.doc



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

May 19, 2011

Geometrician Associates, LLC  
Box 396  
Hilo, Hawaii 96721

Attention: Mr. Ron Terry, Principal

Ladies and Gentlemen:

Subject: Early Consultation for Environmental Assessment for  
Relocation/Expansion of West Hawaii Explorations Academy (WHEA) at  
NELHA

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

Other than the comments from Division of State Parks, Land Division-Hawaii District, Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0414. Thank you.

Sincerely,

A handwritten signature in cursive script, appearing to read "Russell Y. Tsuji".  
Russell Y. Tsuji  
Administrator

54746

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

2011 MAY 11 P 2:53

DEPT. OF LAND & NATURAL RESOURCES  
STATE PARKS DIV.

April 28, 2011

DEPT. OF LAND & NATURAL RESOURCES  
STATE PARKS DIV.  
MAY -2 AM 1:12

RECEIVED  
STATE PARKS DIV.

MEMORANDUM

TO: **DLNR Agencies:**  
 Div. of Aquatic Resources  
 Div. of Boating & Ocean Recreation  
 Engineering Division  
 Div. of Forestry & Wildlife  
 Div. of State Parks  
 ~~Commission on~~ Water Resource Management  
 Office of Conservation & Coastal Lands  
 Land Division -Hawaii District  
 Historic Preservation

*Charlene*

FROM: Charlene Unoki, Assistant Administrator  
SUBJECT: Early Consultation for Environmental Assessment for Relocation/Expansion of West Hawaii Explorations Academy (WHEA)  
LOCATION: Island of Hawaii  
APPLICANT: Geometrician Associates, LLC

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by May 18, 2011.

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

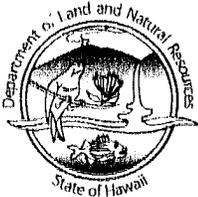
Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *[Signature]*  
Date: 5/5/11



3rd/7-3-43:83,89



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

April 28, 2011

RECEIVED  
LAND DIVISION  
HILO, HAWAII  
2011 APR 32 P 1:16  
RECEIVED  
LAND DIVISION  
HILO, HAWAII  
2011 MAY -2 P 1:21

MEMORANDUM

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

*Charlene*

FROM: Charlene Unoki, Assistant Administrator

SUBJECT: Early Consultation for Environmental Assessment for Relocation/Expansion of West Hawaii Explorations Academy (WHEA)

LOCATION: Island of Hawaii

APPLICANT: Geometrician Associates, LLC

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by May 18, 2011.

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

Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *[Signature]*

Date: 5-18-11

**William P. Kenoi**  
*Mayor*



**Darryl J. Oliveira**  
*Fire Chief*

**Glen P. I. Honda**  
*Deputy Fire Chief*

**County of Hawai'i**  
**HAWAI'I FIRE DEPARTMENT**  
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720  
(808) 932-2900 • Fax (808) 932-2928

May 18, 2011

Mr. Ron Terry  
Geometric Associates, LLC  
PO Box 396  
Hilo, Hawai'i 96721

**SUBJECT:** EARLY CONSULTATION FOR ENVIRONMENTAL ASSESSMENT FOR  
RELOCATION/EXPANSION OF WEST HAWAI'I EXPLORATIONS ACADEMY  
(WHEA), NELHA  
TMK: (3) 7-3-043:083 AND 089 (POR.)

---

In regards to the above-mentioned early consultation Environmental Assessment, no special environmental impacts or conditions however the Fire Department would require the following, at a minimum:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

**"Fire Apparatus Access Roads**

**"Sec. 10.207. (a) General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

**"(b) Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

**"EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).



"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301(c):

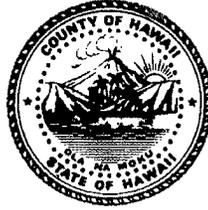
"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

  
DARRYL OLIVEIRA  
Fire Chief

RP:lpc



**William P. Kenoi**  
*Mayor*

**William T. Takaba**  
*Managing Director*

**Frank J. DeMarco, P.E.**  
*Director*

**Hunter Bishop**  
*Deputy Director*

**County of Hawai'i**  
**DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**  
25 Aupuni Street • Hilo, Hawai'i 96720  
(808) 961-8083 • Fax (808) 961-8086  
[http://co.hawaii.hi.us/directory/dir\\_envmng.htm](http://co.hawaii.hi.us/directory/dir_envmng.htm)

May 3, 2011

Mr. Ron Terry, Principal  
Geometrician Associates, LLC  
P. O Box 396  
Hilo, HI 96721

RE: Early Consultation for EA for Relocation/Expansion of West Hawai'i  
Explorations Academy (WHEA), NELHA, TMK: 7-3-043:083 and 089 (por.)  
North Kona District, Island of Hawai'i

Dear Mr. Terry,

We have no comments to offer on the subject project.

Thank you for allowing us to review and comment on this project.

Sincerely,

*Frank DeMarco*

Frank J. DeMarco, P.E.  
DIRECTOR

The FAA would like to opportunity to review the draft EA for the proposed Relocation/Expansion of the West Hawaii Explorations Academy (WHEA).

Noise generated from an airport are typically not compatible with schools if they are located in an area that exceeds 65 Day-Night Average Sound Level (Ldn). Attached is FAA's Noise Metric Chart. Additional information on FAA's guidance on noise may be found at:

[www.faa.gov/airports/environmental/airport\\_noise](http://www.faa.gov/airports/environmental/airport_noise)

Recommend you consult with the Hawaii department of Transportation on the noise policy and if they have an existing noise exposure map showing the noise levels at the proposed WHEA.

Gordon Wong  
FAA Honolulu Airports District Office  
T: 808-541-3565  
F: 808-541-3566  
E: [gordon.wong@faa.gov](mailto:gordon.wong@faa.gov)

(See attached file: FAA Noise Metrics.pdf)

This document is intended for the use of the individual or entity to whom it is addressed and may contain information that is privileged, confidential, and exempt from disclosure under applicable law. Release to third parties must be determined under the provisions of the Freedom Of Information Act (5 U.S.C. Section 552 et seq.).

**From:** Mento, Quince [mailto:QMento@co.hawaii.hi.us]  
**Sent:** Tuesday, May 03, 2011 12:04 PM  
**To:** rterry@hawaii.rr.com  
**Subject:** Early consultation for W. Hawai'i Explorations EA

Ron,

Thank you for your invitation to comment. I'm not certain if this is applicable, but the proposed W. Hawai'i Explorations Academy is well outside the predicted tsunami inundation zone. However, the Academy should anticipate evacuation during a tsunami event as roadblocks will be established at the intersection of Queen Kaahumanu Hwy & OTECH Rd. The school should have plans for relocating students and faculty during such an event.

Thank you,

Quince Mento  
Hawai'i County Civil Defense

Aloha Ron- The Office of Hawaiian Affairs is in receipt of your April 26, 2011 letter seeking comments ahead of an draft environmental assessment (DEA) to support the proposed relocation (project) of the West Hawaii Explorations Academy (WHEA) to a 5.083 land parcel under the control of the Natural Energy Laboratory of Hawai'i Authority. WHEA currently operates from a temporary location within the NELHA and the project will provide a permanent campus and accommodate an anticipated increase in student enrollment.

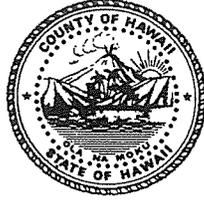
OHA has no substantive comments at this time. We do seek confirmation that an archaeological inventory survey or assessment has been conducted for the project area and submitted to the Department of Land and natural Resources-State Historic Preservation Division for review and approval. We also suggest that native species be considered in project landscaping plans.

Thank you for initiating consultation at this early stage. We look forward to reviewing the DEA and providing additional comments at that time.

Thank you, Keola Lindsey

*Keola Lindsey  
Office of Hawaiian Affairs  
Compliance Monitoring Program  
711 Kapiolani Boulevard  
Honolulu, Hawaii 96813  
[keolal@oha.org](mailto:keolal@oha.org) (email)  
(808) 594-0244 (office)*

Harry Kim  
Mayor



Christopher J. Yuen  
Director

Roy R. Takemoto  
Deputy Director

## County of Hawaii

### PLANNING DEPARTMENT

Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720  
Phone (808) 961-8288 • Fax (808) 961-8742

June 16, 2004

Anna Sanders, Chair  
WHEAPCS Local School Board  
West Hawai'i Explorations Academy  
73-4460 Queen Ka'ahumanu Highway, #105  
Kailua-Kona, HI 96740

Dear Ms. Sanders:

**SUBJECT: Proposed Establishment of the West Hawai'i Explorations Academy**  
**TMK: 7-3-009: 044; O'oma 1<sup>st</sup>, North Kona, Hawai'i**

We apologize for our much-delayed response to your March 1, 2004 letter, requesting confirmation from this office that would allow the West Hawai'i Explorations Academy public charter school (WHEAPCS) to relocate upon the subject property. With this letter, we confirm that the establishment of the WHEAPCS upon the subject property will be consistent with its General Industrial (MG-3a) designation as well as with uses permitted within the Special Management Area (SMA) as approved by SMA Use Permit No. 239.

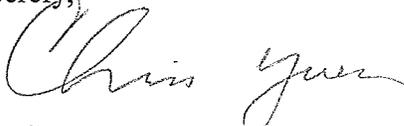
As mentioned within your letter, the WHEAPCS curriculum incorporates the unique resources of the NELHA. School projects are related to the use of surface sea water, cold sea water, and solar exposure, all of which are in abundant supply within HOST Park.

For your information, any proposed improvements upon the subject property will require the issuance of Final Plan Approval by this office. Once Final Plan Approval has been issued, you may then commence with the preparation of plans for a building permit. Please consult with this office to coordinate the submittal of plans for Plan Approval review.

Anna Sanders, Chair  
WHEAPCS Local School Board  
West Hawai'i Explorations Academy  
Page 2  
June 16, 2004

Again, please accept our apology for our tardy response. Please contact Daryn Arai of this office should you have any questions or require additional information regarding this matter.

Sincerely,



CHRISTOPHER J. YUEN  
Planning Director

DSA:mad

P:\WP60\SUBDIV\Documents\Subc2004-2\LWHEAPCS-HOSTPark7-3-43-42.doc

cc w/ltr: SMA 239  
West Hawaii Office

Mr. Jeff Smith  
NELHA  
73-4460 Queen Kaahumanu Hwy., #101  
Kailua-Kona, HI 96740-2637

**ENVIRONMENTAL ASSESSMENT**

**West Hawai'i Explorations Academy Relocation**

**APPENDIX 1b**

**Comments on Draft EA and Responses**

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

In reply, please refer to:  
File:

LUD – 3 7 3 043 083-ID782  
DEA WHI Expirtns Acdmy Relocation

September 26, 2011

Mr. Ron Terry, Principal  
Geometrician Associates, LLC  
P.O. Box 396  
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: Draft Environmental Assessment for West Hawaii Explorations Academy Relocation at 73-4460 Queen Kaahumanu Highway, # 105, Kailua-Kona, Hawaii 96740  
TMK (3) 7-3-043: 083 5.083 acres

Thank you for allowing us the opportunity to review the above subject project which requests comments on the Draft Environmental Assessment for West Hawaii Explorations Academy Relocation. We have the following comments and information on the above subject property:

The subject project is located in the critical wastewater disposal area as determined by the Hawaii County Wastewater Advisory Committee. We do not have any individual wastewater system (IWS) information on file and it not connected to the County sewer service system at this time.

As there is adequate land area, we will offer our approval for the proposed development as domestic wastewater will be treated and disposed of via the construction and use of treatment individual wastewater systems to serve the students and faculty of the Academy. Furthermore, the proposal for the monitoring and disposal plan for the seawater that is generated from the proposed project should be submitted to the Department of Health for our review and approval.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at (808) 586-4294 or fax to (808) 586-4300.

Sincerely,

A handwritten signature in black ink, appearing to read "Sina Pruder".

SINA PRUDER, P.E., ACTING CHIEF  
Wastewater Branch

LM:cle

c: DOH's Environmental Planning Office  
DOH-WWB's Kona Staff, Mr. Dane Hiromasa  
✓ Natural Energy Laboratory of Hawaii Authority, Mr. Jeff Nichols

# geometrician

ASSOCIATES, LLC  
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396HiloHawaii 96721 rterry@hawaii.rr.com

November 16, 2011

Sina Pruder, P.E., Acting Chief  
DOH Wastewater Branch  
919 Ala Moana Blvd, Room 308  
P.O. Box 3378  
Honolulu HI 96814

Dear Ms. Pruder:

**Subject: Comment to Draft Environmental Assessment, West Hawai'i  
Explorations Academy Relocation (3rd. Div.) 7-3-043:083, North  
Kona District, Island of Hawai'i**

Thank you for the comment letter dated September 26, 2011, in which you state that your agency will offer approval for the proposed project, as the project site has adequate land area and domestic wastewater will be treated and disposed of via the construction and use of treatment individual wastewater systems. NELHA and WHEA recognize that the project site is located in the critical wastewater disposal area and understand that plans for the domestic wastewater system and used seawater disposal system must be submitted to DOH for review and approval and must conform to appropriate DOH rules and policies. The facility's architect is working with wastewater specialists to design appropriate systems that will be reviewed by DOH as part of the permitting process.

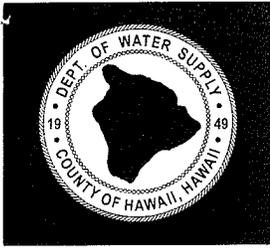
We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,



Ron Terry, Principal  
Geometrician Associates

Cc: Jeff Nichols and Ken Melrose



**DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I**

345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720

TELEPHONE (808) 961-8050 • FAX (808) 961-8657

October 17, 2011

Mr. Ron Terry  
Geometrician Associates, LLC  
P.O. Box 396  
Hilo, HI 96721

**DRAFT ENVIRONMENTAL ASSESSMENT  
RELOCATION/EXPANSION OF WEST HAWAI'I EXPLORATIONS ACADEMY  
TAX MAP KEY 7-3-043:083**

This is in response to your Draft Environmental Assessment.

Please be informed that the existing water system along the Natural Energy Laboratory Hawaii Authority (NELHA) Access Road from the Queen Ka'ahumanu Highway intersection to the subject properties is privately owned and operated. The existing water system is served by a 6-inch master meter.

The Department will note that the average daily water usage through the existing master meter, over the past year, is approximately 552,000 gallons per day, which is equivalent to approximately 1380 units of water and exceeds the total amount of water units allotted for NELHA.

Therefore, the Department can not provide any additional water at this time, extensive improvements and additions, which may include, but not limited to source, storage, booster pumps, transmission, and distribution facilities, would be required. Currently, sufficient funding is not available from the Department for such improvements and no time schedule is set.

The applicant should be informed that if the proposed relocation\expansion is required to comply with the Department's Water System Standards, the following conditions apply:

1. The Department would request estimated maximum daily water usage calculations prepared by a professional engineer licensed in the State of Hawai'i for review. After review of the calculations, the Department will determine the water commitment amount, facilities charges due, and other required water system improvements.
2. The existing 8-inch waterline fronting the subject parcel is inadequate to provide the required 2,000 gallons per minute (GPM) fire-flow required for school facilities. The applicant will be required to submit plans showing the water system improvements necessary to provide the required fire-flow. The applicant should contact the Fire Department to determine any other fire protection requirements or alternatives.
3. The proposed project will require the installation of a reduced principle type backflow prevention assembly within five feet of the meter on private property, if one does not already exist. The Department must inspect and approve the installation prior to commencement of water service.

*... Water, Our Most Precious Resource ... Ka Wai A Kāne ...*

The Department of Water Supply is an Equal Opportunity provider and employer.

Mr. Ron Terry  
Page 2  
October 17, 2011

Should there be any questions, please contact Mr. Ryan Quitarano of our Water Resources and Planning Branch at 961-8070, extension 256.

Sincerely yours,

A handwritten signature in black ink, appearing to be 'M. Pavao', written over a large, faint circular watermark or stamp.

Milton D. Pavao, P.E.  
Manager-Chief Engineer

RQ:dfg

copy – Natural Energy Laboratory of Hawai‘i Authority

**geometrician**  
ASSOCIATES, LLC  
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396HiloHawaii 96721 rterry@hawaii.rr.com

November 16, 2011

Milton Pavao, Manager  
Hawai'i County Department of Water Supply  
345 Kekuaaoa Street, Suite 20  
Hilo HI 96720

Dear Mr. Pavao:

**Subject: Comment to Draft Environmental Assessment, West Hawai'i Explorations Academy Relocation (3rd. Div.) 7-3-043:083, North Kona District, Island of Hawai'i**

Thank you for the comment letter dated October 17, 2011, on the Draft EA, in which you stated that the Department cannot provide any additional water at this time without certain water system improvements that are not scheduled or funded. According to project manager Ken Melrose's records, WHEA has been in early and frequent consultation with DWS on this service request issue and appreciates the continued involvement of DWS. To summarize Mr. Melrose's understandings, the existing WHEA campus is already served by a 1 ½" meter, and it is WHEA's understanding that DWS has agreed that WHEA is already served within the allocation granted to NELHA. While WHEA's consumption would seem to be neither excessive nor the reason for the DWS concern raised broadly for NELHA, WHEA will continue to work with DWS and NELHA to determine and provide what is reasonably necessary for the new campus location. Design features include low flow fixtures and xeriscape landscaping practices as part of the tools to teach sustainable practices to the students. In answer to your numbered comments:

1. *Water usage calculations and determining water commitment, facilities charges and other required water system improvements.* Existing average day consumption at the present campus is 3,500 gpd, or 9 units. WHEA proposes to install a similar size 1 ½" meter, compound with fire flow detector check, at the new campus. At full build out, the school's engineers estimate the average daily demands including irrigation at 6,650 gpd, which represents 17 units. WHEA will work with DWS to secure additional commitments necessary to meet the eventual demand.

2. *Fire flow.* A fire flow test was done in February 2011 on the fire hydrant nearest the new campus entry. According to Mr. Melrose, from subsequent discussions, the DWS and Fire Department appear satisfied with the results.

3. *Backflow preventer.* The water service plans for the new campus location will include a compound meter with 8" backflow preventer meeting the details and standards of the DWS.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

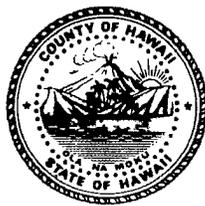
Sincerely,

A handwritten signature in black ink that reads "Ron Terry". The signature is written in a cursive style with a large, sweeping flourish at the end of the name.

Ron Terry, Principal  
Geometrician Associates

Cc: Jeff Nichols and Ken Melrose

William P. Kenoi  
Mayor



BJ Leithead Todd  
Director

Margaret K. Masunaga  
Deputy

West Hawai'i Office  
74-5044 Ane Keohokalole Hwy  
Kailua-Kona, Hawai'i 96740  
Phone (808) 323-4770  
Fax (808) 327-3563

**County of Hawai'i**  
**PLANNING DEPARTMENT**

East Hawai'i Office  
101 Pauahi Street, Suite 3  
Hilo, Hawai'i 96720  
Phone (808) 961-8288  
Fax (808) 961-8742

October 19, 2011

Mr. Ron Terry  
Geometrician Associates, LLC  
P.O. Box 396  
Hilo, HI 96721

Dear Mr. Terry:

**SUBJECT: Review of Draft Environmental Assessment**  
**Project: Relocation/ Expansion of West Hawai'i Explorations Academy (WHEA)**  
**TMK: (3) 7-3-043:083 and 089; North Kona, Hawai'i**

Thank you for a copy of the Draft Environmental Assessment (DEA) received on September 19, 2011 requesting comments from this office. West Hawai'i Explorations Academy (WHEA) is proposing the relocation of the WHEA campus and eventual expansion from 195 to 300 students. The campus would include an administration building, a high school village, a middle school village, an outdoor amphitheater, a multi-purpose room, and a kitchen building. The site would also include a number of labs, a STEM learning center/ shop, covered outdoor spaces and other facilities for agriculture, aquaculture, marine science student projects and court sports.

The project site is proposed for a 5.083 acre area within portions of the subject parcels, which is under the control of the Natural Energy Laboratory of Hawai'i Authority (NELHA). However, please note that the subject parcels were recently part of a subdivision (SUB-11-001091), and the parcel areas have been slightly revised. The project area is zoned MG-3a (General Industrial - 3 acre minimum lot size). The project site is situated within the State Land Use Urban district and designated as Industrial by the Land Use Pattern Allocation Guide (LUPAG).

The project site is also located entirely within the Special Management Area (SMA). According to Hawai'i Revised Statutes (HRS) Chapter 205A-22 and Planning Commission (PC) Rule 9-4(e) (1) (A) and (E), "development" includes *Placement or erection of any solid material or any gaseous, liquid, solid, or thermal waste and*

Mr. Ron Terry  
Geometrician Associates, LLC  
October 18, 2011  
Page 2

*Construction, reconstruction, demolition, or alteration of the size of any structure.* SMA Use Permit No. 239 was amended by the Planning Commission on September 22, 1994 to allow alternate energy research and development, aquaculture research and commercial aquaculture farms, biotechnology research and commercial development, ocean water related specialty agriculture; and other related projects. The relocation of the WHEA campus is permitted under SMA Use Permit No. 239 and therefore will not require further review against the SMA rules and regulations.

Please note that Section 25-5-157 of the Hawai'i County Code (Zoning) states that Plan approval shall be required for all new structures and additions to existing structures in the MG district.

If you have any questions or if you need further assistance, please feel free to contact Bethany Morrison of this office at 961-8138.

Sincerely,



 BJ LEITHEAD TODD  
Planning Director

BJM:cs

P:\wpwin60\Bethany\EA-EIS Review\draftea WHEA.doc

# geometrician

ASSOCIATES, LLC  
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396HiloHawaii 96721 rterry@hawaii.rr.com

November 16, 2011

Bobby Jean Leithead-Todd, Director  
Hawai'i County Planning Dept.  
101 Pauahi Street, Suite 3  
Hilo HI 96720

Dear Ms. Leithead-Todd:

**Subject: Comment to Draft Environmental Assessment, West Hawai'i  
Explorations Academy Relocation (3rd. Div.) 7-3-043:083, North  
Kona District, Island of Hawai'i**

Thank you for your comment letter dated October 19, 2011, on the Draft EA. In answer to your specific comments:

1. *Subdivision and property sizes.* Final subdivision No. 11-001091 was granted July 18, 2011. The revised final WHEA lot size is 4.894 acres.

2. *Land Use Designations, SMA Permit and Plan Approval.* Thank you for confirming the land use designations, the applicability of the existing SMA Permit, and the need for Plan Approval listed in the Draft EA.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

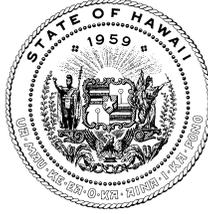
Sincerely,



Ron Terry, Principal  
Geometrician Associates

Cc: Jeff Nichols and Ken Melrose

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

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

GUY H. KAULUKUKUI  
FIRST DEPUTY

WILLIAM M. TAM  
DEPUTY DIRECTOR - WATER

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

July 27, 2011

Robert B. Rechtman, Ph. D.  
Rechtman Consulting, LLC  
507-A East Lanikaula Street  
Hilo, Hawai'i 96720  
(bob@rechtmanconsulting.com)

LOG NO: 2011.2029

DOC NO: 1107TD17

Dear Dr. Rechtman:

Subject: **Chapter 6E-42 Historic Preservation Review –  
Determination of Project Effect, West Hawai'i Explorations Academy  
'O'oma 1<sup>st</sup> Ahupua'a, North Kona District, Island of Hawai'i  
TMK: (3) 7-3-043:083**

This is in response to your letter dated December 14, 2010 regarding an archaeological field inspection conducted of a c. four acre lot (Lot 12A) within the Natural Energy Laboratory Hawai'i Authority (NELHA) lands. The lot is proposed for construction of a new campus for the West Hawai'i Explorations Academy (WHEA). Prior archaeological studies of the NELHA area indicate that no historic properties were identified within the project area; however, a number of sites were found in the general vicinity of the project area. Due to the age of the previous survey (1985), our office has been recommending updated inspections of areas within NELHA lands prior to construction activities.

Your letter indicates that the project area was thoroughly inspected and approximately 20% of the area has been previously graded. No evidence of historic properties was found. The likelihood of subsurface or subterranean findings is minimal, due to the lack of soil and the type of lava. Based on these findings, we concur that no historic properties will be affected by the proposed project.

If you have any questions, please contact Theresa Donham at 808-933-7653.

Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham".

Theresa K. Donham  
Lead Archaeologist, Hawai'i Island Section  
Historic Preservation Division

cc: Ken Melrose (melrose001@hawaii.rr.com)

**geometrician**  
ASSOCIATES, LLC  
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396HiloHawaii 96721 rterry@hawaii.rr.com

November 16, 2011

Theresa K. Donham  
Lead Archaeologist, Hawai'i Island Section  
DLNR-SHPD  
PO Box 621  
Honolulu HI 96809

Dear Ms. Donham:

**Subject: SHPD Review of Archaeological Report (LOG NO. 2011:2029, DOC NO: 1107TD17) and Draft Environmental Assessment, West Hawai'i Explorations Academy Relocation (3rd. Div.) 7-3-043:083, North Kona District, Island of Hawai'i**

Thank you for the letter of July 27, 2011 commenting on the archaeological inspection report by Dr. Rechtman of the subject property, in which you stated that your office concurred with the finding that no historic properties will be affected by the proposed project. As we have received no additional letter from your office specifically relating to the Draft EA, we will assume your office has no additional comments.

We very much appreciate your review of the project documents. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,



Ron Terry, Principal  
Geometrician Associates

Cc: Jeff Nichols and Ken Melrose



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

November 2, 2011

Geometrician Associates  
Attention: Mr. Ron Terry  
P.O. Box 396  
Hilo, Hawaii 96721

via email: [rterry@hawaii.rr.com](mailto:rterry@hawaii.rr.com)

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment for West Hawaii Explorations Academy  
Relocation - North Kona, Island of Hawaii; TMK: (3) 7-3-043:083

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

At this time, enclosed are comments from (a) Engineering Division; and (b) Division of State Parks on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji  
Land Administrator

Enclosures

cc: Natural Energy Laboratory of Hawaii Authority (NELHA) (w/copies)  
Attention: Mr. Jeff Nichols

No. of Pages: 4



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LAND DIVISION

2011 NOV -1 A 10: 25

DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

October 24, 2011

**MEMORANDUM**

TO:

**DLNR Agencies:**

X Div. of Aquatic Resources

   Div. of Boating & Ocean Recreation

X Engineering Division

X Div. of Forestry & Wildlife

X Div. of State Parks

X Commission on Water Resource Management

X Office of Conservation & Coastal Lands

X Land Division – Hawaii District

X Historic Preservation

11 OCT 28 AM 10:18 ENGINEERING

FROM:

Russell Y. Tsuji, Land Administrator

SUBJECT:

Draft Environmental Assessment for West Hawaii Explorations Academy Relocation

LOCATION:

North Kona, Island of Hawaii; TMK: (3) 7-3-043:083

APPLICANT:

Geometrician Associates on behalf of West Hawaii Explorations Academy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by October 31, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed:

Date:

*[Signature]*  
10/31/11

cc: Central Files

**DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION**

**DL/DarleneNakamura**  
**REF.:DEAWestHawaiiExplorationAcademyRelocation**  
**Hawaii.535**

**COMMENTS**

- (X) **We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The National Flood Insurance Program does not have any regulations for developments within Zone X.**
- ( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone\_\_\_\_\_.
- ( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is \_\_\_\_\_.
- ( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

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

- ( ) Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting..
  - ( ) Mr. Frank DeMarco at (808) 961-8042 of the County of Hawaii, Department of Public Works.
  - ( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
  - ( ) Ms. Wynne Ushigome at (808) 241-4890 of the County of Kauai, Department of Public Works.
- ( ) The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.
  - ( ;p.l,klk-0) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update

- ( ) Additional Comments: \_\_\_\_\_  
\_\_\_\_\_
- ( ) Other: \_\_\_\_\_  
\_\_\_\_\_

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

Signed:   
CARTY S. CHANG, CHIEF ENGINEER  
Date: 10/31/11

54987

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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

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2011 OCT 31 P 3:04

DEPT OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

October 24, 2011

MEMORANDUM

DEPT OF LAND &  
NATURAL RESOURCES

11 OCT 27 P 3:22

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STATE PARKS DIV

- TO: **DLNR Agencies:**
- Div. of Aquatic Resources
  - Div. of Boating & Ocean Recreation
  - Engineering Division
  - Div. of Forestry & Wildlife
  - Div. of State Parks
  - Commission on Water Resource Management
  - Office of Conservation & Coastal Lands
  - Land Division – Hawaii District
  - Historic Preservation

FROM: *Russell Y. Tsuji*, Land Administrator

SUBJECT: Draft Environmental Assessment for West Hawaii Explorations Academy Relocation

LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-3-043:083

APPLICANT: Geometrician Associates on behalf of West Hawaii Explorations Academy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by October 31, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: *Russell Y. Tsuji*

Date: 10/31/11

cc: Central Files



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

November 7, 2011

Geometrician Associates  
Attention: Mr. Ron Terry  
P.O. Box 396  
Hilo, Hawaii 96721

via email: [rterry@hawaii.rr.com](mailto:rterry@hawaii.rr.com)

Dear Mr. Terry:

SUBJECT: Draft Environmental Assessment for West Hawaii Explorations Academy  
Relocation - North Kona, Island of Hawaii; TMK: (3) 7-3-043:083

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments previously sent you on November 2, 2011, enclosed are comments from (a) Office of Conservation & Coastal Lands; and (b) Land Division – Hawaii District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

A handwritten signature in blue ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji  
Land Administrator

Enclosures

cc: Natural Energy Laboratory of Hawaii Authority (NELHA) (w/copies)  
Attention: Mr. Jeff Nichols

NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



CORR  
0A-12 HA-12-108

WILLIAM J. AILA, JR.  
CHAIRPERSON

BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED  
OFFICE OF CONSERVATION  
AND COASTAL LANDS



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LAND DIVISION

2011 NOV -11 10:07 AM  
STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

2011 OCT 27 A 10:07

DEPT. OF LAND & NATURAL RESOURCES  
STATE OF HAWAII  
POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

DEPT. OF LAND & NATURAL RESOURCES  
STATE OF HAWAII

October 24, 2011

**MEMORANDUM**

- TO: **DLNR Agencies:**
- Div. of Aquatic Resources
  - Div. of Boating & Ocean Recreation
  - Engineering Division
  - Div. of Forestry & Wildlife
  - Div. of State Parks
  - Commission on Water Resource Management
  - Office of Conservation & Coastal Lands
  - Land Division – Hawaii District
  - Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment for West Hawaii Explorations Academy Relocation

LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-3-043:083

APPLICANT: Geometrician Associates on behalf of West Hawaii Explorations Academy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by October 31, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

- We have no objections.
- We have no comments. \*
- Comments are attached.

Signed: [Signature]  
Date: 11.2.2011

cc: Central Files

\* Not in the Conservation District



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

2011 OCT 28 A 11: 1

RECEIVED  
LAND DIVISION  
HILO, HAWAII

October 24, 2011

MEMORANDUM

TO: **DLNR Agencies:**

- Div. of Aquatic Resources
- Div. of Boating & Ocean Recreation
- Engineering Division
- Div. of Forestry & Wildlife
- Div. of State Parks
- Commission on Water Resource Management
- Office of Conservation & Coastal Lands
- Land Division – Hawaii District
- Historic Preservation

RECEIVED  
LAND DIVISION  
2011 NOV - 3 A 9: 49  
DEPT. OF LAND &  
NATURAL RESOURCES  
STATE OF HAWAII

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment for West Hawaii Explorations Academy Relocation

LOCATION: North Kona, Island of Hawaii; TMK: (3) 7-3-043:083

APPLICANT: Geometrician Associates on behalf of West Hawaii Explorations Academy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by October 31, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

- We have no objections.
- We have no comments.
- Comments are attached.

Signed:

Date: 11.1.11

cc: Central Files

# geometrician

ASSOCIATES, LLC  
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396HiloHawaii 96721 rterry@hawaii.rr.com

November 16, 2011

Russell Y. Tsuji, Administrator  
Hawai'i State DLNR Land Division  
P.O. Box 621  
Honolulu HI 96809

Dear Mr. Tsuji:

**Subject: Comment to Draft Environmental Assessment, West Hawai'i  
Explorations Academy Relocation (3rd. Div.) 7-3-043:083, North  
Kona District, Island of Hawai'i**

Thank you for your comment letters dated November 2 and November 7, 2011, on the Draft EA. We first wish to acknowledge the no-objection memo by the Division of State Parks and the no-comment memos from the Office of Coastal and Conservation Lands and the Hawai'i District Land Division. In regard to the memo from the Engineering Division, we appreciate the confirmation of the Flood Zone X designation contained in the Draft EA, and have provided additional information in the Final EA concerning water consumption. The existing average daily consumption at the present campus is 3,500 gpd. WHEA proposes to install a similar size 1 ½" meter at the new campus and expects a similar demand during the first phase. At full build out the school's engineers estimate the average daily demands including irrigation at 6,650 gpd.

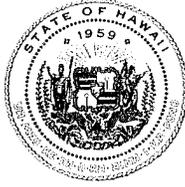
We very much appreciate your review of the document, including circulation to various DLNR agencies. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,



Ron Terry, Principal  
Geometrician Associates

Cc: Jeff Nichols and Ken Melrose



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

IN REPLY REFER TO:  
STP 8.0619

October 28, 2011

Mr. Ron Terry  
Geometrician Associates  
P. O. box 396  
Hilo, Hawaii 96721

Dear Mr. Terry:

Subject: West Hawaii Explorations Academy  
Draft Environmental Assessment (DEA)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project, by West Hawaii Explorations Academy (WHEA) to relocate its campus within the Natural Energy Laboratory of Hawaii Authority (NELHA) from its location near the shoreline to an area nearer to Queen Kaahumanu Highway. The new location will allow for the eventual expansion from 195 to 300 students in grades 7 to 12. The project access will be from the NELHA Access Road.

Given the project location, DOT's Kona International Airport (KOA) and Queen Kaahumanu Highway are impacted. DOT offers the following comments regarding potential impacts to the State airport:

1. Page 15, 3<sup>rd</sup> paragraph, under section 3.1.5 Noise it states that DOT Airports is currently completing its federally required 14 CFR Part 150 Noise Compatibility Program (NCP) update for KOA.

DOT requests that this statement be revised to, 14 CFR Part 150 NCP is not federally required, but a voluntary program that was approved by the Federal Aviation Administration (FAA) on May 31, 2011.

2. Advise tenant that although the development is within the 55-60 Dnl noise contour and compatible under the DOT's standards, the location make it subject to overflights and noise from aircraft. For this reason, the tenant may want to consider noise mitigation for the classrooms and offices.
3. The tenant needs to file FAA Form 7460-1 "Notice of Proposed Construction or Alteration" with the FAA.
4. The tenant should make every effort to prevent any open water ponds to become a wildlife attractant for migratory birds.

Mr. Ron Terry  
October 28, 2011  
Page 2

STP 8.0619

The DOT Highways Division is concluding its review of the subject project for impacts to the DOT highway facilities. Upon completion of this review, DOT will provide additional comments as necessary.

DOT appreciates the opportunity to provide comments. If there are any questions, including the need to meet with DOT Airports Division or Highways Division staffs, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 831-7976.

Very truly yours,

A handwritten signature in black ink, appearing to read "Glenn M. Okimoto". The signature is fluid and cursive, with a prominent initial "G" and "O".

GLENN M. OKIMOTO, Ph.D.  
Director of Transportation

c: Jeff Nichols, Natural Energy Laboratory of Hawaii Authority (NELHA)

# geometrician

A S S O C I A T E S , L L C  
integrating geographic science and planning

phone: (808) 969-7090 PO Box 396 Hilo Hawaii 96721 rterry@hawaii.rr.com

November 16, 2011

Glenn M. Okimoto, Ph.D., Director  
Hawai'i State Department of Transportation  
869 Punchbowl Street  
Honolulu HI 96813

Dear Dr. Okimoto:

**Subject: Comment to Draft Environmental Assessment, West Hawai'i  
Explorations Academy (WHEA) Relocation (3rd. Div.) 7-3-043:083,  
North Kona District, Island of Hawai'i**

Thank you for your comment letter dated October 28, 2011 (postmarked November 8, 2011), on the Draft EA. In answer to your specific comments:

1. *Voluntary status of Noise Compatibility Program update.* This language has been amended as requested.
2. *Noise mitigation should be considered.* WHEA has been advised of your recommendation.
3. *Need to file FAA Form 7460-1.* WHEA obtained the FAA Form 7460-1 approvals on October 4, 2011, which has been noted in the FEA.
4. *Ponds as bird attractants.* WHEA was advised of your statement, and they stated that shark/reef tanks on the existing campus within NELHA have not created such an attractive nuisance for birds. WHEA does not expect any of its relocated or future facilities to attract birds.
5. *Future Highways Division comments.* Please note that the comment period expired on October 23, 2011 (although we have chosen to include your October 28, 2011 comment) and we have proceeded with completing the Final EA. WHEA will work to address any future questions or concerns from HDOT outside the EA process.

We very much appreciate your review of the document. If you have any questions about the EA, please contact me at (808) 969-7090.

Sincerely,

A handwritten signature in black ink that reads "Ron Terry". The signature is written in a cursive style with a large, stylized "R" and a long, sweeping underline that extends to the right.

Ron Terry, Principal  
Geometrician Associates

Cc: Jeff Nichols and Ken Melrose

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**ENVIRONMENTAL ASSESSMENT**

**West Hawai'i Explorations Academy Relocation**

**APPENDIX 2**

**Archaeological Letter Report**

**[This page intentionally left blank]**

## RECHTMAN CONSULTING, LLC

507-A E. Lanikaula St. Hilo, Hawaii 96720  
phone: (808) 969-6066 fax: (808) 443-0065  
e-mail: bob@rechtmanconsulting.com  
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

December 14, 2010

RC-0720

Theresa Donham, M.A.  
Acting Archaeology Branch Chief  
DLNR-SHPD  
40 Po'okela Street  
Hilo, HI 96720

Dear Theresa:

Ken Melrose of Pa'ahana Enterprises LLC, on behalf of his client West Hawaii explorations Academy (WHEA) asked Rechtman Consulting, LLC to conduct a field inspection of a roughly four acre lot (Lot 12A) within the HOST park at NELHA, 'O'oma 1<sup>st</sup> Ahupua'a, North Kona, Island of Hawai'i. The lot is situated directly across the street and *makai* of the SOPOGY solar energy collector site near the intersection of Queen Ka'ahumanu Highway and the NELHA access road; and directly adjacent to the newly constructed Goodfellow Bros., Inc reservoir (Figure 1). WHEA has received permission from NELHA to use the lot for a new campus location. As a result of an earlier archaeological study (Barrera 1985) four sites (SIHP Site 10151, 10152, 10153, and 10158) had been recorded in the immediate vicinity of the current area; no sites were recorded on the study property (see Figure 1). Site 10151 was a cluster of three marine shells; Sites 10152 and 10153 were stone cairns; and Site 10158 was a *pāhoehoe* excavation. Rechtman Consulting, LLC also conducted a field inspection (Rechtman 2010) for the Goodfellow Bros. reservoir site and found the area to be void of archaeological resources.

On December 13, 2010, Robert B. Rechtman, Ph.D. and J. David Nelson, B.A. conducted a thorough surface examination of the study area. Ground visibility was excellent throughout within only light vegetation (Fountain grass and a few *noni*) cover. The ground surface consists of undulating fractured *pāhoehoe* across roughly 80% of the lot (Figure 2) with the roughly 20% northern portion of the lot having been completely graded in the past (Figure 3). No archaeological resources were observed and the likelihood of encountering subsurface resources is extremely remote. Based on these negative findings, on behalf of our client, we are requesting that DLNR-SHPD issue a written determination of "no historic properties affected" in accordance with HAR 13§13-284-5(b)1.

In the unlikely event that archaeological resources are encountered during subsurface development activities within the current study area, work in the immediate area of the discovery will be halted and DLNR-SHPD contacted as outlined in Hawai'i Administrative Rules 13§13-275-12.

Should you require further information, or wish to visit the lot, please contact me directly.

Respectfully,



Bob Rechtman, Ph.D.  
Principal Archaeologist

References Cited

Barrera, W.

1985 Ke-ahole Point, Hawaii: Archaeological Reconnaissance. Chiniago Inc., Honolulu.

Rechtman, R.

2010 Letter Report dated September 3, 2010 submitted to DLNR-SHPD for Lot 11A in the HOST Park at NELHA. Rechtman Consulting Report RC-0704. Prepared for Goodfellow Bros., Inc.

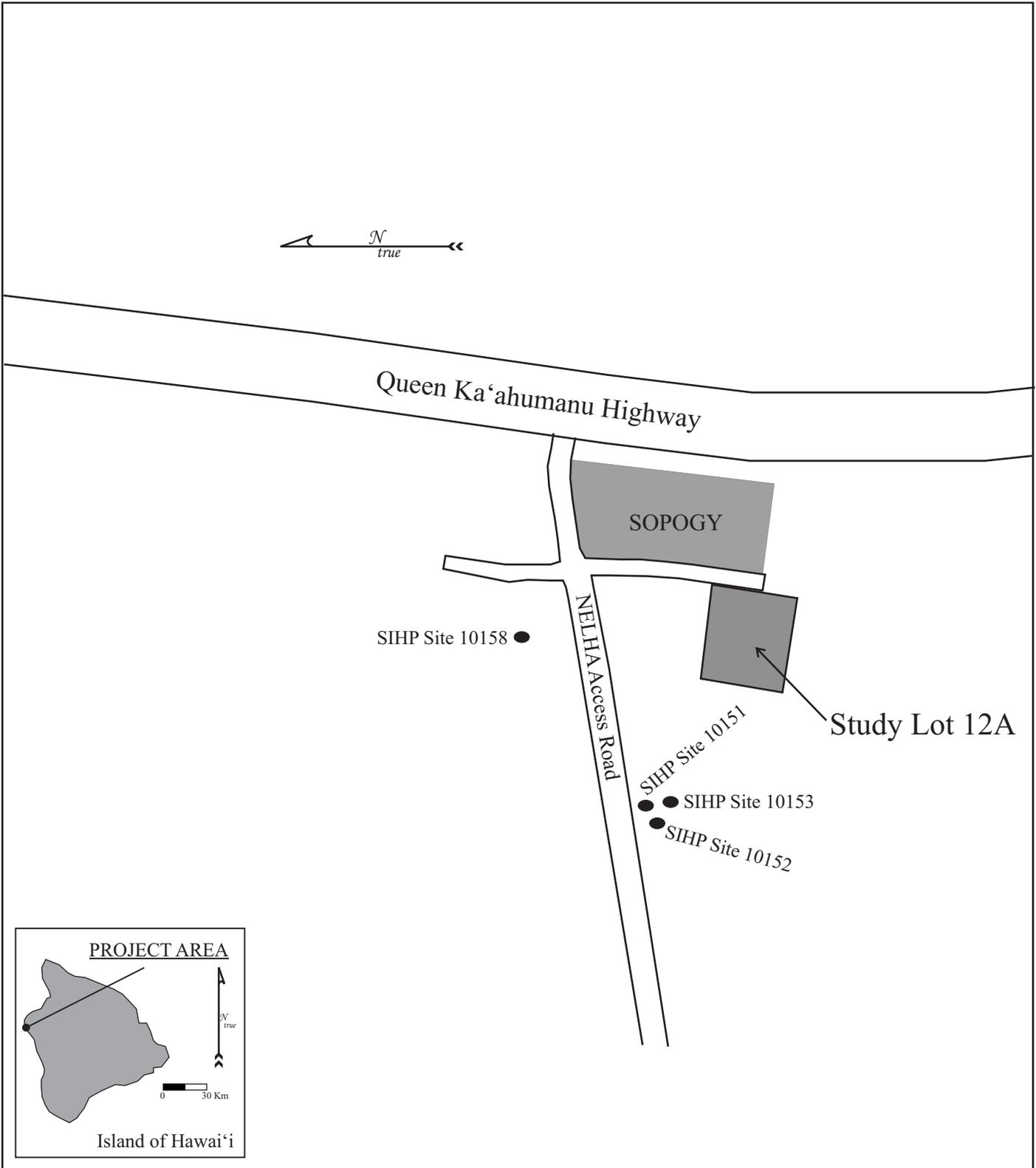


Figure 1. Location of study lot.



Figure 2. Typical undulating *pāhoehoe* throughout most of the study lot.



Figure 3. Grubbed northern portion of the study lot.

# **ENVIRONMENTAL ASSESSMENT**

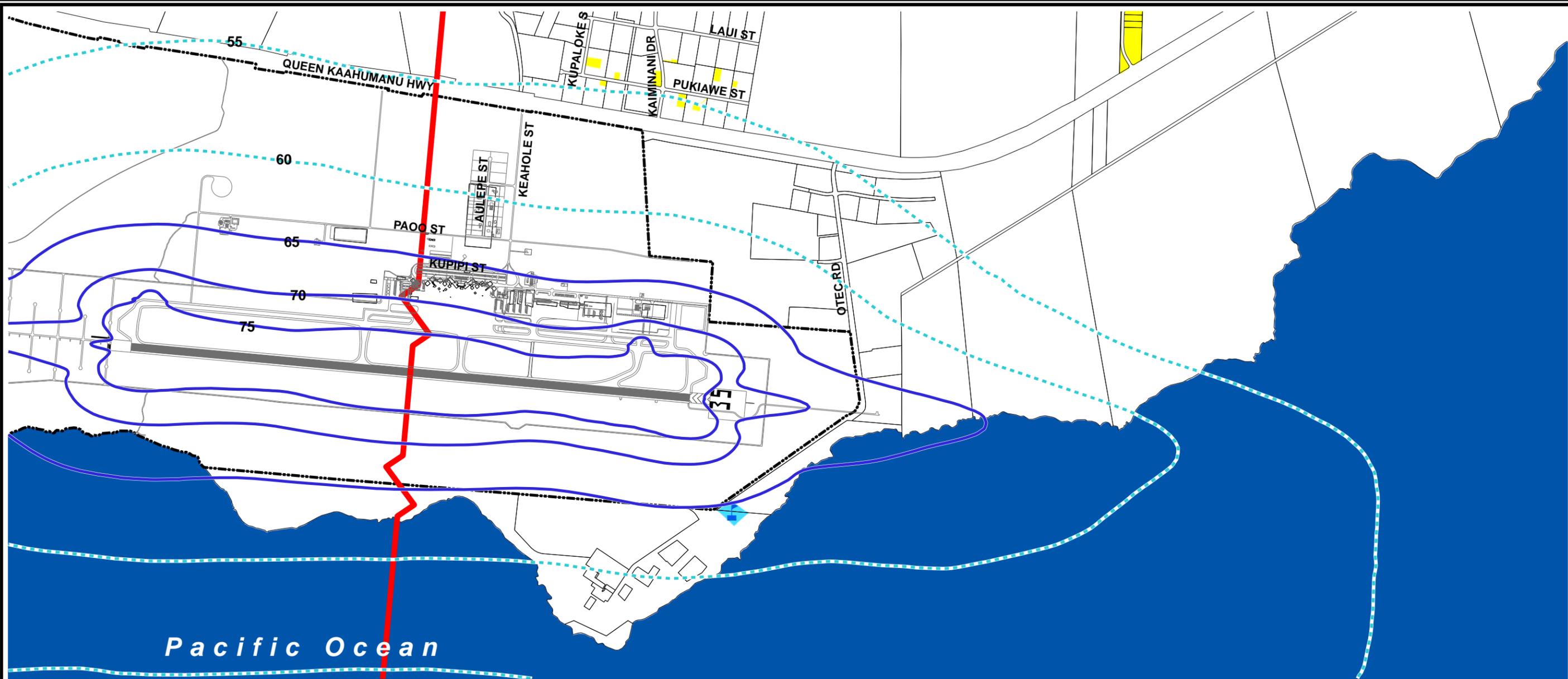
## **West Hawai'i Explorations Academy Relocation**

### **APPENDIX 3**

#### **14 CFR Part 150 Noise Compatibility Program Update Noise Contour Maps for Kona International Airport**

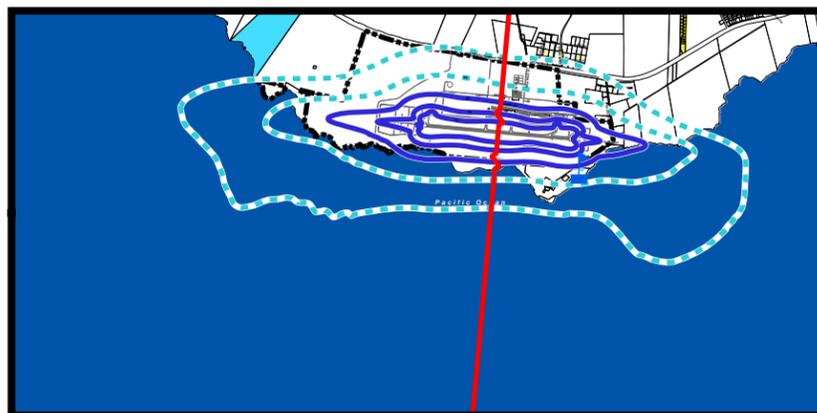
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06MP06-7C-06/19/09



**LEGEND**

- Airport Property
- 2008 Noise Exposure Contour - (55 to 60 DNL)
- 2008 Noise Exposure Contour - (65 to 75 DNL)
- Residential
- Noise-Sensitive Institutions
- School
- Water
- Non Noise-Sensitive Land Use

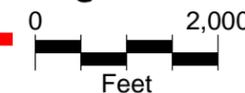


North

South

Source: Prepared by Coffman Associates.

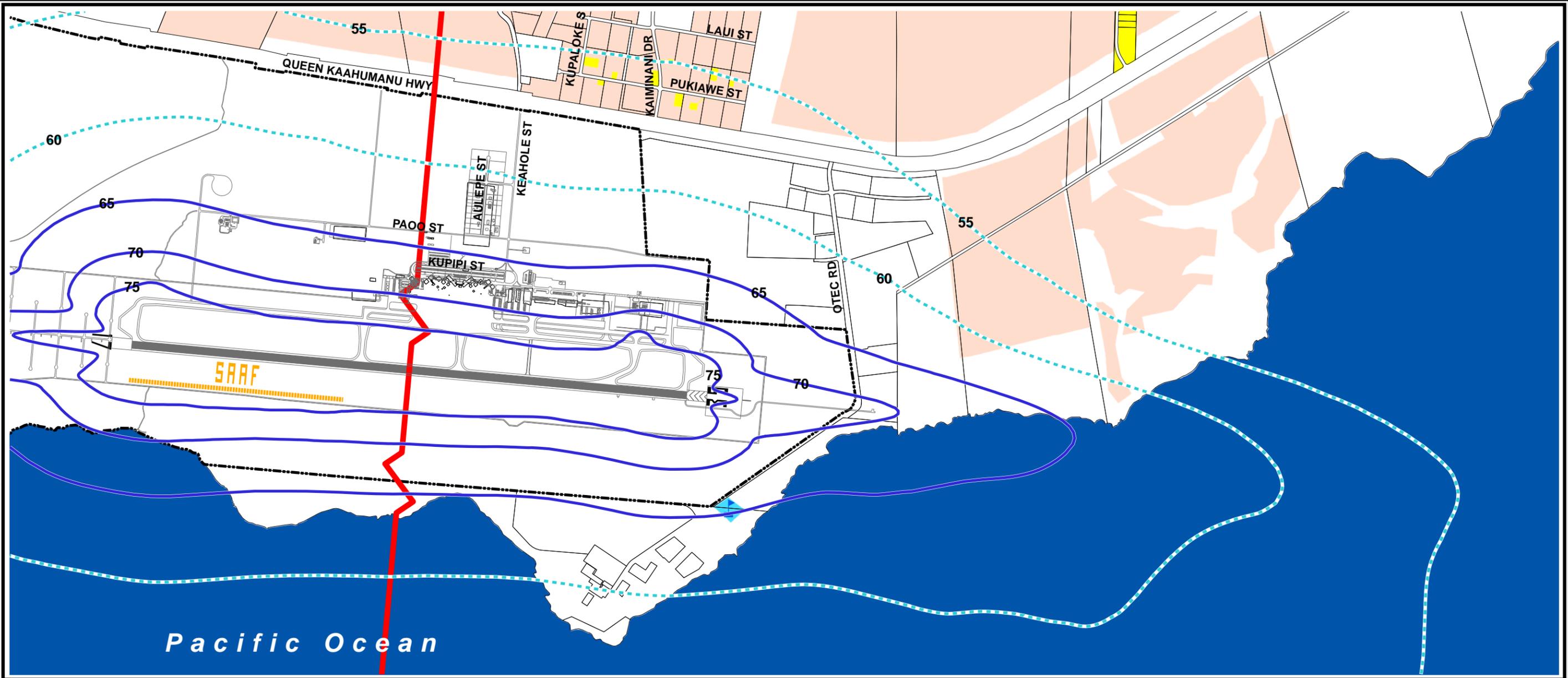
Note: Contours pending final Master Plan airfield concept.



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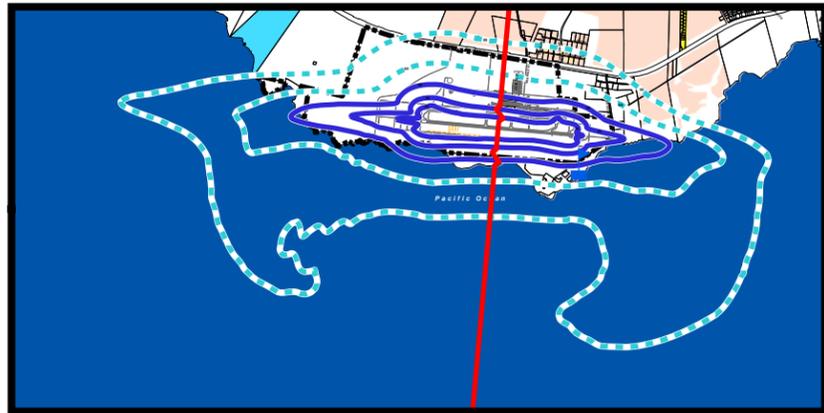


06MPO6-7D-06/19/09



**LEGEND**

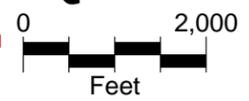
- Airport Property
- Short Austere Airfield (SAAF)
- 2013 Noise Exposure Contour - (55 to 60 DNL)
- 2013 Noise Exposure Contour - (65 to 75 DNL)
- Residential
- Noise-Sensitive Institutions
- School
- Water
- Growth Risk Areas
- Non Noise-Sensitive Land Use



North South

Source: Prepared by Coffman Associates..

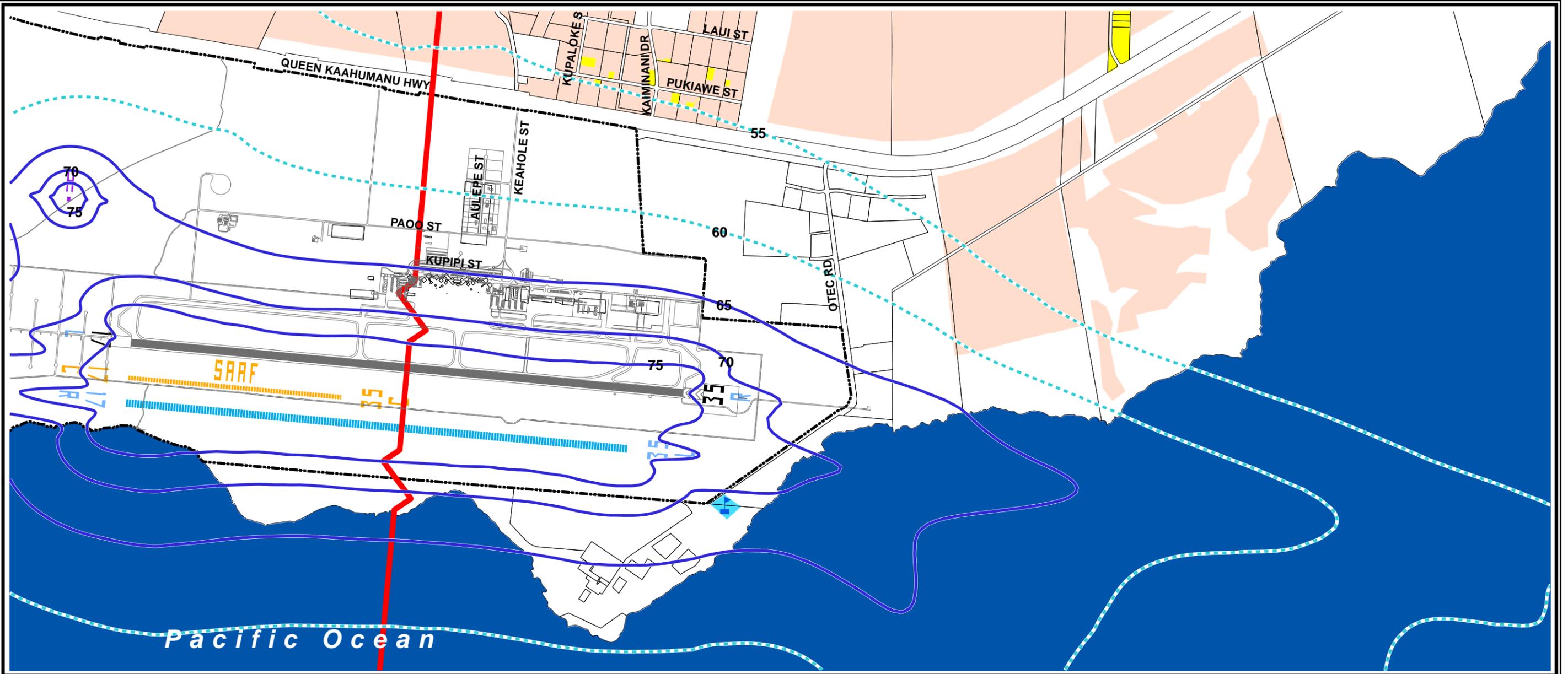
Note: Contours pending final Master Plan airfield concept.



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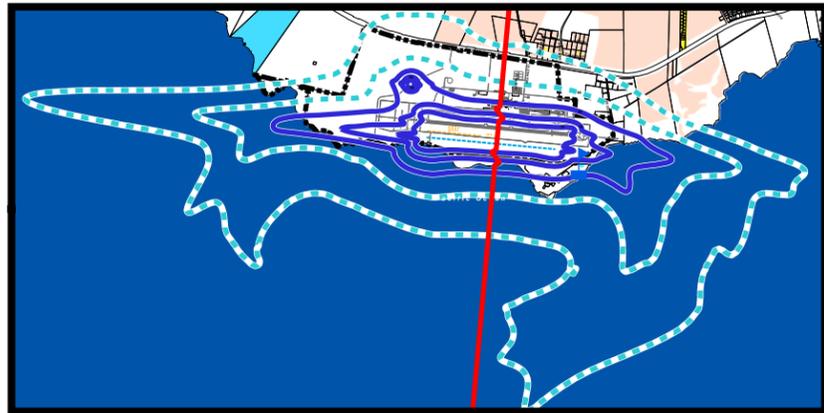


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**LEGEND**

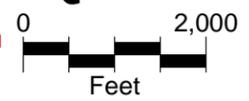
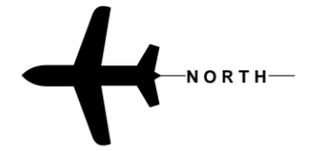
- Airport Property
- Short Austere Airfield (SAAF)
- Ultimate Runways
- Long Range Noise Exposure Contour - (55 to 60 DNL)
- Long Range Noise Exposure Contour - (65 to 75 DNL)
- Residential
- Noise-Sensitive Institutions
- School
- Water
- Growth Risk Areas
- Non Noise-Sensitive Land Use



North South

Source: Prepared by Coffman Associates.

Note: Contours pending final Master Plan airfield concept.



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# **ENVIRONMENTAL ASSESSMENT**

## **West Hawai‘i Explorations Academy Relocation**

### **APPENDIX 4**

#### **The Spirit, Sense and Place of Hawaiian Culture**

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## DRAFT Executive Summary 2/28/11

West Hawaii Explorations Academy  
Stakeholder Charrette February 2011

# *The Spirit, Sense and Place of Hawaiian Culture*

## *Malama Aina*

“Take care of the land and in turn the land will provide for all of our needs.”

*Olelo Noeau – Hawaiian proverb  
A WHEA High School Project*

West Hawaii Explorations Academy (WHEA) is situated in *pahoehoe* fields within the *ahupuaa* of Kalaoa, on the North Kona Coast of Hawaii Island adjacent to Kalaoa-Ooma *ahupuaa*. This area is also known as the Kekaha land area of Hawaii Island known for its arid environment. *Mauka* from WHEA lies the *Wao Akua*, realm of the gods and home to Ooma’s fragile native forest. WHEA is on ceded lands and are tenants of the Natural Energy Laboratory of Hawaii (NELHA). Largely sheltered from the predominant trade winds by Mauna Loa, Mauna Kea and Hualalai nearby Keahole Point, otherwise known as Ka-La-O-Keahole (Fisherman’s Point) is known for the strong sea breeze from the south named *Eka* and its strong ocean current. Neighboring “landmarks” include Wawaloli Beach and Pine Trees – a popular surf spot. The native flower *maiapilo*, is WHEA’s school flower chosen for its grace, beauty, strength, adaptability, and resilience to thrive in harsh conditions. WHEA reflects the *maiapilo* in myriad ways.

This theme of reflection and mirroring was repeated throughout the charrette and alludes to the relationship between the school, its objectives, educational framework and approach to learning, and the Hawaiian values, ideals and observed structures inherent in the total environmental and social context the school resides within. The purpose of this executive summary is to simply mirror what was experienced and heard from WHEA’s stakeholders in the charrette.

Hawaiian culture has a central place in WHEA life. This is especially relevant within the school’s place-based, project-based curriculum as noted through the values and belief systems expressed and demonstrated by students, their parents, faculty, spouses of faculty, grandparents of students, *kupuna* or elders, board members and other key stakeholders throughout the charrette. In a regularly practiced and integrated way, these Hawaiian values and practices such as, *aloha, ohana, lokahi, kuhao, laulima, kokua, hookipa, naauao, malama aina, aloha kai*,<sup>1</sup> etc. have allowed WHEA to flourish under seemingly adverse conditions, and like the *maiapilo*, go beyond mere survival to

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<sup>1</sup> aloha (love, charity), ohana (family), lokahi (unity), kuhao self-reliance), laulima (cooperation), kokua (service, help), hookipa (hospitality), naauao (learned, enlightened), aloha kai (love and care for the sea).

ultimately thrive interdependently within its chosen environment with grace and robustness.

Co-executive directors Heather Nakakura and Curtis Muraoka made a point of saying, “WHEA is more Hawaiian culture-oriented than most folks know.” As best exemplified by our traditional kupuna, WHEA doesn’t waste time talking about Hawaiian values and principles, they just “do”!

Economy is valued in words and actions, and anticipated to be demonstrated in the planning, design and building of the school’s new campus, including the selection of building materials, which should as much as possible come from the Hawaiian aina and be sustainably harvested or produced within Hawaii. While this is an ideal to work towards, it’s acknowledged that resources may be limited in the Islands. Whether locally produced or obtained from off-island sources, the goal will be to utilize environmentally appropriate materials.

WHEA appears to follow the basic elements of indigenous community-based economic development, which focuses on creating sustained abundance, self-sufficiency and wellness through malama aina – *caring for the land and sea in an enlightened way*. Malama aina embraces the core values and principles expressed by WHEA in many ways that are associated with indigenous economic development including environmental balance, cultural integrity, spirituality, vision, personal efficacy, responsibilities and consequences, vibrant initiatives, social respect, political and civic participation, control of assets, kinship, productivity, skills, health and wellness, trade and exchange, and income.

Malama aina was practiced by the Hawaiian ancestors throughout everyday life in the ancient ahupuaa system. Through the ahupuaa and malama aina, the ancestors were able to create sustained abundance and self-sufficiency in all ways. By employing the ahupuaa model, WHEA aspires to bridge the past and present including all planning and design considerations, operational programs, facilities management, resource management, building materials etc. with incorporating science and technology that is culturally appropriate, as well as *pono* or proper and beneficial for Hawaii’s aina and community.

### ***The Ahupuaa Model***

WHEA’s new master plan and campus design is based upon the values, principles, beliefs and some of the traditional ecological knowledge (TEK) and practices associated with life within an ahupuaa as reflected in their project based curriculum i.e. food gardens, medicinal gardens, *hee* or squid tank, *mano* or shark tank, *opihi* tank, etc. By definition, the ahupuaa is a land division usually extending from the uplands to the sea, so called because the boundary was marked by an *ahu* (alter) of stones surmounted by an image of a *puaa* (pig). – *The Hawaiian dictionary, Mary Kawena Pukui and Samuel Elbert.*

The puaa represents *Lono*, the Hawaiian god of agriculture, fertility and healing. Lono was visible at WHEA in his various *kino lau* or forms such as the *kukui* tree (representing

the earth) and the *humuhumunukunukuapuaa* (representing the sea), illustrating the school's belief, "As above, so below." This Hawaiian belief is also found throughout many ancient world civilizations and reflects and mirrors WHEA's recognition of the relationship between the earth, the sea and the sky (see WHEA school symbols for the earth, sea and sky).

Stakeholders identified these five Hawaiian values and principles exemplified through the ahupuaa model as key to implement within WHEA's new master plan and campus design: 1) sustained and renewable resources; 2) self-sufficiency; 3) interdependence; 4) reciprocity; and 5) resilience. These values and principles were recognized as vital to insure WHEA's overall well-being, productivity, longevity and positive orientation towards the future, including upholding their *kuleana*<sup>2</sup> throughout the ahupuaa, Hawaii Island, Hawaii and their global community. In essence, these five values and principles can be described as *lokahi* (see *Lokahi Triangle model*).

Within the traditional ahupuaa system, employing the spiritual values and practices associated with *malama aina* and *lokahi* were essential in traditional resource management practices to maintain a healthy ecological balance within the *aina* – which includes the land, sea and sky. In turn, the ahupuaa supplied all of the everyday household needs required in creating a vibrant social and economic environment for communities to thrive in an on-going closed sustainable system. By emulating the ahupuaa model, WHEA feels they will eventually achieve self-sufficiency.

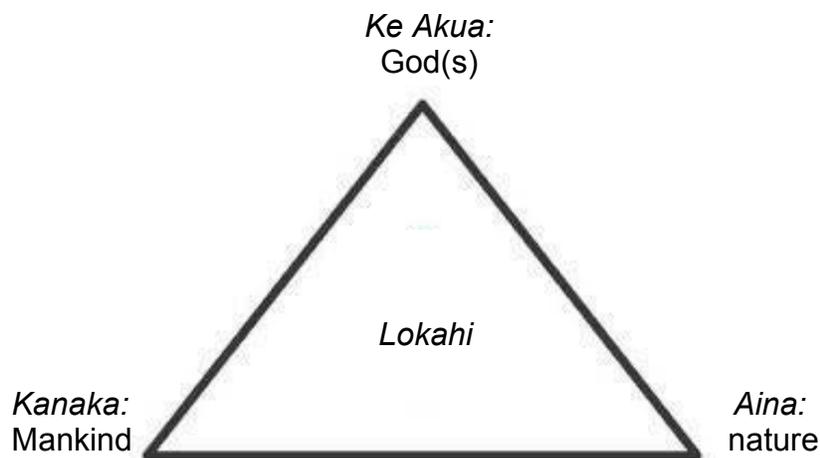
WHEA envisions their future campus to serve as a center/social hub for community life within the ahupuaa, which means opening their doors beyond normal school hours. This vision is reflected in their wish-list and requirements for facilities that are adaptable, flexible, simple, replicable and energy independent to fit any given project or situation i.e. terrain, climate and weather – like structures in old Hawaii. It also points towards the need to have facilities, which can serve multiple purposes such as classrooms, assemblies, performing arts, graduations, market-places etc. like *halau* – a longhouse. WHEA would also like to have the capacity to supply both campus and community needs, including and not limited to year-round food gardens (food security), and cutting plants (plumeria and heliconia were specifically mentioned) for events such as graduation. In addition, they spoke of having a certified kitchen and café to serve campus needs and the public. This vision addresses the relevance of connective corridors, trails and pathways in relation to WHEA site within the ahupuaa.

Just as WHEA's values, principles and practices are reflected in their buildings, they are equally present in the campus landscape. The landscape tells the story of WHEA and their connection to the *aina*, their place within the ahupuaa and their relationship to community. Trails and pathways serve as connective corridors throughout the campus, and may also "branch" to include the nearby Mamalahoa Trail and Ala Kahakai Trail. There is a central water feature running from *mauka* to *makai*, which may be looked upon as the *Waters of Kane*. Some stakeholders felt that the central water feature was akin to the *kuamoo*, spine or backbone in relation to WHEA's position in the community.

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<sup>2</sup> *kuleana*: right, privilege, concern, responsibility, title, business, property, estate, portion, jurisdiction, authority, liability, interest, claim, ownership, tenure, affair, province; reason, cause, function, justification; small piece of property, as within an ahupuaa. Hawaiian Dictionary: Pukui and Elbert.

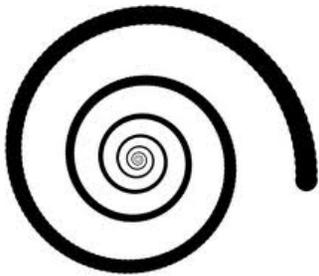
## ***Lokahi Triangle***



### ***Lokahi***

Lokahi literally means “unity, agreement and harmony” and may be depicted using the model called the “Lokahi Triangle.” This value describes the interdependence between *Ke Akua*/the spiritual realm, *ke kanaka* and the *aina* that is necessary to creating healthy relationships and self-sufficiency. Perhaps lokahi best portrays WHEA’s epistemology and place-based approach in designing project-based curriculum. The schools’ projects include Aloha Kai, Shark Lagoon, Malama Aina, Cold Water Agriculture, School Gardens, Vog Project, and a Galaxy Garden to name a few.

These PBL projects designed by students fundamentally represent lokahi and demonstrate WHEA’s deep respect and commitment to care for the earth, the sea and the sky as shown in the school’s symbols of the native *hapuu* fern (earth), the nautilus (sea) and the galaxy (sky) as depicted in their website.



If one looks carefully at all three symbols, a pattern resembling a “sacred spiral” or *piko*<sup>3</sup> emerges. From a Hawaiian worldview, the piko represents WHEA’s connectivity to the Hawaiian aina as their source of nourishment and life, and their place within the universal web of life. It also represents the *moolelo* and the kuamoo – backbone/spine connecting past, present and future generations.

### ***Aina and Moolelo: stories, traditions, history and accounts***

The physical aina provides sustenance for our bodies. It also distinguishes our ancestral homelands. Knowing the moolelo of one’s aina and birthplace including stories, legends, historical accounts, *wahi pana* (celebrated areas), landmarks, names of the winds, rains, mountains, bodies of water, flora, fauna, etc. is an essential part of Hawaiians’ understanding of the aina and gives one a sense of connection and belonging. It is equally important to understand the moolelo of one’s adopted homeland and workplace – where one spends most of their productive hours for the same reasons.

Having working knowledge of the moolelo from the ahupuaa will influence and enhance the design of WHEA’s new campus and assist towards their ability to achieve self-sufficiency through having this intimate knowledge of their home. Aside from briefly acknowledging the remnants of ancient fishing villages, archeological sites, Ooma’s native forest, a guardian honu and perhaps *mano* or shark, and a side discussion about

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<sup>3</sup> Navel, navel string, umbilical cord

the winds, there was very little discussion of moolelo throughout the charrette. It would serve to better inform the design of the campus grounds and facilities if further research is placed towards tracing the moolelo from the area.

For instance, Keahole Point is known for the fishpond of Paiea, Kamehameha I. As earlier shared, the area is also known for Eka, a strong sea breeze. Neighboring Wawaloli Beach is named for Wawaloli, a demigod who changed from a *loli* or sea cucumber into a man to seduce girls who visited his seashore home. WHEA expressed a desire to become more familiar with the moolelo of Kalao and Ooma, and identified persons within the school and community that would make excellent candidates for oral history interviews.

### ***The Aina: Marine and Flora Life***

#### Native Marine Life

WHEA school projects features many native species including the mano, sea horse, opihi, humuhumunukunukuapuaa and many more. It was mentioned that every year there is a student hee project. At the end of each school year, the marine life is released back into their native habitats.

#### Native Flora

A partial list of native flora of the Ooma Forest, as described by an instructor includes: *hapuu, mamake, amau, kolea* and *lehua*.

WHEA's present campus includes the following native flora: *aalii, kookoolau, ilima, ki, loulu, naupaka, niu, kukui, ohai, kalo uala, pauohiaka, lauwae, maia, hala, halapepe, akia, mao, nau, mao hau hele, and nanea*. According to a board member, *kaunaoa* also grows on the coastline.

Native plants seen growing in the pahoehoe fields in between fountain grass from the "platform" overlooking WHEA's new campus include: *maiapilo, noni, ilima* and *uhaloa*.

The native plants seen on the site, as well as, natives of the present campus and hardy candidates from throughout the ahupuaa should be used in creating the landscape surrounding the buildings. Careful selection of native planting material will support the ahupuaa design concept, and reinforce the connection to aina, culture and moolelo.

\*The above should not be construed as a complete plant inventory.

## **Conclusion**

Bridging the past, present and future in creating the spirit, feel, and design of WHEA's new campus while embracing Hawaii's spiritual, cultural and physical landscape is imperative to WHEA stakeholders, and a bench-mark for the school to achieve sustainability in a way that is linked to their core values, beliefs and practices.

Based upon the ancient ahupuaa - a healthy model of community social and economic stability, WHEA aspires to achieve self-sufficiency for the school and community while continuing to integrate the Hawaiian values, principles, beliefs and practices that compliment their day-to-day operations and informs their project-based curriculum. These values, principles, practices and belief systems should also inform the spatial relations, landscape, facilities and architecture of their campus and facilities. WHEA believes this foundation will lead them towards their vision of serving as a world-class model for education, sustainability, and community-building which can be replicated anywhere, while emulating the vastly successful aspects of the ancient ahupuaa system.

### **Summary of Opportunities Identified for Planning and Design:**

- Employ WHEA values and goals as it relates to Hawaiian culture and elements of indigenous community-based economic development found within the traditional ahupuaa model towards building a sustainable campus, operational programs, project based curriculum and resource management practices e.g. sustained and renewable resources, self-sufficiency, interdependence, reciprocity and resilience.
- Identify moolelo relevant to the planning and the design of the new campus, including the selection of building materials. For example, having knowledge of the wahi pana, geography, wind, rains, flora, fauna and marine life in the area.
- Identify traditional ecological knowledge relevant to the planning, design, architecture and building of the new campus. This has the opportunity to influence the selection of building materials, which should as much as possible come from the Hawaiian aina and be sustainably harvested or produced within Hawaii. While this is an ideal to work towards, it's acknowledged that resources may be limited in the Islands. Whether locally produced or obtained from off-island sources, the goal will be to utilize environmentally appropriate materials.
- Employ WHEA's identified schools symbols such as maiapilo, hapuu, nautilus, and galaxy and further identify and understand other "symbols" important to WHEA. Is it acceptable to incorporate the piko as a design element for instance?
- Use project-based curriculum i.e. Aloha Kai and shark tank, and on-going projects such as food gardens (food security was an identified priority) and cold water nurseries to inform planning and design in relation to the ahupuaa "from mountains to sea" model. Planning considerations range to include spiritual

aspects to engineering, to design, to ongoing cultural resource management practices.

- Examine “wish-list” to inform planning and design in relation to the ahupuaa model i.e. a halau/open space that can also be sheltered for school assemblies, performance arts, and graduation ceremonies etc. This includes having “cutting gardens” for lei, performances etc. In addition to the halau, requirements for facilities require adaptability, flexibility and simplicity and must also be replicable and energy independent to fit any given project or situation i.e. terrain, climate and weather – like structures in old Hawaii.

A market-place for produce and student wares (created from the garden), exhibit areas for student projects, a certified kitchen and a café were also on the list. Also, WHEA expressed the wish for their campus to become a hub for community activity outside of school hours. Consider how these sites fit within the ahupuaa model, especially in relation to connective corridors, trails and pathways.

- Utilize native plants that are seen on site or within the ahupuaa to provide landscape around the buildings and connection to the aina and moolelo.

#### ***Recommendations for Further Research:***

- Conduct a charrette focused on Hawaiian values, cultural practices, moolelo and traditional ecological knowledge as it relates to planning and design for WHEA’s new campus. For example, stakeholders expressed the need to have more Hawaiian culture visible in the design, facilities and landscape in their new campus. Note: Logene, Butter and Alika (Butter’s son and a WHEA student) among many others that expressed this sentiment away from the larger group charrette.
- Conduct research to gather moolelo from the area. Identify lineal descendents of the area and conduct oral history interviews to gather local moolelo, which can inform the planning, design, architecture, and outdoor areas including trails and pathways. A better understanding of the archeology in the area will also serve towards this goal.

This knowledge will enhance WHEA’s ability to develop a sustainable campus and operational programs. In addition, it will also serve to inform project-based curriculum which has the potential to further assist WHEA towards their goal to achieve self-sufficiency, including social and economic development goals.

- Identify traditional ecological knowledge relevant towards the planning, design, architecture and outdoor areas, including trails and pathways. For example, the use of *makaloa* for waste treatment.

Just as with identifying the moolelo from the area, knowledge of TEK will enhance WHEA’s ability to develop a sustainable campus and operational programs. In addition, it will also serve to inform project-based curriculum, which

has the potential to further assist WHEA towards their goal to achieve self-sufficiency, including social and economic development goals.

- Identify sources of building materials from the aina such as concrete aggregates and natural stone, and locally produced materials with recycled content. Identify local building materials that are sustainably harvested, as well as certified. Whether locally produced or obtained from off-island sources, the goal will be to find and utilize environmentally appropriate materials.
- Investigate other “symbols” i.e. colors, forms, and metaphors etc. that upholds WHEA’s vision, mission, curriculum and might contribute towards their long-range goals to achieve self-sufficiency.
- Conduct a comprehensive survey and inventory of native flora and fauna.
- Conduct a comprehensive survey of the mauka-makai trail systems in the ahupuaa, which intersect with the WHEA campus.

Note: Hawaiian diacriticals were purposely not used in this document in deference of traditional Hawaiian language. Throughout this document Hawaiian words are italicized when they were first introduced and exclude place names or names of persons.

*Disclaimer: The purpose of this executive summary is to simply mirror what was experienced and heard from WHEA’s stakeholders in the charrette. By no means can this summary be construed as a comprehensive cultural report, which might include more in depth investigation of moolelo, archeology, plant inventory, fauna inventory and other studies that would be found in an Environment Impact Assessment.*

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**ENVIRONMENTAL ASSESSMENT**

**West Hawai'i Explorations Academy Relocation**

**APPENDIX 5**

**Traffic Impact Assessment Report**

## Phillip Rowell and Associates

47-273 'D' Hui Iwa Street

Kaneohe, Hawaii 96744

Phone: (808) 239-8206

FAX: (808) 239-4175

Email: [prowell@hawiiantel.net](mailto:prowell@hawiiantel.net)

July 18, 2011

West Hawaii Explorations Academy  
73-4460 Queen Kaahumanu Highway, #105  
Kailua-Kona, HI 96740

Attn: Mr. Ken Melrose

Re: **Traffic Impact Assessment Report for the  
Relocation of West Hawaii Explorations Academy (WHEA)  
Kailua-Kona, Hawaii**

Dear Mr. Melrose:

Phillip Rowell and Associates have completed the following Traffic Impact Assessment Report (TIAR) for the proposed relocation of WHEA. The report is presented in the following format:

- A. Project Location and Description
- B. Purpose and Objective of Study
- C. Study Approach
- D. Description of Existing Streets and Intersection Controls
- E. Existing Peak Hour Traffic Volumes
- F. Level-of-Service Concept
- G. Background Traffic Projections
- H. Project Trip Generation
- I. Background Plus Project Projections
- J. Traffic Impact Assessment
- K. Mitigation
- L. Left Turn Storage Lane Requirements

### **A. Project Location and Description**

The proposed action is the relocation of the West Hawaii Explorations Academy (WHEA) from its temporary shoreline relocation to a permanent campus with facilities that would accommodate expansion of the school from 195 to 300 students. The existing and proposed locations are on NELHA property.

The proposed relocation of WHEA is scheduled for 2013. Widening of Queen Kaahumanu Highway is scheduled to be completed by 2015. There will be an interim access and egress scenario for 2013 to 2015. During this time, access and egress will be via OTEC Road which is the existing NELHA access road. Currently, all traffic movements at the intersection of OTEC Road at Queen Kaahumanu Highway are allowed. At some point during the construction period, use of this intersection will be restricted to right turn to and right turns from OTEC Road.

Access to and egress from the school site will be via a driveway along the west side of a road west of and parallel to Queen Kaahumanu Highway. This road is currently referred to as Secondary Road A.

When widening of Queen Kaahumanu Highway is completed in 2015, access to and egress from the school at the intersection of Queen Kaahumanu Highway at OTEC will be limited to right turns into and right turns out of OTEC Road. Traffic from the south will use the intersection of Kaahumanu Highway at Kaiminani Drive. Traffic may make a U-turn or use Roads A and B, which will be new roads connecting the intersection of Queen Kaahumanu Highway at Kaimi Nani Drive with NELHA.

[Attachment A](#) is a copy of the project site plan and [Attachment B](#) is a schematic drawing of the future (2015) traffic circulation plan.

## **B. Purpose and Objective of Study**

1. Quantify and describe the traffic related characteristics of the proposed project.
2. Assess the intersection of OTEC Road at Secondary Road A to determine the traffic requirements to operate at acceptable levels-of-service during the interim period (2013 to 2015) and upon completion of the Queen Kaahumanu Highway widening (2015), with and without Roads A and B.

## **C. Study Approach**

1. *Define the Study Area*

The first step in defining the study area was to estimate the number of peak hour trips that the proposed project will generate. It was estimated that the project will generate 141 trips during the morning peak hour and 87 trips during the afternoon peak hour. This implies that the scope of the traffic assessment could be limited to an Small Development:Traffic Impact Assessment” as described by the Institute of Transportation Engineers<sup>1</sup>. Accordingly, the traffic impact assessment is limited to the intersection of OTEC Road at Secondary Road A.

Both the existing and proposed locations of WHEA are within the NELHA property. Therefore, traffic impacts will be limited to intersections and roadways within NELHA as any changes in traffic patterns associated with WHEA are within NELHA and will have no impacts on traffic conditions along Queen Kaahumanu Highway. Traffic associated with WHEA would be included in existing traffic counts along Queen Kaahumanu Highway and included in the traffic projections that are part of the Traffic Study for NELHA<sup>2</sup>.

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<sup>1</sup> Institute of Transportation Engineers, *Transportation and Land Development*, 2002, Washington, D.C., page 3-6

<sup>2</sup> PB Americas, *Traffic Study Natural Energy Laboratory of Hawaii Authority*, April 2011

## 2. *Analyze Existing Traffic Conditions*

Existing traffic volumes along Queen Kaahumanu Highway were obtained from manual traffic counts and previous traffic studies. Traffic counts were performed during 2010 and 2011. The existing intersection were analyzed using the level-of-service analysis as described in the *Highway Capacity Manual*.

## 3. *Estimate Horizon Year Background Traffic Projections*

Background traffic conditions are defined as future traffic conditions without the proposed project. The design horizon year does not necessarily represent the project completion date of the project. It is a date for which future background traffic projections were estimated. For this project, we have used a design, or horizon, year of 2015. Horizon year background traffic conditions were obtained from the NELHA Traffic Study.

## 4. *Estimate Project-Related Traffic Characteristics*

The number peak-hour trips that the proposed project will generate was estimated using standard trip generation procedures outlined in the *Trip Generation Handbook*<sup>3</sup> and data provided in *Trip Generation*<sup>4</sup>. These trips were distributed and assigned based on approach and departure patterns used in previous traffic studies for projects in the area.

## 5. *Analyze Project Related Traffic Impacts*

The project-related traffic was then superimposed on background traffic volumes. A level-of-service analysis was performed using the methodology described in the *Highway Capacity Manual*<sup>5</sup> to quantify traffic operating conditions. The purpose of this analysis was to confirm that the intersection of OTEC Road at Secondary Road A will accommodate projected traffic volumes at acceptable levels-of-service.

## **D. Description of Existing Streets and Intersection Controls**

Queen Kaahumanu Highway is located along the east side of NELHA and has a north-south orientation and is the major highway along the west side of the Island of Hawaii. Adjacent to NELHA, Queen Kaahumanu Highway is a two-lane highway with limited access. The posted speed limit is 45 miles per hour. State of Hawaii Department of Transportation currently has plans to widen this section of the highway to four lanes. Construction is imminent with completion scheduled for 2015.

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<sup>3</sup> *Trip Generation Handbook*, Institute of Transportation Engineers, Washington, D.C., 1998

<sup>4</sup> *Trip Generation*, Institute of Transportation Engineers, Washington, D.C., 2003

<sup>5</sup> Transportation Research Board, *Highway Capacity Manual*, 2000, Washington, D.C.

Kaiminani Drive is a two-lane, east-west collector road connecting Queen Kaahumanu Highway with Mamalahoa Highway, which is located mauka of Queen Kaahumanu Highway. The posted speed limit is 25 miles per hour.

The intersection of Queen Kaahumanu Highway at Kaiminani Drive is a signalized T-intersection. A separate left turn lane is provided for southbound to eastbound left turns from Queen Kaahumanu Highway and a separate right turn and deceleration lane is provided for northbound to eastbound right turns. Left turns from Queen Kaahumanu Highway are protected. The westbound approach of Kaiminani Drive to Queen Kaahumanu Highway has one left turn lane and one right turn lane.

OPEC Road provides access to and egress from NELHA from Queen Kaahumanu Highway. OPEC Road is a two-lane running the length of the NELHA property makai (west) of Queen Kaahumanu Highway. The posted speed limit is 25 miles per hour. The connection with Queen Kaahumanu Highway is gated and is closed from 8:00 PM to 6:00 AM.

The intersection of Queen Kaahumanu Highway at OPEC Road is an unsignalized T-intersection. A separate left turn lane and separate right turn lane is provided for turns from Queen Kaahumanu Highway into NELHA.

Immediately past the gate on OPEC Road is the intersection of OPEC with Secondary Road A. The plan for the future NELHA indicates that this road will be renamed Road D and Road C. Road C is the north leg of the intersection and Road D is the south leg. Road D is currently closed. Road D currently provides access to the visitors center and the solar farm, which are located along the east side of Road D between Road D and Queen Kaahumanu Highway. WHEA will be located along the west side of Road D across from the solar farm. Both roads are two-lanes wide.

The intersection of OPEC Road with Road C and Road D is an unsignalized, four-legged intersection. OPEC Road is the major roadway.

#### **E. Existing Peak Hour Traffic Volumes**

Existing peak hour traffic volumes for the intersection of Queen Kaahumanu Highway at Kaiminani Drive and Queen Kaahumanu Highway at OPEC Road were obtained from the NELHA traffic study. These counts are summarized on [Attachment C](#).

The traffic counts include buses, trucks and other large vehicles. Mopeds and bicycles are not included. Pedestrian activity was negligible.

#### **F. Level-of-Service Concept**

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in [Table 1](#). In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. *Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.*<sup>6</sup>

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

**Table 1 Level-of-Service Definitions for Signalized Intersections<sup>(1)</sup>**

Level of Service	Interpretation	Volume-to-Capacity Ratio <sup>(2)</sup>	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:  
 (1) Source: *Highway Capacity Manual*, 2000.  
 (2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. [Table 2](#) summarizes the definitions for level-of-service and the corresponding delay.

<sup>6</sup> Institute of Transportation Engineers, *Transportation Impact Analyses for Site Development: A Recommended Practice*, 2006, page 60

**Table 2 Level-of-Service Definitions for Unsignalized Intersections<sup>(1)</sup>**

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:

(1) Source: *Highway Capacity Manual*, 2000.

(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

## G. Background Traffic Projections

Background traffic projections are defined as future background traffic conditions without the proposed project. The estimated 2015 background traffic projections for 2015 were obtained from the NELHA traffic study and are shown in [Attachment D](#). These projections include background growth, traffic generated by future development and roadway improvement projects, including estimated traffic generated by future NELHA development.

## H. Project Trip Generation

Future traffic volumes generated by a project are typically estimated using the methodology described in the *Trip Generation Handbook*<sup>7</sup> and data provided in *Trip Generation*<sup>8</sup>. This method uses trip generation equations and rates to estimate the number of trips that the project will generate during the peak hours of the project and along the adjacent street.

Trip generation does not provide trip generation data for a school with grades 7 through 12. Instead, Trip generation provides separate trip generation data for intermediate schools (grades 7 through 9) and high school (grades 9 through 12). For the trip generation analysis, it was assumed that there will be 130 intermediate school students and 170 high school students.

The trip generation analysis is summarized in [Table 3](#). The trips shown are the peak hourly trips generated by the project. The morning peak hour of project generated traffic typically coincides with the peak hour of the adjacent street. The afternoon peak hour of the project is around 2:30 PM. Which is earlier than the afternoon peak hour of the street. As shown, the project will generate 139 trips during the morning peak hour, 86 inbound and 53 outbound. During the afternoon peak hour, the project will generate 87 inbound and 33 outbound trips for a total of 54 trips.

<sup>7</sup> Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

<sup>8</sup> Institute of Transportation Engineers, *Trip Generation, 7<sup>th</sup> Edition*, Washington, D.C., 2003

**Table 3 Trip Generation Analysis**

Period & Direction		Intermediate School			High School			Total Trips
		Trips per Student or Percent	Students	Trips	Trips per Student or Percent	Students	Trips	
AM	Total	0.53	130	69	0.41	170	70	139
Peak	Inbound	55%		38	69%		48	86
Hour	Outbound	45%		31	31%		22	53
PM	Total	0.30		39	0.28		48	87
Peak	Inbound	45%		18	32%		15	33
Hour	Outbound	55%		21	68%		33	54

Project trips were distributed and assigned based on traffic approach and departure patterns of estimated from the traffic patterns provided in the NELHA traffic study. Based on this count the approach and departure patterns are:

<u>To/ From</u>	<u>Percent AM</u>	<u>Percent PM</u>
North via Queen Kaahumanu Highway	45	55
East via Kaimi Nani Drive	10	<u>15</u>
South via Queen Kaahumanu Highway	45	30
TOTAL	100	100

The resulting project trip assignments are shown in [Attachment D](#). Project trips assignments are shown for two scenarios, Scenario A and Scenario B. Scenario A represents traffic conditions with Road A and Road B. This is the plan represented in the NELHA Traffic Study. Scenario B represents traffic conditions without Road A and Road B. This plan represents interim conditions that would exist after Queen Kaahumanu Highway has been widened and Roads A and B have not yet been constructed.

**I. Background Plus Project Projections**

Background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the background (without project) peak hour traffic projections for both scenarios. This assumes that the peak hourly trips generated by the project coincide with the peak hour of the adjacent street. This represents a worse-case condition as it assumes that the peak hours of all the intersection approaches and the peak hour of the study project coincide. The resulting background plus project peak hour traffic projections are shown in [Attachment D](#).

## J. Traffic Impact Assessment

A level-of-service analysis was performed for “with project” conditions to confirm that the intersection will operate at an acceptable level-of-service and that there are no traffic operational deficiencies. A level-of-service analysis was not performed for “without project” conditions because traffic volumes without project traffic is negligible. The level-of-service analysis would estimate the delays to be zero.

The level-of-service analysis was performed for an unsignalized, T-intersection. All approaches were assumed to be one lane with no separate turn lanes.

The results of the level-of-service analysis are summarized in [Table 5](#). Shown are the average vehicle delays and the levels-of-service of the controlled lane groups. Delays and levels-of-service are not calculated for uncontrolled movements. The analysis concluded that all controlled traffic movements will operate at Level-of-Service A, which implies good operating conditions and minimal delays.

**Table 5 2015 Levels-of-Service - OTEC Road at Secondary Road A**

Approach and Movement	With Roads A and B				Without Roads A and B			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Westbound Left & Thru	4.0	A	3.7	A	2.3	A	1.7	A
Northbound Left & Right	9.7	A	9.5	A	9.2	A	9.9	A

**NOTES:**

1. Peak hour conditions analyzed are “worst-case” conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. Delay is in seconds per vehicle.
3. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.
4. See [Attachment E](#) for Level-of-Service Calculation Worksheets.

## K. Mitigation

Level-of-Service D is generally considered to be the minimum acceptable peak hour level-of-service for urban intersections.<sup>9</sup> As all controlled traffic movements will operate at Level-of-Service A, no mitigation is recommended.

<sup>9</sup> Institute of Traffic Engineers *Transportation Impact Analyses for Site Development, A Recommended Practice*, Washington, D.C., 2006, p 60.

## **L. Left Turn Storage Lane Requirements**

An assessment of the need for a separate left turn lane for traffic turning into the project was performed using guidelines published by the Transportation Resource Board<sup>10</sup>. The assessment is presented as [Attachment F](#). If the plotted intersection of the approaching volumes and the opposing volume falls above and right of the percentage of left turns, then a separate left turn lane should be considered. As previously noted, the posted speed limit along OTEC Road in the vicinity is 25 miles per hour. This implies that the design speed is 35 miles per hour. Since there is no graph for 35 miles per hour, the assessment was performed using the graphs for 40 miles per hour, which is the lowest speed limit that graphs were provided for. The assessment determined that a separate left turn lane was not warranted during either peak period. Accordingly, based on the findings of an accepted standard, a separate left turn lane is not recommended.

## **M. Summary and Conclusions**

1. The proposed action is the relocation of the West Hawaii Explorations Academy (WHEA) from its temporary shoreline relocation to a permanent campus with facilities that would accommodate expansion of the school from 195 to 300 students. The existing and proposed locations are on NELHA property.
2. The TIAR is limited to the intersection of OTEC Road at Secondary Road A. All the remaining intersections were analyzed in the NELHA Traffic Study that was completed April 2011. The study report implied that traffic associated with WHEA is included in the traffic projections for the remaining intersections serving NELHA. The NELHA Traffic Study did not include the intersection of OTEC Road at Secondary Road A, which is the roadway serving the future location of WHEA. The purpose of this TIAR is to assess the intersection of OTEC Road at Secondary Road A to confirm that there will be no traffic operational deficiencies.
3. The NELHA Traffic Study concluded that the intersection of Queen Kaahumanu Highway at Kaimi Nani Road and Road A will operate at Level-of-Service D during the morning peak hour and Level-of-Service C during the morning peak hour<sup>11</sup>. The study also concluded that all movements at the intersection of OTEC Road at Road B will operate at Level-of-Service A and that all movements at the intersection of Queen Kaahumanu Highway at OTEC Road are uncontrolled, and therefore free flow.
4. Due to the project schedule, a trip generation study of the existing school campus could not be performed since the school had recessed for the summer. Therefore, the trip generation analysis is based on trip generation data contained in *Trip Generation* published by the Institute of Transportation Engineers. Based on Institute of Transportation Engineers trip generation data, it is estimated that the project will generate 141 trips during the morning peak hour, 86 inbound and 55 outbound. During the afternoon peak hour, the project will

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<sup>10</sup> Transportation Resource Board, NCHRP Report 457, *Evaluating Intersection Improvements: An Engineering Study Guide*, 2001, Washington, D.C. p21-22

<sup>11</sup> PB Americas, Inc., *Traffic Study for Natural Energy Laboratory of Hawaii Authority*, April 2011, p 31.

generate 87 inbound and 33 outbound trips for a total of 54 trips. It is recommended that a morning and afternoon peak hour generation study be performed to confirm the trip generation estimates used in this TIAR.

5. When widening of Queen Kaahumanu Highway is completed in 2015, access to and egress from the school at the intersection of Queen Kaahumanu Highway at OTEC will be limited to right turns into and right turns out of OTEC Road. Traffic from the south will use the intersection of Kaahumanu Highway at Kaiminani Drive. Traffic may make a U-turn or use Roads A and B, which will be new roads connecting the intersection of Queen Kaahumanu Highway at Kaimi Nani Drive with NELHA. However, the construction of Roads A and B may not be completed until after the widening of Queen Kaahumanu Highway is completed, which means that all traffic will use the intersection of Queen Kaahumanu Highway at OTEC Road. Therefore, 2015 traffic projections were prepared for conditions with and without Roads A and B.
6. The level-of-service analysis determined that the traffic movements of the intersection of OTEC Road at Secondary Road A will operate at Level-of-Service A, which implies minimal delays and good operating conditions, with or without Roads A and B.
7. An assessment of the need for a separate left turn lane for vehicles turning left into the project from OTEC Road determined that established guidelines for the need are not satisfied for either morning or afternoon peak hour conditions.

Respectfully submitted,  
**PHILLIP ROWELL AND ASSOCIATES**



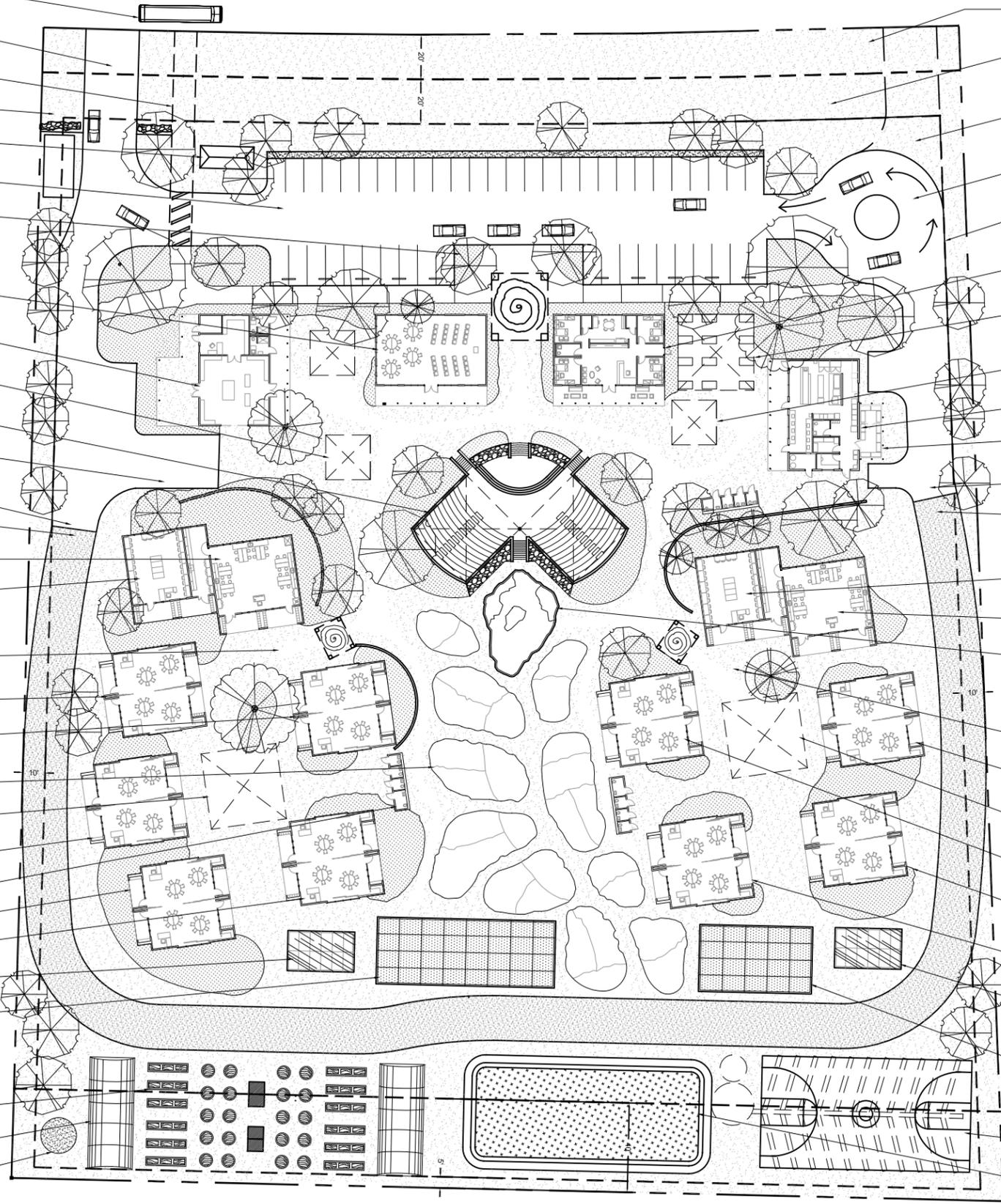
Phillip J. Rowell, P.E.  
Principal

## **List of Attachments**

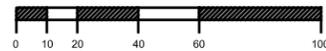
- A. Project Site Plan
- B. Schematic Drawing of Future Traffic Circulation Plan
- C. Existing Peak Hour Traffic Volumes
- D. Project Trip Assignments and 2015 Peak Hour Traffic Projections
- E. Level-of-Service Calculation Worksheets
- F. Guidelines for Determining the Need for a Left Turn Storage Lane at Two-Way Stop Controlled Intersections

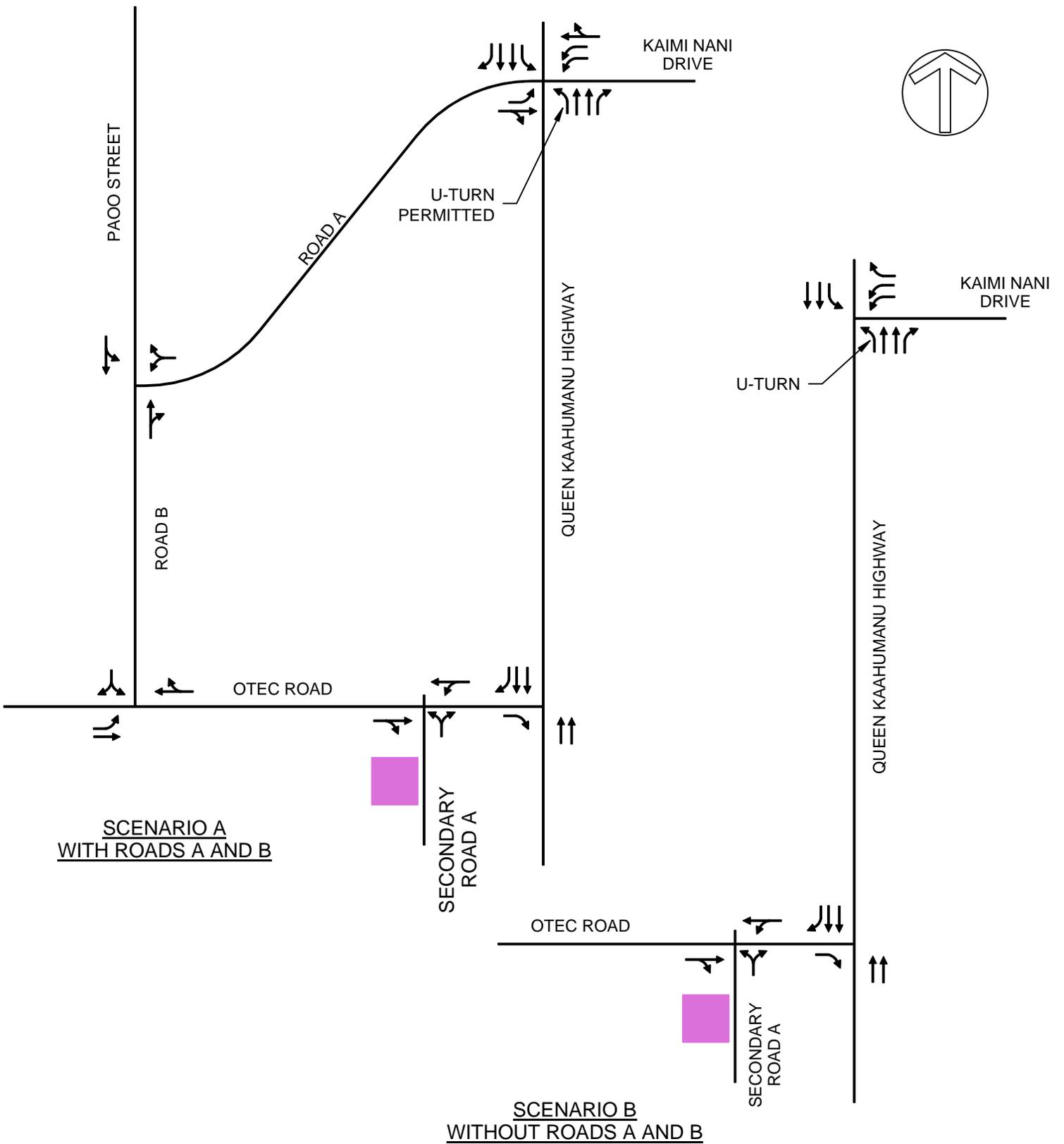
Attachment A  
Project Site Plan

BUS DROP-OFF & PICK UP  
 ENTRY  
 SEAWATER CORRIDOR  
 UTILITY CORRIDOR  
 WAITING AREA  
 PARKING  
 PICK-UP AND DROP-OFF  
 MULTI-PURPOSE / CLASSROOM  
 STEM CLASSROOM AND SHOP  
 HALAU  
 COVERED 350 SEAT AMPHITHEATRE  
 LOADING  
 PAVED ROADWAY  
 FIRE LANE  
 WET LAB  
 COMPUTER LAB  
 HIGH SCHOOL VILLAGE  
 CLASS 1  
 CLASS 2  
 STUDENT PROJECTS  
 34' X 34' TENT  
 CLASS 3  
 REST ROOMS  
 CLASS 4  
 CLASS 5  
 GREENHOUSE  
 SHADECLOTH STRUCTURE  
 AQUACULTURE  
 QUONSET TENT  
 SALTWATER DRY WELL

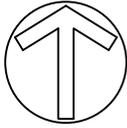


FUTURE FRONTAGE ROAD  
 FUTURE SEAWATER CORRIDOR  
 FUTURE DRIVEWAY  
 TURNABOUT  
 YARD SETBACK  
 ADMINISTRATION  
 34' X 34' TENT FOR COVERED DINING  
 HALAU TENT  
 KITCHEN / MICROWAVE SERVERY  
 FUTURE WALK-IN FREEZERS  
 PAVED ROADWAY  
 FIRE LANE  
 COMPUTER LAB  
 WET LAB  
 SHARK/REEF TANK  
 MIDDLE SCHOOL VILLAGE  
 CLASS 2  
 34' X 34' TENT  
 CLASS 1  
 CLASS 3  
 CLASS 4  
 GREENHOUSE  
 SHADECLOTH STRUCTURE  
 PLAYCOURT  
 BIOLOGICAL WASTE TREATMENT

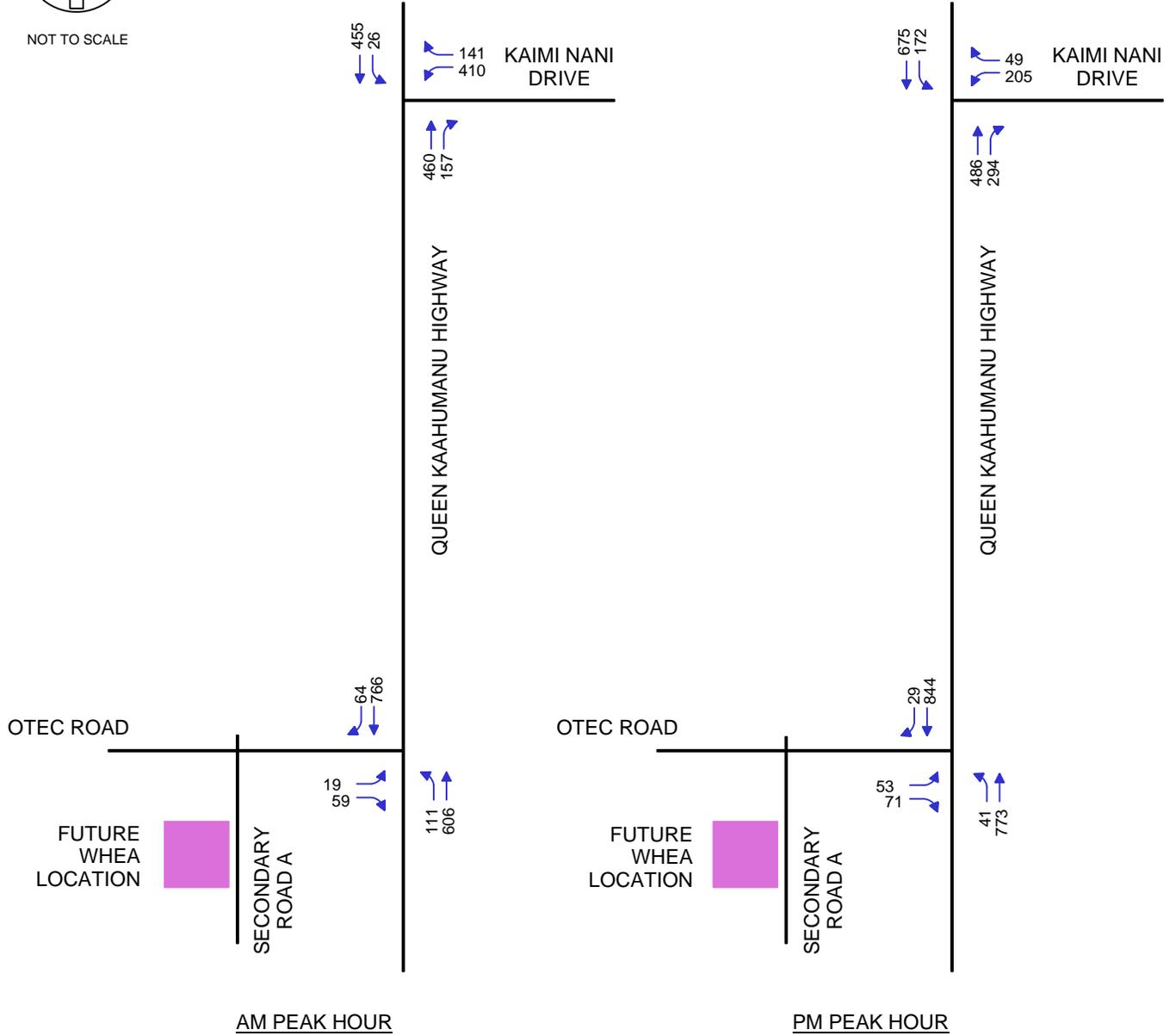




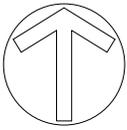
Attachment B  
 SCHEMATIC DRAWING OF FUTURE TRAFFIC  
 CURCULATION PLANS



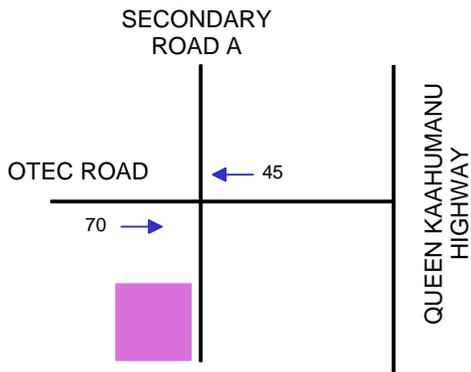
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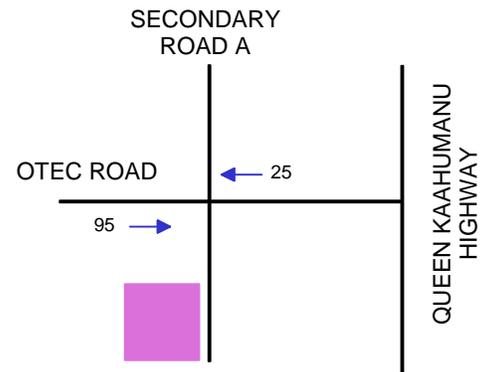
Attachment C  
EXISTING PEAK HOUR TRAFFIC VOLUMES



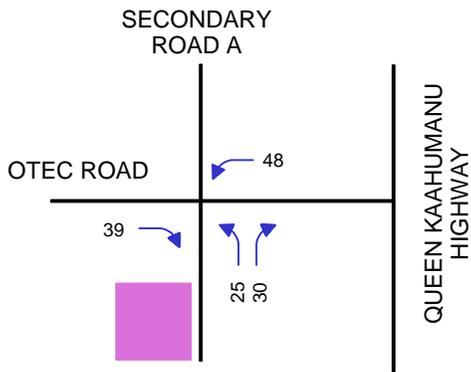
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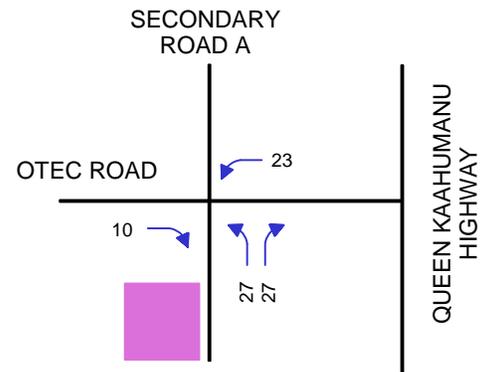
2015 AM PEAK HOUR  
BACKGROUND PROJECTIONS



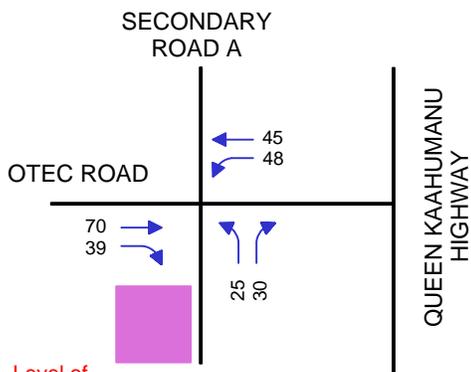
2015 PM PEAK HOUR  
BACKGROUND PROJECTIONS



AM PEAK HOUR  
TRIP ASSIGNMENTS

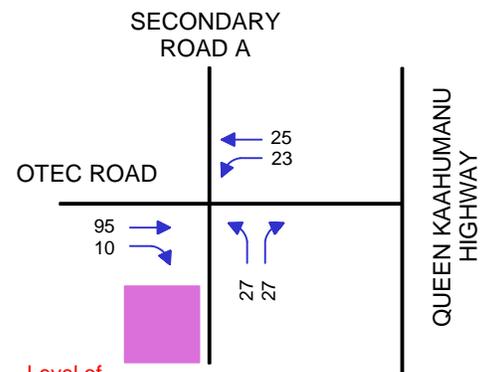


PM PEAK HOUR  
TRIP ASSIGNMENTS



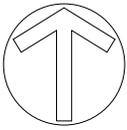
2015 AM PEAK HOUR  
BACKGROUND PLUS  
PROJECT PROJECTIONS

Approach & Mvt.	Delay	Level of Service
WB Lt & Th	4.0	A
NB Lt & Rt	9.7	A

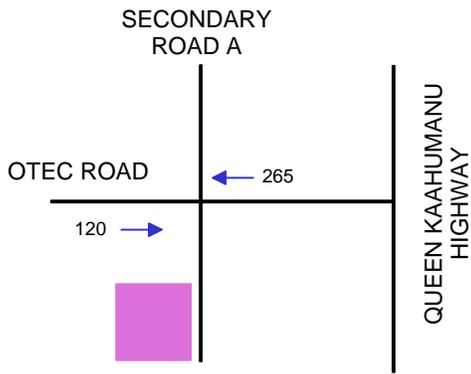


2015 PM PEAK HOUR  
BACKGROUND PLUS  
PROJECT PROJECTIONS

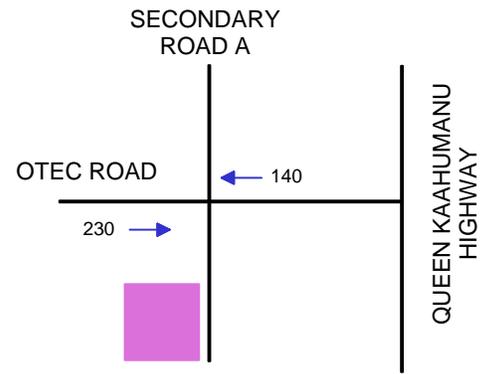
Approach & Mvt.	Delay	Level of Service
WB Lt & Th	3.7	A
NB Lt & Rt	9.5	A



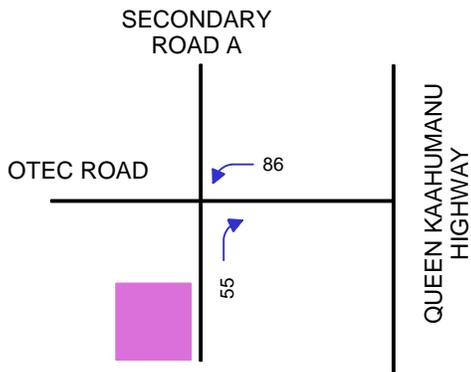
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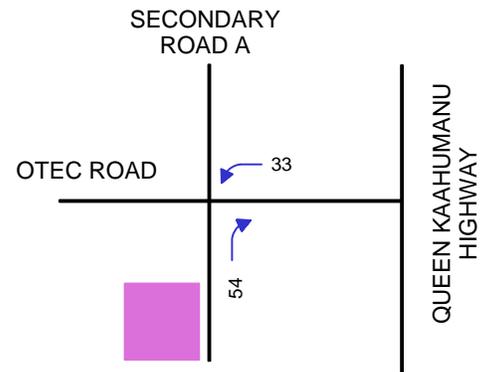
2015 AM PEAK HOUR  
BACKGROUND PROJECTIONS



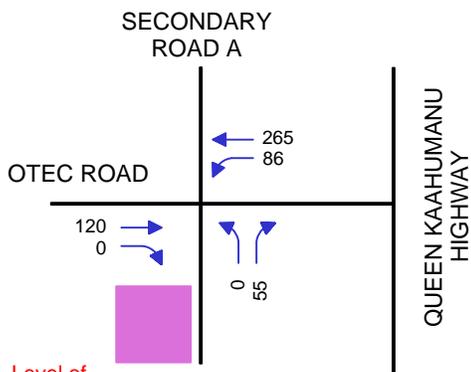
2015 PM PEAK HOUR  
BACKGROUND PROJECTIONS



AM PEAK HOUR  
TRIP ASSIGNMENTS

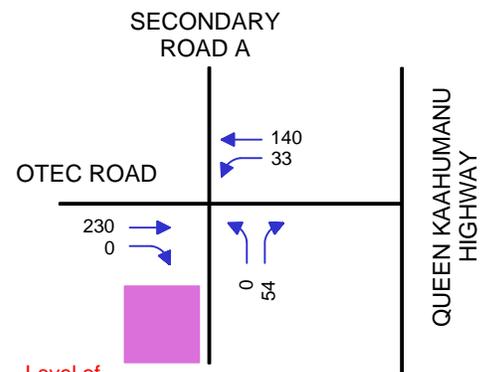


PM PEAK HOUR  
TRIP ASSIGNMENTS



2015 AM PEAK HOUR  
BACKGROUND PLUS  
PROJECT PROJECTIONS

<u>Approach &amp; Mvt.</u>	<u>Delay</u>	<u>Level of Service</u>
WB Lt & Th	2.3	A
NB Lt & Rt	9.2	A



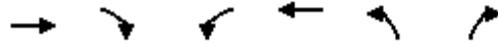
2015 PM PEAK HOUR  
BACKGROUND PLUS  
PROJECT PROJECTIONS

<u>Approach &amp; Mvt.</u>	<u>Delay</u>	<u>Level of Service</u>
WB Lt & Th	1.7	A
NB Lt & Rt	9.9	A

Attachment E  
Level-of-Service Calculation Worksheets

HCM Unsignalized Intersection Capacity Analysis  
 1: OTEC ROAD & SECONDARY ROAD A

7/14/2011



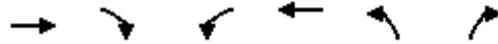
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	70	39	47	45	24	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	42	51	49	26	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				796		
pX, platoon unblocked						
vC, conflicting volume			118		248	97
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			118		248	97
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		96	97
cM capacity (veh/h)			1470		714	959

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	118	100	58
Volume Left	0	51	26
Volume Right	42	0	32
cSH	1700	1470	830
Volume to Capacity	0.07	0.03	0.07
Queue Length 95th (ft)	0	3	6
Control Delay (s)	0.0	4.0	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	4.0	9.7
Approach LOS			A

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization	21.6%		ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis  
 1: OTEC ROAD & SECONDARY ROAD A

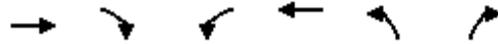
7/8/2011



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	95	10	23	25	27	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	11	25	27	29	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				796		
pX, platoon unblocked						
vC, conflicting volume			114		186	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		186	109
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	97
cM capacity (veh/h)			1475		790	945
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>			
Volume Total	114	52	59			
Volume Left	0	25	29			
Volume Right	11	0	29			
cSH	1700	1475	860			
Volume to Capacity	0.07	0.02	0.07			
Queue Length 95th (ft)	0	1	5			
Control Delay (s)	0.0	3.7	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.7	9.5			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			3.3			
Intersection Capacity Utilization		19.3%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 1: OTEC ROAD & SECONDARY ROAD A

7/18/2011



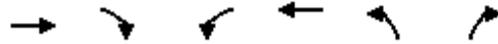
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	120	0	86	265	0	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	0	93	288	0	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				796		
pX, platoon unblocked						
vC, conflicting volume			130		605	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			130		605	130
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		100	94
cM capacity (veh/h)			1455		431	919

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	130	382	58
Volume Left	0	93	0
Volume Right	0	0	58
cSH	1700	1455	919
Volume to Capacity	0.08	0.06	0.06
Queue Length 95th (ft)	0	5	5
Control Delay (s)	0.0	2.3	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	2.3	9.2
Approach LOS			A

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization	35.4%		ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis  
 1: OTEC ROAD & SECONDARY ROAD A

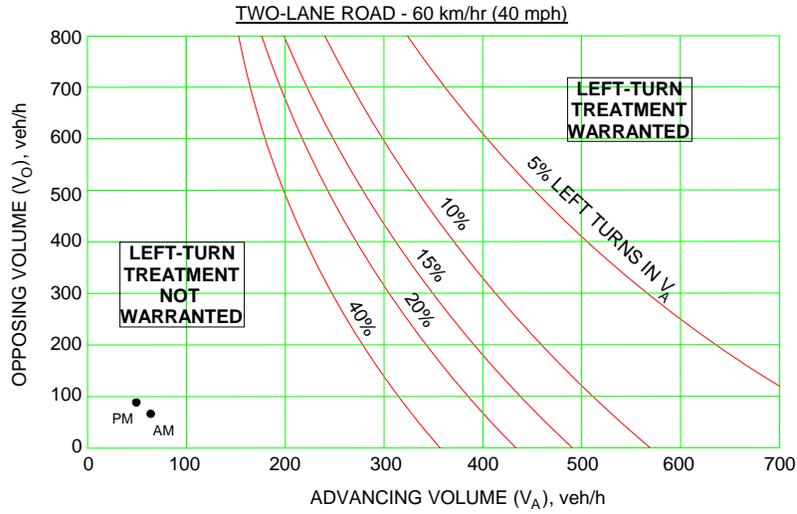
7/18/2011



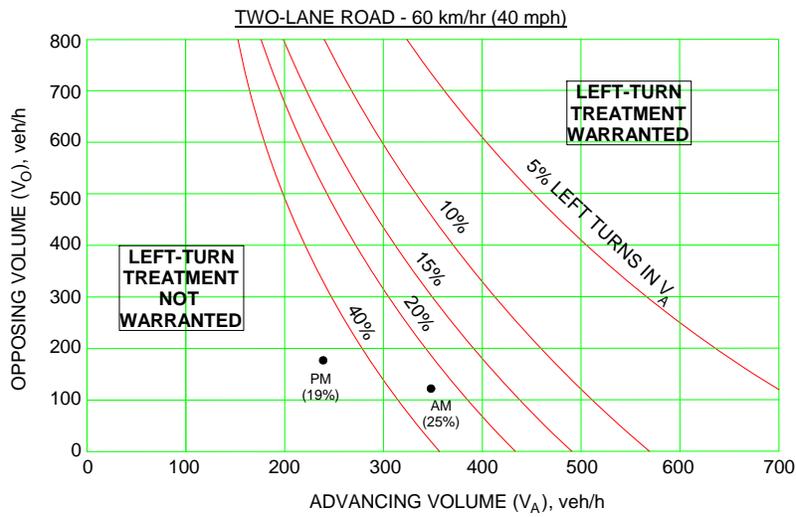
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	230	0	33	140	0	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	250	0	36	152	0	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)				796		
pX, platoon unblocked						
vC, conflicting volume			250		474	250
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			250		474	250
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	93
cM capacity (veh/h)			1316		534	789

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	250	188	59
Volume Left	0	36	0
Volume Right	0	0	59
cSH	1700	1316	789
Volume to Capacity	0.15	0.03	0.07
Queue Length 95th (ft)	0	2	6
Control Delay (s)	0.0	1.7	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	1.7	9.9
Approach LOS			A

Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)		15	



**SCENARIO A  
WITH ROAD A AND ROAD B**



**SCENARIO B  
WITHOUT ROAD A AND ROAD B**

Source: NCHRP Report 457  
Evaluating Intersection Improvements: An Engineering Study Guide  
2001, page 22

Attachment F  
GUIDELINES FOR DETERMINING THE NEED FOR  
A MAJOR ROAD LEFT-TURN BAY AT A TWO-WAY STOP CONTROLLED INTERSECTION